BUILDING MAINTENANCE PLAN

For

Alpha Elementary School
123 Imaginary Lane
Nowhereville, MD 99999

Initial BMP: 8/3/00
1st Return Visit BMP: 12/10/02
2nd Return Visit BMP: 9/3/04

Phone: 301-555-3256 Fax: 301-555-1807

Principal: Jane Doeville
Building Service Manager: John McDoe

School No. 7256

INTRODUCTION

Montgomery County Public Schools (MCPS) is committed to addressing indoor environmental problems relating to air quality. A major component of this commitment is the establishment of an IAQ Preventive Maintenance Team. This Team will help to achieve MCPS indoor air quality goals, which are:

> *To achieve, maintain, and where necessary, to restore an indoor air quality environment in which everyone in a Montgomery County Public Schools (MCPS) facility can perform the necessary tasks of learning, teaching, administering, and sustaining facilities in a safe and healthy manner.*

The measures utilized by the team to improve air quality will rely on proactive steps to improve building maintenance and training of staff, rather than responding to complaints. The existing complaint and response process has been retained to ensure that IAQ problems that may arise are handled efficiently and effectively.

Another primary effort of the Team is the initial creation of a building maintenance plan (BMP) specific to this school. This plan is equivalent to a user manual for an automobile. It contains all the necessary routine maintenance schedules, maintenance routines, logs of work orders and repairs, as well as other relevant records. As such, it is a living document that is tailored to the maintenance of the school.

This following BMP is specific for Alpha Elementary School and is designed to be utilized as a tool with the building service manager as the focal user of the tool. Other staff and outside users are expected to contribute to the ongoing growth and accuracy of this living document to ensure its success.

This document, along with the building service procedures manual and the accompanying EPA Tools for Schools kit, are key instruments in maintaining conditions at Alpha Elementary School which would greatly reduce the incidence and severity of indoor air quality concerns. It also provides guidance in addressing issues as they may arise for quick and successful resolution for minimum impact on our primary task of the success of the students and staff of Alpha Elementary School to their full potential.

If you have any questions regarding this living document, its use, or any other environmental and/or safety issues, please do not hesitate to contact your environmental safety coordinator at 301-926-4317.

Thank you,

Richard Hawes, Director
Department of Facilities Management

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SECTION 1 GENERAL BUILDING INFORMATION

This section provides general information on building systems and personnel, and on the building itself.

BUILDING DESCRIPTION

Alpha Elementary is a split-level, slab-on-grade facility containing 30 classrooms, a multi-purpose room, gym, IMC, administrative offices, two resource rooms, one math lab, one speech room, and two reading initiative rooms.

Substantial additions and/or modernizations to the original building (opened 1965) occurred in 1992.

Most of the roof is built-up asphalt. Some areas of the roof are pitched shingled.

BUILDING INFORMATION

Grades served:	K-5
Enrollment (2004):	650
School Capacity:	678
Original Construction:	1965
Last Modernization:	1992
Site Size:	9.9 acres
Square Footage:	68,755

HVAC SYSTEM DESCRIPTION

Two gas-fired low-pressure fire tube type boilers heat the building. The two-pipe-system distributes heater water to unit ventilators/fan coil units located in classrooms and offices. The temperature of the main heating loop for the building is controlled by Energy Management. Classroom temperature is controlled by individual thermostats. The pneumatic air station located in the boiler room sends a supply pressure of (15 psi in winter and 20 psi in summer) to all thermostats for proper operation.

The kindergarten rooms K1 and K2 have individual air handlers. Energy Management controls the kindergarten temperature by operating the 3-way valve for the air handler. The administrative offices, health room, media center, and computer lab have roof-top units for heating and cooling. Those units are controlled by Energy Management.

Building-wide cooling is by an air cooled chiller except for DX cooling in the following zones: 1, 3, 4, 6, 7, & 8. The chilled water is distributed to each classroom unit ventilator/fan coil unit.

Ventilation air is connected to the Andover Energy Management System that controls the starting/stopping of the HVAC systems at the beginning and end of each occupancy period. The HVAC equipment is operated from the thermostat controls within the building during the occupied period. Roof-top units and air handlers are controlled by energy management.

Relocatable Classroom Log

Room Number	Mfr. Serial Number	MCPS Serial Number	Manufacture	Age (yrs)	Leased/ Owned
NONE	NONE	NONE	NONE		

Major Recent Renovations

No major renovations have been completed at Alpha Elementary since FY-97.

BUILDING SERVICE PERSONNEL INFORMATION

School:_____ Principal's Phone #:_____

Building Service Manager _____ Phone #: _____

Building Service Leader _____ Phone #: _____

Plant Equipment Operator _____ Phone #: _____

Building Service Supervisor _____ Phone #: _____

BUILDING SERVICE STAFF ASSIGNMENTS

	FIRST SHIFT	SECOND SHIFT	SPECIAL SHIFT
Working Hours	_____	_____	_____
Number Of Staff	_____	_____	_____

Name	Phone Number	Shift	Training*

*1 = Asbestos Awareness, 2 = Right-to-Know Law, 3 = Basic Training, 4 = Boiler Operation, 5 = Plant Equipment Operation, 6 = Refresher, 7 = Air Conditioning, 8 = Supervisory and Leadership Skills, 9 = Sexual Harassment, and 10 = Bloodborne Pathogens

LOCATION OF EMERGENCY EQUIPMENT AND CUT-OFF CHART

The attached color-coded floor plan according to the key below should show the locations of fire extinguishers, emergency generator, main cut-off valves and switches, for each facility should be posted in the building service manager's office and in the boiler room. Anyone with access to the chart should be able to respond to a problem involving any of the identified items quickly and effectively.

EMERGENCY CUT OFF CHART

\+ = Main Water Location

\# = Fire Extinguishers

< = Generator

> = Main Electric

= = Natural Gas Cut-Off

/ = Main Oil Line

In actual BMPs, a floor plan is inserted here with emergency equipment/cut-off locations.

SECTION 2 SUPPLY VENTILATION UNITS

This section provides specific information on the ventilation systems regarding their type, brand, location, and preventative maintenance routine. These routines are schedules of tasks to be performed by building service and maintenance staff to ensure proper operation and cleanliness as the first step in a healthful learning environment.

*These records are for each piece of ventilation equipment and are to be utilized by any and all personnel who may perform maintenance on this equipment.

SUPPLY VENTILATION UNITS
TYPE, BRAND, LOCATION, PREVENTIVE MAINTENANCE (PM) ROUTINES

The spreadsheet on the following page allows you to cross-reference the appropriate preventative maintenance routine for each type of supply ventilation unit in this facility.

Supply Ventilation Equipment – Preventive Maintenance								
Building: Alpha ES Date of Assessment: June 2004								
Unit Location	**Area/Zone Served**	**Unit Type**	**Brand**	**Model**	**Serial No.**	**Direct Drive**	**Belt**	**PM Routine**
Under window	Staff lounge	Unit ventilator	Nelson Aire	FE126B	T67Ax	Yes		1
Under window	IMC Office	Unit ventilator	Engineered Air	VUV-16	RV255	Yes		1
Mechanical Room #1	IMC	AHU	Engineered Air	AHU-8		Yes		2
Under window	Kitchen	Fan coil unit	Nelson Aire	FE125C	P88Tv	Yes		1
Under window	Principal's Office	Unit ventilator	Trane	FCBB06055	V99H990	Yes		1
Roof penthouse	APR	AHU	York	K3ET9900	NHT67888	No	4L380	2
Under window	Room 1	Unit ventilator	Engineered Air	VUV-16	RV255	Yes		1
Under window	Room 2	Unit ventilator	Engineered Air	VUV-16	RV255	Yes		1
Under window	Room 3	Unit ventilator	Engineered Air	VUV-16	RV255	Yes		1
Under window	Room 4	Unit ventilator	Engineered Air	VUV-16	RV255	Yes		1
Under window	Room 5	Unit ventilator	Engineered Air	VUV-16	RV255	Yes		1
Under window	Room 6	Unit ventilator	Engineered Air	VUV-16	RV255	Yes		1
Under window	Room 7	Unit ventilator	Engineered Air	VUV-16	RV255	Yes		1
Under window	Room 8	Unit ventilator	Engineered Air	VUV-16	RV255	Yes		1

The number of supply ventilation units at MCPS schools is variable, ranging from less than 20 to over 200.

SUPPLY UNIT PREVENTIVE MAINTENANCE ROUTINE #1
(Unit ventilators, Fan coil units)

RESPONSIBILITY	TASK	Every Month	Every 3 Months	Every 6 Months	Every Return Visit
BSM	Check filter condition	X			
BSM	Check and clear area in front of intake grill	X			
BSM	Change filter. Verify thermostat guard is in place. Check for pneumatic and water leaks. Check damper operation		X		
BSM	Replace filter, remove debris, vacuum and wipe interior (including coils), clean accessible side of coil, clean and sanitize pan, oil bearings, check thermostat operation, oil motor if needed, check valve operation, flush condensate line with clean water, check water valve for exterior leakage			X	
Maintenance	Check damper calibrations, calibrate thermostats, inspect electrical connections, blow out condensate lines			As Needed	
IEQ Team	Check damper calibrations, calibrate thermostats, inspect electrical connections, blow out condensate lines				X

SUPPLY UNIT PREVENTIVE MAINTENANCE ROUTINE #2
(Portable classroom units, heat pumps, central air handling units, rooftop units)

RESPONSIBILITY	TASK	Every Month	Every 3 Months	Every 6 Months	Every Return Visit
BSM or PEO	Check filter condition	X			
BSM or PEO	Change filter.		X		
BSM or PEO	Vacuum interior of unit			X	
Maintenance	Check damper calibrations, calibrate thermostats, inspect electrical connections			As Needed	
IEQ Team	Check damper calibrations, calibrate thermostats, inspect electrical connections				X

SUPPLY UNIT PREVENTIVE MAINTENANCE ROUTINE #4
(Condensers)

RESPONSIBILITY	TASK	Every Month	Every 3 Months	Every 6 Months	Every Return Visit
IEQ Team	Remove corrosion from unit surfaces and repaint. Inspect refrigerant piping and fittings for leaks. Check fan assemblies for loose sheaves, excessive end play, abnormal vibration and noise. Determine if lubrication of fan bearings is needed; lubricate with proper material (e.g. non-detergent SAE 30 oil, grease, etc.) Do not over lubricate. Chemically clean coil and straighten coil fins. Inspect control panel and disconnect wiring to ensure all connections are tight, insulation is intact, and that no water damage is evident. Remove accumulated dust and dirt from control panel. Check unit operating pressures, super heat and subcooling. Record readings on work sheet in this section.				X

SUPPLY UNIT PREVENTIVE MAINTENANCE ROUTINE #5
(Baseboard heaters)

RESPONSIBILITY	TASK	Every Month	Every 3 Months	Every 6 Months	Every Return Visit
BSM or PEO	Vacuum fins and visually inspect connections and housing for damage	X			
IEQ Team	Check thermostat operation/calibration				X

LOCK-OUT/TAG-OUT OF SUPPLY VENTILATION UNITS

The following steps need to be completed when servicing air handlers. This is to remove sources of energy, which may cause harm if accidentally released during servicing. This procedure is called "Lock-Out/Tag-Out": It must be performed in accordance with a written Hazardous Energy Control Program.

1. Identify circuit breaker that supplies unit to be de-energized.
2. Flip breaker to the off position.
3. Verify that no power is present at the unit. Flip switch at unit on and off and verify unit is off; check line voltage incase power is supplied by secondary source.
4. After it has been verified that no power is present at the unit, place appropriate lock on breaker. Secure breaker lock with padlock. Key for padlock must be kept with individual working on unit. Place label on breaker lock indicating who has key to lock.
5. To energize unit, turn unit switch to off position. Verify that all tools, etc. have been removed from unit and mechanisms are secure
6. Unlock breaker padlock and remove breaker lock.
7. Flip breaker to on position.
8. Turn unit switch to on position and verify it is operating correctly

The spread sheet on the following page lists circuit breaker locations for supply ventilation units.

Supply Ventilation Equipment – Electrical Lock-Out/Tag-out						
Building: Alpha ES Date of Assessment: June 2004						
ALWAYS RE-VERIFY BREAKER INFORMATION BEFORE WORKING ON UNITS!						
Unit Location	**Area/Zone Served**	**Unit Type**	**Voltage**	**Breaker Panel**	**Panel Location**	**Breaker**
Under window	Staff lounge	Unit ventilator	115	H	Boiler Room	20
Under window	IMC Office	Unit ventilator	115	E3	Hall across art room	12
Mechanical Room #1	IMC	AHU	480 3ph	E3	Hall across art room	31,33,35
Under window	Kitchen	Fan coil unit	115	K	Hall across kitchen	18
Under window	Principal's Office	Unit ventilator	115	H	Boiler Room	26
Roof penthouse	APR	AHU	480 3ph	E1	Closet across room 5	16,18,20
Under window	Room 1	Unit ventilator	115	MDP	Closet by BSM office	15
Under window	Room 2	Unit ventilator	115	MDP	Closet by BSM office	15
Under window	Room 3	Unit ventilator	115	MDP	Closet by BSM office	10
Under window	Room 4	Unit ventilator	115	MDP	Closet by BSM office	10
Under window	Room 5	Unit ventilator	115	MDP	Closet by BSM office	12
Under window	Room 6	Unit ventilator	115	T5	Closet by room 9	6
Under window	Room 7	Unit ventilator	115	T5	Closet by room 9	6
Under window	Room 8	Unit ventilator	115	L6	Boiler Room	10

The number of supply ventilation units at MCPS schools is variable, ranging from less than 20 to over 200.

AIR FILTERS and THERMOSTATS

The spreadsheet on the following page lists air filters used for each supply unit.

Supply Ventilation Equipment – Air Filters and Thermostats							
Building: Alpha ES Date of Assessment: June 2004							
Unit Location	**Area/Zone Served**	**Unit Type**	**Brand**	**Filter Size (in.)**	**Filter Type**	**Stat Brand**	**Stat Model**
Under window	Staff lounge	Unit ventilator	Nelson Aire	11.5 x 33.5 x 1	Roll media		
Under window	IMC Office	Unit ventilator	Engineered Air	14 x 32 x 1	Roll media	Barber Coleman	TK-1741
Mechanical Room #1	IMC	AHU	Engineered Air	20 x 33 x 2	Roll media	Barber Coleman	TK-1741
Under window	Kitchen	Fan coil unit	Nelson Aire	8.5 x 25 x 1	Roll media	Robert Shaw	T33-301
Under window	Principal's Office	Unit ventilator	Trane	14.5 x 18.5 x 1 (2)	Disposable		Integral
Roof penthouse	APR	AHU	York	16 x 40 x 1 (2)	Tri-Link	Barber Coleman	TK-1741
Under window	Room 1	Unit ventilator	Engineered Air	14 x 32 x 1	Roll media	Barber Coleman	TK-1741
Under window	Room 2	Unit ventilator	Engineered Air	14 x 32 x 1	Roll media	Barber Coleman	TK-1741
Under window	Room 3	Unit ventilator	Engineered Air	14 x 32 x 1	Roll media	Barber Coleman	TK-1741
Under window	Room 4	Unit ventilator	Engineered Air	14 x 32 x 1	Roll media	Barber Coleman	TK-1741
Under window	Room 5	Unit ventilator	Engineered Air	14 x 32 x 1	Roll media	Barber Coleman	TK-1741
Under window	Room 6	Unit ventilator	Engineered Air	14 x 32 x 1	Roll media	Barber Coleman	TK-1741
Under window	Room 7	Unit ventilator	Engineered Air	14 x 32 x 1	Roll media	Barber Coleman	TK-1741
Under window	Room 8	Unit ventilator	Engineered Air	14 x 32 x 1	Roll media	Barber Coleman	TK-1741

The number of supply ventilation units at MCPS schools is variable, ranging from less than 20 to over 200.

Supply Ventilation PM Log Sheet – ALPHA ES				Month: _____	
Sheet Completed by: _____				Year: _____	
Unit Location	**Area Served**	**Unit Type**	**Filter Changed**	**Unit Cleaned**	**Needs Repair**
Under window	Staff lounge	Unit ventilator			
Under window	IMC Office	Unit ventilator			
Mechanical Rm #1	IMC	AHU			
Under window	Kitchen	Fan coil unit			
Under window	Principal's Office	Unit ventilator			
Roof penthouse	APR	AHU			
Under window	Room 1	Unit ventilator			
Under window	Room 2	Unit ventilator			
Under window	Room 3	Unit ventilator			
Under window	Room 4	Unit ventilator			
Under window	Room 5	Unit ventilator			
Under window	Room 6	Unit ventilator			
Under window	Room 7	Unit ventilator			
Under window	Room 8	Unit ventilator			
Comments (if repairs needed, describe here):					

SECTION 3 EXHAUST FANS

This section provides specific information on the building exhaust systems regarding their type, number, location, belt size, and preventative maintenance routine. These routines are schedules of tasks to be performed by building service and maintenance staff to ensure proper operation as the first step in a healthful learning environment.

EXHAUST FANS TYPE, UNIT NUMBER, LOCATION, BELT SIZE, PREVENTIVE MAINTENANCE (PM) ROUTINE

The spreadsheet on the following page allows you to cross-reference the appropriate preventive maintenance routine for each type of exhaust fan found at this facility.

Exhaust Ventilation Equipment – Preventive Maintenance									
Building: Alpha ES Date of Assessment: June 2004									
Fan	**Location**	**Area/Zone Served**	**Unit Type**	**Brand**	**Model**	**Serial No.**	**Direct Drive**	**Belt**	**PM Routine**
1	Roof above staff lounge	Staff Lounge	Exhaust fan	Dayton	CI 14B	222RT	Yes		2
2	Roof above APR	APR	Exhaust fan	Greenheck	TX265	26133	Yes		2
3	Roof above hall by rm 11	Rooms 11,12,13,14	Exhaust fan	Power	LC30BC	18555	No	A75	1
4	Roof above BSM Office	Girls' restrm by BSM Office	Exhaust fan	Power	LC30BC	18559	No	A75	1
5	Roof above boys' restrm	Boys' restrm by BSM Office	Exhaust fan	Greenheck	CX299	22TY6	Yes		2
6	Roof above hall by room 3	Rooms 3,4,5,6	Exhaust fan	Greenheck	CX299	22TY7	Yes		2
7	Roof near room 17	Restrooms by room 17	Exhaust fan	Greenheck	CX299	22TY8	Yes		2
8	Roof near room 19	Restrooms by room 19	Exhaust fan	Chelsea	RDD90XB	55616	Yes		2
K	Roof above kitchen	Kitchen (removed from svc)	Exhaust fan	Chelsea	RDD90XB	55615	Yes		None

In actual BMPs, a school map with marked exhaust fan locations is inserted here.

EXHAUST FAN PREVENTIVE MAINTENANCE (PM) ROUTINE #1

RESPONSIBILITY	TASK	Every Month	Every 3 Months	Every 6 Months
BSM	Inspect motor and belt Oil/grease, if applicable Clean housing and fan, check operation and secure top		X	

EXHAUST FAN PREVENTIVE MAINTENANCE ROUTINE #2

RESPONSIBILITY	TASK	Every Month	Every 3 Months	Every 6 Months
BSM	Inspect motor Oil/grease, if applicable Clean housing and fan, check operation and secure top		X	

EXHAUST FAN PREVENTIVE MAINTENANCE ROUTINE #3

RESPONSIBILITY	TASK	Every Month	Every 3 Months	Every 6 Months
BSM	Inspect motor and belt Oil/grease, if applicable Clean housing and fan, check operation and secure top	X		

LOCK-OUT/TAG-OUT OF EXHAUST FANS

The following steps need to be completed when servicing exhaust fans. This is to remove sources of energy, which may cause harm if accidentally released during servicing. This procedure is called "Lock-Out/Tag-Out": It must be performed in accordance with a written Hazardous Energy Control Program.

1. Identify circuit breaker that supplies unit to be de-energized.
2. Flip breaker to the off position.
3. Verify that no power is present at the unit. Flip switch at unit on and off and verify unit is off; check line voltage incase power is supplied by secondary source.
4. After it has been verified that no power is present at the unit, place appropriate lock on breaker. Secure breaker lock with padlock. Key for padlock must be kept with individual working on unit. Place label on breaker lock indicating who has key to lock.
5. To energize unit, turn unit switch to off position. Verify that all tools, etc. have been removed from unit and mechanisms are secure
6. Unlock breaker padlock and remove breaker lock.
7. Flip breaker to on position.
8. Turn unit switch to on position and verify it is operating correctly

The spreadsheet on the following page lists circuit breaker locations for exhaust fans.

Exhaust Ventilation Equipment – Electrical Lock-out/Tag-out									
Building: Alpha ES Date of Assessment: June 2004									
ALWAYS RE-VERIFY BREAKER INFORMATION BEFORE WORKING ON UNITS!									
Fan	**Location**	**Area/Zone Served**	**Unit Type**	**Voltage**	**Fan Control**	**Starter**	**Breaker Panel**	**Panel Location**	**Breaker**
1	Roof above staff lounge	Staff Lounge	Exhaust fan	115/1/60	Wall switch		B	Across staff restrms	11
2	Roof above APR	APR	Exhaust fan	115/1/60	Humidistat		B	Across staff restrms	17
3	Roof above hall by rm 11	Rooms 11,12,13,14	Exhaust fan	120/1/60	Humidistat		D	Hall by room 13	20
4	Roof above BSM Office	Girls' restrm by BSM Office	Exhaust fan	120/1/60	Humidistat		A	Hall by room 5	21
5	Roof above boys' restrm	Boys' restrm by BSM Office	Exhaust fan	115/1/60	Wall switch		C	Hall by APR	1
6	Roof above hall by room 3	Rooms 3,4,5,6	Exhaust fan	115/1/60	Wall switch		C	Hall by APR	1
7	Roof near room 17	Restrooms by room 17	Exhaust fan	115/1/60	Wall switch		F	Hall by room 17	11
8	Roof near room 19	Restrooms by room 19	Exhaust fan	120/1/60	Wall switch		F	Hall by room 17	11
K	Roof above kitchen	Kitchen (removed from svc)	Exhaust fan	120/1/60					

Exhaust Ventilation PM Log Sheet – ALPHA ES				Month: _____	
Sheet Completed by: _____				Year: _____	
Fan	**Unit Location**	**Area Served**	**Cleaned/oiled**	**New belt**	**Needs Repair**
1	Roof above staff lounge	Staff Lounge			
2	Roof above APR	APR			
3	Roof above hall by rm 11	Rooms 11,12,13,14			
4	Roof above BSM Office	Girls' restrm by BSM Office			
5	Roof above boys' restrm	Boys' restrm by BSM Office			
6	Roof above hall by room 3	Rooms 3,4,5,6			
7	Roof near room 17	Restrooms by room 17			
8	Roof near room 19	Restrooms by room 19			
Comments (if repairs needed, describe here):					

SECTION 4 PNEUMATIC SYSTEM

This section provides specific information on the pneumatic system; the type, brand, location, and preventative maintenance routine is included. These routines are schedules of tasks to be performed by building service and maintenance staff.

GENERAL

A central air compressor usually supplies compressed air for pneumatic control systems. Air in the system must be clean and dry; pressure is reduced to 15-18 psi depending on pneumatic system age.

Intake air is passed through a screen filter. Compressed air is passed through a check valve and then an oil filter.

Standard high-pressure air from the compressor is passed through a pressure-reducing valve (prv) where its final system pressure is adjusted to 15-18 psi.

AIR STATION
TYPE, BRAND, LOCATION, PREVENTIVE MAINTENANCE (PM) ROUTINES

The spreadsheet on the following page allows you to cross-reference the appropriate preventative maintenance routine for each pneumatic system air station found in this facility.

Pneumatic System--Preventive Maintenance

Building: ALPHA ELEMENTARY SCHOOL

Date of Assessment: JUNE 2004

Type of Unit	Unit Location	Brand	Model	Serial #	Direct Drive	Belt Size
Compressor	**Boiler Room**	**Quincy**	**2100RB**	**61292L5**	**No**	**B52**
Air Dryer	**Boiler Room**	**Hankison**	**8010**	**0302L-8504**	**Yes**	

AIR STATION PREVENTIVE MAINTENANCE ROUTINE

RESPONSIBILITY	TASK	Every Week	Every Month	Every 6 Months	Every Return Visit
BSM	Drain compressor tank, filter bowl, and any air lines that have drain cocks. Check compressor crankcase oil level. Check compressor safety-relief valve	X			
Maintenance	Change crankcase oil. Check compressor pressure switches. Inspect for moisture, oil, or dirt in the air lines. Inspect starter or starting switch. Clean contacts if necessary. Measure motor current, compare with full load rating and overload heater size.			X	
BSM	Oil the compressor motor(s). Check pressure relief valve and the check valve. Check operation of air drier. Check for moisture, oil, and dirt in air lines. Clean air intake filter, felt, and screens. Check compressor belt(s).			X	
IEQ Team	Inspect all steel fittings for rust and replace if needed. Replace cartridge-type intake air filter				X

LOCK-OUT/TAG-OUT OF AIR STATION COMPONENTS

The following steps need to be completed when servicing the compressors or air dryer. This is to remove sources of energy, which may cause harm if accidentally released during servicing. This procedure is called “Lock-Out/Tag-Out”: It must be performed in accordance with a written Hazardous Energy Control Program.

1. Identify circuit breaker that supplies unit to be de-energized.
2. Flip breaker to the off position.
3. Verify that no power is present at the unit. Flip switch at unit on and off and verify unit is off; check line voltage incase power is supplied by secondary source.
4. After it has been verified that no power is present at the unit, place appropriate lock on breaker. Secure breaker lock with padlock. Key for padlock must be kept with individual working on unit. Place label on breaker lock indicating who has key to lock.
5. To energize unit, turn unit switch to off position. Verify that all tools, etc. have been removed from unit and mechanisms are secure
6. Unlock breaker padlock and remove breaker lock.
7. Flip breaker to on position.
8. Turn unit switch to on position and verify it is operating correctly

The spreadsheet on the following page lists circuit breaker locations for air station components.

Pneumatic System—Electrical Lock-out/Tag-out

Building: ALPHA ELEMENTARY SCHOOL

Date of Assessment: JUNE 2004

ALWAYS RE-VERIFY BREAKER INFORMATION BEFORE WORKING ON UNIT!

Type of Unit	Unit Location	Brand	Model	Voltage	Breaker Panel	Panel Location	Breaker
Compressor	**Boiler Room**	**Quincy**	**2100RB**	**208/3/60**	**M**	**Boiler Room**	**21**
Air Dryer	**Boiler Room**	**Hankison**	**8010**	**115/1/60**	**M**	**Boiler Room**	**22**

AIR STATION SERVICE RECORDS FOR _____ in _____ Page ___ of ____

NAME	DATE	WEEKLY	MONTHLY	6 MONTH	12 MONTH	COMMENTS

SECTION 5 CHILLER

This section provides information and service records for the school's chiller.

CHILLER

General Description

Type of Unit:	2 Trane (#CG101) Air Cooled Reciprocating (R-22 refrigerant) chiller
Size:	100 tons each

Chiller Operation

The chiller is operated only when the building is occupied. It is cycled automatically with temperature sensors in the return water from the building. The chilled water temperature is set at 45^0F. The unit is started 1 hour before building occupancy to bring space temperatures to an acceptable level. The unit is operated for cooling purposes and provides some dehumidification capability. The chilled water circulation pump is to be operated whenever the chiller operates.

General Maintenance

The Division of Maintenance performs all maintenance of the chiller system. The Building Service Manager is required to keep the area around the chiller clear of debris on an as need basis. During summer operations, the Building Service Manager must confirm and record temperature of chiller water, water conditions and check for unusual noises on a daily basis. A form for recording those activities follows.

CHILLER SERVICE RECORD

The form is to be used by the building service manager during the cooling season on a daily basis.

Date	Water Temperature	Name	Time and Comments

SECTION 6 BOILER ROOM

This section provides information regarding the boiler room and its equipment including proper operating values, duties, and appropriate log sheets.

BOILER ROOM DUTIES

Routine maintenance tasks for the boiler room as outlined in the MCPS Procedure Manual from the Division of School Plant Operations are listed on the following pages with appropriate scheduling.

BOILER ROOM DUTIES	HOURLY	DAILY	WEEKLY	MONTHLY	QUARTERLY	AS REQUIRED
Check burner operation	X					
Check gauge readings	X					
Check for leaks	X					
Blow down low water cut-offs *		X				
Test try cocks *		X				
Blow down water columns *		X				
Test glass gauges *		X				
Blow down boilers *		X				
Test safety valves *			X			
Test relief valves				X		
Service oil burners #		+X				X
Stick fuel oil storage tank		X				
Clean fuel oil strainers			#X			X
Test emergency switch					X	
Check fresh air louvers			X			
Lubricate motors & equipment						X
Tighten bolts, screws, etc.				X		X
Clean boilers (fire side) @				#X		X
Sweep boiler room floor			X			
Dust tops of boilers and pipes				X		
Clean boiler room equipment				X		
Clean dial faces, glass gauges				X		
Remove trash, rags, etc.		X				
Clean boiler room (thoroughly)				X		
Replace burned out light bulbs						X

Steam boilers *
Heavy oil burners #
Rotary cup burners +
PEOs only @

BOILER ROOM DUTIES (cont'd)	HOURLY	DAILY	WEEKLY	MONTHLY	QUARTERLY	AS REQUIRED
Clean up spilled oil						X
Check air compressor operation		X				
Drain air compressor tank			X			X
Drain filter bowls and separator			X			
Check oil level in compressor			X			
Test compressor relief valve			X			
Check dryer operation		X				
Clean/replace air intake filter				X		X
Check circulator pumps		X				
Check condensate receivers *		X				
Check automatic water feeders		X				
Check water heater		X				
Test water heater relief valve					X	
Check sump pumps		X				
Check fuel oil pumps		X				
Check belt condition / tension			X			
Replace guards / covers		X				X
Exercise gate valves					X	
Check for damaged insulation				X		
Check boiler alarm		X				
Check AHUs and unit ventilators		X				
Service AHUs and unit ventilators						X
Check filters – replace				X	X	X
Check thermostats and controls @					X	X

Steam boilers *
Heavy oil burners #
Rotary cup burners +
PEOs only @

BOILER ROOM DUTIES (cont'd)	HOURLY	DAILY	WEEKLY	MONTHLY	QUARTERLY	AS REQUIRED
Check A/C chillers	X					
Check A/C cooling towers	X					
Read A/C gauges and record on log	X					X
Service emergency generator			X			
Check emergency light packs					X	
Test fire alarm system		X				
Maintain log sheets		X				
Maintain service record cards						X
Check stock of service supplies				X		
Paint boiler room / pipes @					X	
Paint equipment @					X	
Maintain tools and equipment		X			X	

Steam boilers *
Heavy oil burners #
Rotary cup burners +
PEOs only @

BOILER ROOM DATA

Write N/A in the spaces which do not apply to this system. Place this data sheet in a protective holder and display it in a conspicuous place in the boiler room.

Steam _____ Hot Water _____ Steam Conversion Hot Water _____

Boiler cut in _____ ˚F or psi Boiler cut out _____ ˚F or psi

Fuel oil – grade number _____ tank capacity _____ gallons

Oil temperature – from fuel tank _____ ˚F at burner ____ ˚F

Oil pressure – at pump _____ psi at burner _____ psi

Oil pressure – suction side of pump _____ inches Hg

Side arm oil heater in use _____ yes/no

Air atomizing oil burner (air pressure)

Low fire ____ psi High fire ____ psi

Natural gas burners (gas pressure)

Supply ____ inches wc Reduced _____ inches wc

Water pressure (hot water heating systems) – boiler ____ psi

Pump supply ____ psi Pump discharge ____ psi

Domestic hot water tank temperature _____ ˚F

Air compressor – cut in ____ psi cut out _____ psi

Reduced _____ psi

BOILER ROOM LOG SHEET

Date ____ / ____ / _____ to ____ / ____ / _____ STEAM _____ HOT WATER _____

SERVICE BOILER ROOM NUMBER _____

DAILY M T W T F M T W T F M T W T F M T W T F

1. Test try cocks * __
2. Test low water cut-offs * __
3. Blow down water columns * __
4. Blow down boilers (*) __
5. Service rotary cup burners __
6. Check burner operation __
7. Check all gauge readings __
8. Stick fuel oil tank __
9. Check unit ventilators __

WEEKLY

1. Test safety valves * __ __ __ __ __
2. Test scanners __ __ __ __ __
3. Test low draft cut-offs __ __ __ __ __
4. Service air compressor __ __ __ __ __
5. Drain compressor tank __ __ __ __ __
6. Clean oil strainers # __ __ __ __ __
7. Check expansion tanks __ __ __ __ __

MONTHLY

1. Clean boilers @ 1 ___ 2____ 3____ 4____
2. Service equipment and record on service sheets __
3. Flush condensate tanks * __
4. Flush hot water boilers __
5. Test relief valves __
6. Clean boiler room __

* Steam systems only
(*) See W.T. Specialist
\# Heavy fuel oil only
@ PEOs only

SECTION 7 BUILDING SERVICE STANDARDS

The frequency of specific cleaning tasks has been itemized in the MCPS Procedures Manual. A copy of chapter five follows and items requiring special attention are highlighted.

The work of the building service staff consists of many tasks. The sum of these tasks, when properly carried out, should result in all areas of the building and grounds being adequately cared for.

The Routine Task/Work Performance Guides on the following pages establish the frequencies for normal cleaning. The frequencies given were determined through building surveys, inspections, and conferences with personnel performing and supervising cleaning tasks.

Any major variations from the standards should be brought to the attention of the building service supervisor, who will investigate the matter and make recommendations for action that should be taken to resolve the problem.

Items that have been added to the standard Building Service Standard Checklist as found in the MCPS Procedures Manual, are listed in a separate chart at the bottom of each page with recommended frequencies indicated with an 'REC'. Changes to the frequencies of tasks on the standard checklist are indicated with a 'REC'.

KEY FOR TASK/WORK PERFORMANCE GUIDE FREQUENCY

D----------DAILY
W---------WEEKLY
M---------MONTHLY
Q---------QUARTERLY
A---------ANNUALLY
R--------AS REQUIRED

CORRIDOR AND ENTRANCE CARE

Includes sweeping the corridors and entrance areas; removing all loose paper, trash, and rubbish; removing gum, tar, and other sticky substances from the floors; keeping trash receptacles emptied and presentable; cleaning drinking fountains and glass surfaces in the area; mopping up wet spots due to bad weather, leaks, or spills; keeping floor mats clean; and the proper care and maintenance of equipment and materials used. When floors are wet or slippery, keep warning signs in place.

DUTIES	D	W	M	Q	A	R
Dust horizontal surfaces	X					
Dust mop floors & steps	X					
Secure windows & doors	X					
Wash fountains & fittings	X					
Wash windows						X
Wash doors, frames, & glass						X
Wash entrance doors & glass	X					
Wash lockers			X			X
Wash woodwork & trim						X
Wash lights and fixtures			REC			X
Dust walls & ceiling corners		X				
Damp wipe exit lights & clocks			X			
Damp wipe walls			X			X
Clean exhibit cases & art work		X				
Clean/vacuum walk-off mats	X					
Spot mop floors	X					
Spray buff floors		X				
Scrub or strip floors						X
Refinish floors						X

Wash interior window sills			REC			
Wash window troughs			REC			
Wash steps & handrails		REC				
Clean supply & return grills				REC		

STAIRWAY CARE

Includes all cleaning work inside the confines of the stairwells such as sweeping stair landings and steps; removal of gum or other foreign substances; dusting stair railings, clean glass, fire extinguisher, doors, ledges, etc.; cleaning and polishing handrails; wall spot cleaning; mopping or scrubbing stair landings and steps, thoroughly drying all water from these areas after mopping or scrubbing; and proper care and maintenance of stair cleaning equipment. The stairwell must be properly lighted.

DUTIES	D	W	M	Q	A	R
Dust horizontal surfaces	X					
Dust mop steps & landings	X					
Secure windows	X					
Wash windows						X
Wash doors, frames, & glass						X
Wash stair treads		X				
Wash stair risers						X
Wash lights and fixtures					X	
Damp wipe handrails		X				
Damp wipe walls			X			X
Damp wipe exit lights			X			
Dust walls & ceiling corners			X			
Replace light tubes/bulbs						X
Remove chewing gum						X
Remove graffiti						X
Wet mop landings		X				
Scrub or strip landings						X
Refinish landings						X

Wash interior window sills			REC			
Wash window troughs			REC			
Clean supply & return grills				REC		

OFFICE, LOUNGE, AND HEALTH ROOM CARE

Includes emptying wastebaskets; damp-wiping or dusting desks, counter tops, tables, filing cabinets, and other specified surfaces; cleaning sinks and toilets; sweeping or mopping floors and vacuuming carpet; scrubbing, stripping, refinishing, and buffing floors; proper care and maintenance of equipment and materials.

DUTIES	D	W	M	Q	A	R
Dust desks, tables, & chairs	X					
Dust filing cabinets	X					
Dust open book shelves		X				
Dust telephones	X					
Dust walls & ceiling corners			X			
Dust mop floors	X					
Vacuum carpet/rugs	X					
Empty wastebaskets	X					
Damp wipe telephones		X				
Damp wipe clock			X			
Wash windows			X			
Wash door glass	X					
Wash doors & frames		X				
Wash woodwork & trim		X				
Wash walls						X
Wash lights & fixtures					X	X
Clean shades/drapes			X			
Adjust shapes/drapes uniformly	X					
Secure windows & doors	X					
Wet mop or spray buff floors		X				
Scrub/strip & refinish floors						X

Wash interior window sills			REC			
Wash window troughs			REC			
Clean supply & return grills				REC		
Intensively clean carpets					REC	

CLASSROOM CLEANING

Includes emptying pencil sharpeners and wastebaskets; cleaning chalkboards and chalk trays; damp wiping or dusting desks, tables, cabinets, and other specified surfaces; cleaning student cloak closets, sinks, and toilets in assigned work area; sweeping or mopping floors; vacuuming carpet; securing windows; adjusting venetian blinds and drapes uniformly.

DUTIES	D	W	M	Q	A	R
Dust horizontal surfaces	X					
Dust mop floors	X					
Empty pencil sharpeners	X					
Empty wastebaskets	X					
Secure windows	X					
Adjust blinds/drapes uniformly	X					
Wash sink & fittings	X					
Wash windows				X		X
Wash woodwork & trim						X
Wash doors & frames						X
Wash baseboards				X		
Wash furniture				X		
Wash lights & fixtures					X	
Clean chalkboards & trays		X				X
Clean venetian blinds			X			
Dust walls & ceiling corners				X		
Vacuum carpet/rugs	X					
Damp wipe clock, TV, computer monitors			X			
Replace light tubes						X
Wet mop &/or spray buff floor						X
Scrub/strip & refinish floors						X

Wash interior window sills		REC				
Wash window troughs		REC				
Clean supply & return grills				REC		
Intensively clean carpet					2REC	

RESTROOM CLEANING AND SERVICE

Includes all cleaning work inside restrooms such as: emptying waste receptacles; dusting window sills and ledges; cleaning walls, grills, mirrors, shelves, dispensers, waste receptacles, stall partitions and doors, wash basins, commodes, urinals, and polishing metal work; sweeping, mopping, or scrubbing floor; servicing toilet tissue, paper towel, sanitary napkin, soap dispensers; and the proper care and maintenance of restroom cleaning equipment.

DUTIES	D	W	M	Q	A	R
Dust horizontal surfaces	X					
Wash sinks/basins & fittings	X					
Wash urinals & fittings	X					
Wash commodes including seats	X					
Wash windows			X			
Wash walls & ceiling					X	X
Wash lights & fixtures					X	
Damp wipe partitions & walls		X				X
Polish metal work		X				
Clean mirrors	X					
Empty waste receptacles	X					
Fill toilet tissue dispenser	X					
Fill paper towel dispenser	X					
Fill sanitary napkin dispenser	X					
Clean and fill soap dispensers	X					
Wet mop floor	X					
Secure windows	X					
Replace light tubes						X
Scrub and strip floors			X			X

Wash interior window sills			REC			
Wash window troughs			REC			
Clean supply & return grills				REC		

KITCHEN AND CAFETERIA SERVICES

Includes removing trash/garbage from the kitchen and dining areas; washing and sanitizing trash cans, compactor room and compactor; washing overhead hoods, ducts, and pipes; removing and washing range hood filters; cleaning refrigerator/walk-in box floors; washing walls, windows, doors and door frames; wet mopping the kitchen and dining area floors with a sanitizing solution; setting up tables before lunch; damp wiping tables and putting them away after lunch; and the proper care and maintenance of the cleaning equipment.

DUTIES	D	W	M	Q	A	R
Wash hoods, filters, ducts, etc.			X			
Wash trash/garbage cans	X					
Wash door sills	X					
Wash doors & door frames			X			X
Wash windows			X			X
Wash walls, woodwork, & trim				X		X
Wash lights & fixtures				X		
Clean venetian blinds			X			
Clean grease traps					X	X
Dispose of trash/garbage	X					
Sweep cafeteria floor	X					
Wet mop cafeteria floor	X					
Wet mop kitchen floor	X					
Spot mop floors - due to spills						X
Clean drinking fountains	X					
Replace light tubes						X
Secure windows & doors	X					
Spray buff cafeteria floor		X				
Scrub/strip and refinish floors						X

Wash interior window sills			REC			REC
Wash window troughs			REC			REC
Clean supply & return grills				REC		

OUTDOOR AND GROUNDS CARE

Consists of keeping school grounds clear of trash, glass, leaves, and other debris; sweeping sidewalks, parking lots, and paved play areas; hosing down sidewalks, steps, and outside entrance areas; maintaining the lawn in a presentable condition by mowing grass, trimming around the building, sidewalks, fence lines, etc.; pulling weeds and trimming shrubbery as necessary. During the winter, removing snow and ice from sidewalks, entrances, bus loading and unloading areas, oil fill pipe and stick lines, fire hydrants; and sanding icy areas as required.

DUTIES	D	W	M	Q	A	R
Pick up trash & debris	X					
Sweep entrances & sidewalks	X					
Sweep play area pavement		X				X
Sweep parking lots & driveway		X				X
Remove graffiti	X					
Check playground equipment	X					
Rake grounds						X
Remove leaves						X
Clean storm drain grating		X				X
Clean roof drains			X			
Inspect gutters & downspouts		X				
Mow lawn (in season)		X				X
Trim around building & walks		X				X
Trim along fence lines		X				X
Pull weeds						X
Trim shrubbery						X
Remove ice & snow						X
Sand icy areas						X
Replace burnt out light bulbs						X

GYMNASIUM CARE

Includes all cleaning and service work associated with the gymnasium and related equipment such as: dust mopping floors daily and before and after athletic events, spot mopping as necessary; cleaning trash and debris from under and around bleachers; emptying trash receptacles; washing walls, doors, door frames, windows, and bleachers; making sure that bleachers, partition operators, basketball backboard operators, etc. are in good and safe working order; replacing light bulbs/tubes as necessary.

DUTIES	D	W	M	Q	A	R
Dust mop floors	X					X
Spot mop floors						X
Dust walls and bleachers			X			
Wash walls and bleachers				X		X
Wash doors and door frames		X				
Wash door glass	X					
Empty trash receptacles	X					
Clean under bleachers		X				
Perform bleacher safety checks			X			
Check partition operators		X				
Check backboard operators		X				
Check volleyball pole anchors	X					
Replace burned out light bulbs						X
Remove gum/tar from floor						X
Remove graffiti						X
Wash windows				X		
Wash light fixtures					X	
Secure windows and doors	X					
Scrub and refinish floors					X	X

Clean supply & return grills				REC		
Wash interior window sills				REC		
Wash window troughs				REC		

SECTION 8 OTHER MAINTENANCE DUTIES

This section covers information on proper procedures for other duties such as ceiling tile replacement and carpet cleaning.

CEILING TILE REPLACEMENT PROCEDURES

The following procedure should be used to replace moisture-damaged tiles after the source of water has been contained.

1. Identify tiles with moisture staining and possible mold growth that need to be replaced.
2. Check asbestos management plan to determine whether tile contains asbestos. If it does, removal should only be performed by trained and licensed asbestos workers. Contact Mr. Brown (301-670-8238).
3. Obtain appropriate replacement tiles.
4. Prepare to do the replacement after school. Obtain the following before proceeding:
   replacement tile
   vacuum cleaner
   labeled spritzer bottle containing water
   ladder of appropriate height
   utility knife, if necessary
   face-fitting dust mask (recommended)
   heavy plastic trash bag
   masking or duct tape
4. Move furniture and other objects from the immediate vicinity of the work and cover other items to prevent debris from falling on these items.
5. Cautiously lift an adjacent tile.
6. Spray the backside (top side) of the tile to be removed with water to dampen any fine material resting on the tile
7. Remove the tile from the grid and avoid tilting it and spilling debris.
8. Place the tile directly into the garbage bag. Do not exceed the working limit of the bag.
9. Install the new tile
10. Remove equipment from the area and vacuum debris. Replace any moved objects.

Carpet Care

Carpeted areas can be separated into two broad categories according to use.

Medium Traffic—conference rooms, offices, media center, lounge

Heavy Traffic---Classrooms

Medium Traffic areas should be intensively cleaned on a yearly basis in addition to regular vacuuming. Heavy use areas should be intensively cleaned two times a year in addition to daily vacuuming.

The following guidelines should be followed when performing intensive carpet cleaning:

- Use an extraction vacuum for shampoo cleaning when available
- Bonnet cleaning may be used with a minimum of water when treating high traffic areas and/or areas of extreme staining
- Use only minimum amount of water for job
- Perform shampooing during daylight hours, Monday through Friday
- Ensure ventilation system is *on* during operation (7 a.m. to 7 p.m.). Contact Energy Management if under EM control (301-230-5482)
- Use dehumidifiers on a 24-hour basis as appropriate. Empty pans frequently.
- Keep lights on for 24-hour period.
- Keep blinds open during daytime hours.
- Where possible, keep hallway doors open.

APPENDIX A REQUESTED MAINTENANCE SERVICES

This section covers the procedures and forms used to request maintenance services from the Division of Maintenance. Included is also a copy of outstanding work orders. The first set is dated at the approximate time of the creation of this BMP. Updated outstanding work orders should be requested from Division of Maintenance on a quarterly basis.

Procedure for Requesting Maintenance Services

The building service manager is responsible for assessing any problems or needs relating to the school building, its equipment, or grounds, and making a determination as to whether the building services staff can handle the situation, or whether the services of the maintenance division will be required.

If maintenance services are required, the building service manager must submit a work order to the Division of Maintenance via the computerized work order system.

Record of Maintenance Services

Copies of work orders submitted for ventilation or indoor environmental quality-related repairs should be inserted here.

APPENDIX B SAFETY & ENVIRONMENTAL GUIDELINES AND RECOMMENDATIONS

Montgomery County Public Schools (MCPS) is committed to providing a safe and healthful environment in support of the Success for Every Student Plan. Therefore, the following information is provided to reduce the risk of injury and the risk of environmental factors, which can adversely affect the quality of the learning environment.

The State of Maryland, which has adopted federal occupational safety and health regulations promulgated by the Occupational Safety and Health Administration (OSHA), regulates MCPS. The state regulates MCPS through the Maryland Occupational Safety and Health (MOSH) plan within the Division of Labor and Industry. Applicable worker safety and health regulations can be found in 29 Code of Federal Regulations, Part 1910 (available at http://www.osha.gov). Questions related to worker safety and health should be directed to the Building Service Supervisor or the Safety Supervisor, Department of Facilities Management.

If you have any questions regarding a potentially "unsafe" or "unhealthful" condition, please contact your supervisor immediately to report your concern(s).

If you have any questions regarding the following information, an environmental safety coordinator can be contacted at 301-926-4409.

SUMMARY OF TOPICS COVERED IN THIS DOCUMENT:

A. TEMPERATURE AND RELATIVE HUMIDITY

Temperature and relative humidity are significant in investigations of indoor air quality complaints. When temperatures or humidities are outside the comfort zone, complaints about poor indoor air quality or discomfort will increase. Students, teachers, and administrative staff tend to become less tolerant of odors and other indicators of "poor air quality" at elevated temperatures and extreme relative humidities (and also less tolerant of non-IAQ stressors such as noise and overcrowding).

Additionally, to minimize foot discomfort, the surface temperature of the floor should be between 65 – 84°F. The following American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) table represents optimum and acceptable temperature ranges for typical classroom environments:

Season	Optimum Temperature	Temperature Range (90% satisfaction criterion)
Winter	71 F	68 – 75 F
Summer	76 F	73 –79 F

Other than clothing, there are no adjustments for season or sex (male/female) to the temperatures of this table. For infants, certain elderly people, and individuals that are physically disabled, the lower limits of this table should be avoided.

This table was derived from the ANSI/ASHRAE 55-1992 Thermal Environmental Conditions for Human Occupancy.

MCPS has adopted the Board of Education's energy conservation guidelines for temperature, which is 70°F in the winter season and 76°F in the summer season. Media centers and computer labs have a 75°F criterion for the cooling season and 70°F for the heating season.

The American Conference of Governmental Industrial Hygienists recommend maintaining relative humidity in the occupied space below 60% throughout the year in their "Guidelines for the Assessment of Bioaerosols in the Indoor Environment." Humidity levels that exceed 60% will present a significant problem related to the potential for increased microbial growth. Based on the ANSI/ASHRAE 55-1992 *Thermal Environmental Conditions for Human Occupancy* guidelines, the relative humidity levels should be in the ranges listed below:

Season	Relative Humidity Range
Winter	25 – 60%
Summer	20 – 60%

B. CARPET REMOVAL PROCEDURES

Maintenance of carpet as recommended in the above section should ensure a complete life cycle for carpet in all but the most extreme use cases. When carpet can no longer be returned to acceptable conditions and represents an unacceptable risk to the quality of the indoor air environment, the following procedures should be strictly adhered to: (Note: This procedure should only be performed during non-occupied periods.)

A. Day One Activities
    1. Determine work area.
    2. Turn off local unit ventilators in work area.
    3. Wipe all removable items using damp cloth.
    4. Remove wiped down items from the work area.
    5. Place HEPA negative air filtration machine(s) in the work area and turn the fan speed to "High". Allow the HEPA negative air filtration machine to exhaust INSIDE THE WORK AREA.
    6. Seal all supply and return vents and grills in the room with plastic.
        - Close door or otherwise seal off work area before beginning work. Staff only exit work area in emergency.
    7. Dampen carpet with clean water. Use enough water to ensure that the carpet is wet throughout the pile.
        - Use portable sprayer.
        - Worker Protection—disposable coveralls, dust masks
    8. Cut carpet into strips as it is removed from floor.
    9. Place carpet strips into non-marked disposal bags (6 mil plastic).
        - Seal bags shut with duct tape.
        - Worker Protection—gloves, disposable coveralls, dust masks
    10. Vacuum floor with HEPA vacuum.
        - Worker Protection—disposable coveralls, dust masks
    11. Scrape floor in preparation for new floor tile, remove underlying floor tile if necessary.
        - Worker Protection—gloves, disposable coveralls, dust masks
    12. Vacuum floor with HEPA vacuum again.
        - Worker Protection—disposable gloves, dust masks
    13. Wipe all equipment (negative air machine, scrappers, tools, etc.) with a detergent solution.
        - Worker Protection-gloves, disposable coveralls, and dust masks
    14. Remove all worker protection (personal protective equipment) and dispose in a plastic bag (6 mil plastic). Seal plastic bag with duct tape.
    15. Remove bags of debris from building and transport to disposal area.
    16. ALLOW HEPA NEGATIVE AIR FILTRATION MACHINES TO CONTINUE TO OPERATE. DO NOT REMOVE PLASTIC FROM VENTS OR GRILLS AND INSURE WORK AREA REMAINS SEALED.

B. Day Two Activities
    1. HEPA vacuum all wall, shelf, and flooring surfaces.
        - Worker Protection—disposable coveralls, dust masks
        - CONTINUE TO OPERATE THE HEPA NEGATIVE AIR FILTRATION MACHINES THROUGH THIS PROCESS. DO NOT REMOVE PLASTIC FROM VENTS OR GRILLS AND ENSURE THE WORK AREA REMAINS SEALED.
    2. Start tile process after HEPA air filtration machines has operated for approximately 12 hours since completion of carpet removal.
    3. Remove plastic from vents and work area boundaries.

4. Reactivate local ventilation.
5. Apply water-based tile adhesive and wait until the surface is tacky enough for proper tile installation.
    - Worker Protection-gloves and safety splash goggles.
6. Install floor tile.
7. Damp mop completed tile floor and wax (3 coats).
8. The HEPA negative air machines should remain operating to facilitate the new floor drying process.
9. Start replacing furniture/materials in the work area.

C. LOCK-OUT/TAG-OUT

When employees are working on a piece of equipment (electrical, moving parts, energized systems, etc.) it must be locked out. Employees who are cleaning or performing maintenance where a body part could be injured should be using a "lock out tag out system". The lock out system will physically stop the piece of machinery and render it safe. A tag is attached to notify other fellow employees that someone is working on the equipment and not to start it up. State occupational safety and health laws require these procedures be performed in accordance with a written Hazardous Energy Control Program.

All employees shall have their own locks and keys and they should be the only authorized individuals with access to their keys. No one else should be removing the lock except for the employee who attached it in the beginning of his/her maintenance work. After the lock is in place, try to start the machinery/equipment to ensure the right circuit has been disabled. At this time the employee is testing to ensure the circuit is not live and releasing any stored energy left in the system.

See your supervisor for additional information on "lock out tag out equipment" and proper use. If your facility has a Building Maintenance Plan, the site-specific lock out tag out procedures can be found in SECTION 2. For additional clarification, the following checklist is provided and lists the common questions to ask when performing lock-out/tag-out procedures:

Yes/No	Item to be answered
	Is the equipment you are working on capable of being turned off?
	With the switch in the off or closed position, can you physically place a lock in to keep it from turning back on?
	If the switch can not accept a lock can you disconnect power at the circuit board?
	Make sure the lock you place is your lock issued to you and that you have the only key.
	Did you attempt to turn the equipment on to release all stored energy?
	Has normal movement completely stopped?

D. CONFINED SPACE

The employee must be aware of hazards that he/she is completing as a result of the Building Maintenance Plan. Inspecting and cleaning the boilers present physical hazards to the employee. A boiler is commonly referred to as a pressurized vessel. It is also considered a confined space. It is large enough and so configured that an employee can bodily enter it, has a limited number of entrances and exits from the space, and was not built for humans to occupy the space. This is a requirement under federal OSHA, and State (MOSH).

The confined space may hold a build up of toxic gases or pockets where the oxygen level is too low for a human to be in there. An employee should not be entering into the boilers unless they have had prior intensive training. Employees who work or enter into confined spaces require special training and equipment.

If you have any questions as to whether something is a confined space or are unsure of the meaning of a confined space, please see your supervisor for further information. The following questions are provided to assist in determining if this applies to a given task:

Yes/No	Item to be answered
	Is it a confined space? 1) Large enough and so configured that an employee can enter, AND 2) Has limited entry or exit, AND 3) not designed for continuous occupancy?
	Does the confined space contain corrosives or hazardous substances (acids, caustics)
	Does the confined space have moving parts and equipment?
	Are there areas not being ventilated in the space prior to entry?
	Has testing shown that the area is oxygen deficient or has hazardous concentrations of potential contaminants, or that there is reason to believe that these conditions exist?
	Are hazardous materials or gases being brought into the confined space by the worker?
	Is it probable that portable electrical equipment used inside the area may not be grounded and insulated?
	While in the area, are there decaying vegetation or animal matter observed?

IF YOU HAVE ANSWERED "YES" TO ANY QUESTION IN THIS SECTION OR SEE A 'CONFINED SPACE' LABEL ON ANY EQUIPMENT OR SPACE, DO NOT GO INTO THE SPACE. CONTACT YOUR SUPERVISOR IMMEDIATELY AND EXPLAIN THE SITUATION.

E. RIGHT-TO-KNOW (CILs and MSDSs)-- Access to Information About Hazardous and Toxic Substances:

The employee has the right to know what type of chemicals they are working with. The employee is also able to obtain chemical information that would be deemed pertinent information to the individual (i.e. health risks, health effects, reactivity, etc). Please remember that chemicals are not allowed to be purchased outright. The chemicals need to be procured. Employees need to purchase chemicals from the procurement list. This will ensure each chemical has been reviewed for safety and health affects before it enters the school system.

Yes/No	Item to be answered
	Is there a list of hazardous substances used in the facility?
	Is each container for a hazardous substance (i.e. spray bottles, temporary bottles) labeled with product identity and warning information?
	Has the employees supervisor reviewed with the employee the hazards (if any) associated with the product?
	Does the employee know what to do if they are exposed to the hazardous substance?

IF YOU HAVE ANSWERED "NO" TO ANY QUESTION IN THIS SECTION CONTACT YOUR SUPERVISOR IMMEDIATELY AND EXPLAIN THE SITUATION.

F. WALKING/WORKING SURFACES

The employee must pay particular attention to hazards that are created by other work practices. Places in the facility that have a high traffic volume of people should be clean on a more frequent schedule. There is a significant reduction in occupational injuries with walking, working surfaces, and storage that is kept properly.

The following checklist provides questions to keep in mind while performing your normal duties:

Yes/No	Item to be answered
	Is the walking surface kept dry and free of debris?
	Are spills of liquids cleaned up immediately and appropriately?
	Does the facility have storage in a hap-hazard manner?
	Are floors and carpets swept and vacuumed on a routine basis?
	Are unused portions of service pits covered/protected by a guardrail?

G. LADDERS

Ladders should be inspected on a frequent basis. If a ladder is found to be defective, the employee should take the ladder out of service and notify his or her supervisor. A tag should be attached to the ladder that states “Do Not Use – Danger”

Great care should be taken when placing ladders so that they are not carried or positioned near overhead power lines. Maintain at least ten-foot distance from over-head lines.

To ensure a safe ladder angle, the 4 to 1rule should always be obeyed. This rule states that the bottom of a leaning ladder is one foot away from the vertical surface being climbed for every four feet of working ladder length. Hence, the bottom of a ladder should be three feet from the wall when going up twelve feet of ladder length. Holding the ladder, placing the bottom of the ladder at one’s feet, and fully extending one’s arms generally achieves the proper angle.

The ladder should also extend three feet beyond the edge of the top of a wall when using the ladder to climb to the top of the wall.

H. SANITIZATION PROCEDURES

Due to certain circumstances sanitation of surfaces is recommended to remove noted or potential microbial contamination. The following are guidelines for ensuring successful results:

- Remove all gross debris using a properly functioning commercial vacuum.
- Prepare a detergent (such as A-125 or A-33) solution according to label instructions. If a strong degreaser is needed, contact the Division of School Plant Operations for approved products.
- Wash all non-porous surfaces, removing all residue. Removal of residue is very important in ensuring decontamination and prevention of future contamination.
- Wipe surfaces with clean water.
- Allow surfaces to dry before reassembly (such as ventilation equipment).

I. TEACHER CHECKLIST (IAQ)

As indoor air quality (IAQ) can be strongly affected by occupant activities, in addition to the Tools For Schools checklists, building service or teacher staff may use the following checklist to ensure that conditions that promote poor indoor air quality can be avoided:

INDOOR AIR QUALITY (IAQ)

CLASSROOM CHECKLIST

_____ Keep the wall unit ventilator in the “ON” position.

_____ Keep papers, boxes, and other materials off of the unit ventilator vents.

_____ Keep plants and other organic displays off the unit ventilator or hanging over the unit.

_____ Keep desks, and other furniture at least 3-5 feet away from the front of the wall unit ventilator

_____ Do not tape papers, posters, laminating material or any other material including “sticky” back shelves, or folders on the wall unit ventilator

_____Report any deficiencies (odors, noise, excessive temperature variations, leaks, visible mold, etc.) of the ventilation system (wall unit ventilators, ceiling units, etc) to your Building Service Manager or Plant Equipment Operator immediately.

_____ Report water-damaged and stained ceiling tiles immediately to your Building Service Manager.

_____ Only food items being used as part of the curriculum should be stored in the classroom and should be in air-tight containers.

_____ Refer to the MCPS Safety Handbook for information on having animals in the classroom (Section 8-78, page 115).

_____ Sightings of insects and/or rodents should be reported to your Building Service Manager immediately.

APPENDIX C PM VISIT WORK PLANs

The following work plan was developed based on observations and measurements explained in the initial assessment described in Appendix E. The plan is broken into four categories, indicating the groups that have primary responsibility to complete the identified tasks. Target completion dates of these tasks are indicated.

Alpha Elementary Work Plan **2/25/00**
IAQ Team

PRIMARY RESPONSIBILITY	TASK	INITIATED	SCEHULED COMPLETION	ACTUAL COMPLETION
IAQ Team	Clean, adjust, replace defective components in univents or other air handlers. Verify correct room control and fix if needed. Verify correct heat valve control and correct if leaking or otherwise dripping. Cleaning and disinfection should be thorough in each unit up to the outside air damper in univents and to the intake grill on other air handlers. Filter replacement if needed. Occupied rooms to be addressed are in the zones listed below. Zones are to be prioritized in the following order: 14, 13, 18, 17, 9, 16, 2, 6, 11, 12, 10, 7,			12/23/99
IAQ Team	Verify performance of relief device; advise. Occupied rooms to be addressed are in the zones listed below. Zones are to be prioritized in the following order: 14, 13, 18, 17, 9, 16, 2, 6, 11, 12, 10, 7			12/23/99
IAQ Team	Additional tasks to complete are as follow: • Counselor's office: correct draft problem at univent • Resource Room: fix filter holder in univent • Room 14: fix univent cover			12/23/99
IAQ Team	Clean univent intake chambers and inside of intake grills.		7/1/00	
IAQ Team	Clean evaporator coils and drain pans in RTU's 3, 4, 5, 6	12/23/99	7/1/00	

Alpha Elementary Work Plan **2/25/00**
Building Service Manager

PRIMARY RESPONSIBILITY	TASK	INITIATED	SCEHULED COMPLETION	ACTUAL COMPLETION
Building Service Manager	Replace ceiling tiles as needed after leaks have been corrected. IAQ Team will instruct.	12/23/99	2/19/00	
Building Service Manager	Review carpet maintenance methods and schedule	12/23/99	2/19/00	
Building Service Manager	Review dusting methods and schedules	12/23/99	2/19/00	
Building Service Manager	Clean window troughs and interior sills with a phosphate detergent or suitable alternative. Establish a schedule to inspect troughs and sills and to clean those components	12/23/99	2/19/00	
Building Service Manager	Clean ventilation terminal devices and establish a schedule for that action	12/23/99	2/19/00	
Building Service Manager	Verify that all containers containing maintenance products (e.g. soap, polish, buffing solution, etc.) are labeled	1/24/00	2/19/00	
Building Service Manager	Verify that all maintenance chemical products are district approved. Remove non-approved products from school grounds	1/24/00	4/21/00	
Building Service Manager	Clear areas in front of electrical panels of debris, equipment, and other obstructions for at least 3 feet	12/23/99	4/21/00	
Building Service Manager	Remove padlocks from roof-top AC unit switches	12/23/99	4/21/00	
Building Service Manager	Notify IPM of on-going pest problems throughout the building. IPM should follow-up	12/23/99	4/21/00	

Alpha Elementary Work Plan **2/25/00**
Maintenance

PRIMARY RESPONSIBILITY	TASK	INITIATED	SCEHULED COMPLETION	ACTUAL COMPLETION
Maintenance	Remove univentilator outside grilles. Fill exposed wall block cavities between grill and unit. Disinfect if needed. Replace grill with modified attachment to facilitate easy removal of grill in future.	12/23/99	7/1/00	
Maintenance	Repair 3-way mixing valve that is leaking in boiler room	12/23/99	7/1/00	
Maintenance	If possible install filter access doors in fan coils in resource room and math lab	12/23/99	7/1/00	
Maintenance	Repack valve and replace thermostat (Johnson 4756-205) in room 22	12/23/99	7/1/00	

Alpha Elementary Work Plan **2/25/00**
Building Staff

PRIMARY RESPONSIBILITY	TASK	INITIATED	SCEHULED COMPLETION	ACTUAL COMPLETION
Building Staff	Remove books, papers and other items from the tops and sides of univentilators and keep clear.	12/23/99	1/14/00	
Building Staff	Assign a person to create and maintain product inventory especially for maintenance, kitchen, science and art areas	12/23/99	1/14/00	
Building Staff	Verify that all chemical products are district approved. Remove non-approved products from school grounds	12/23/99	1/14/00	
Building Staff	Verify that all containers containing chemical products are labeled and kept closed	12/23/99	1/14/00	

Alpha ES 1st Return Visit Work Plan **6/28/01**
IAQ Team

PRIMARY RESPONSIBILITY	TASK	INITIATED	SCEHULED COMPLETION	ACTUAL COMPLETION
IAQ Team	Verify accuracy and completeness of supply and exhaust equipment tables in building maintenance plan.	7/30/01		9/7/01
IAQ Team	Provide annual PM service to ventilation equipment as indicated in BMP. Record activities on individual service record pages for each piece of equipment. Indicate any non-routine work completed on equipment in the "comments" column of those pages. The predominant finding during the annual building assessment was low room temperatures.	7/30/01		9/7/01
IAQ Team	Verify roof labels are still legible.	7/30/01		9/7/01
IAQ Team	Check volumetric flow rates of six unit ventilators at random. Check volumetric flowerets of three restroom ceiling exhausts and three restroom wall exhausts. Try to locate ventilation equipment schedules to determine design flow rates.	7/30/01		9/7/01

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Alpha ES 1st Return Visit Work Plan **6/28/01**
Building Service Manager

PRIMARY RESPONSIBILITY	TASK	INITIATED	SCEHULED COMPLETION	ACTUAL COMPLETION
Building Service Manager	It is critical that all ventilation equipment receive regular preventive maintenance as described in the building maintenance plan. Those maintenance activities should be recorded in the maintenance plan on individual service record pages.	7/30/01	10/30/01	
Building Service Manager	Systematically inspect all areas for moldy ceiling tiles, sagging and/or broken ceiling tile grids, and missing ceiling tiles. Replace moldy ceiling tiles immediately using guidelines found in the building maintenance plan. Issue work orders for ceiling grid repairs. Replace missing ceiling tiles.	7/30/01	10/30/01	
Building Service Manager	Continue to remove unapproved products from the school. Refer to the list of approved products.	7/30/01	10/30/01	
Building Service Manager	Systematically survey all building service areas for unlabelled secondary containers. Place adequate labels on those items.	7/30/01	10/30/01	
Building Service Manager	Continue to implement the area cleaning schedules as they are presented in the building maintenance plan.	7/30/01	10/30/01	

Alpha ES 1st Return Visit Work Plan **6//28/01**
Building Staff

PRIMARY RESPONSIBILITY	TASK	INITIATED	SCEHULED COMPLETION	ACTUAL COMPLETION
Building Staff	Be vigilant about reporting problems with unit ventilators and air handlers to building services. Unit ventilators and air handlers need to operate during times of occupancy.	7/30/01	10/30/01	
Building Staff	Continue to remove unapproved products from the building. Refer to the list of approved products.	7/30/01	10/30/01	
Building Staff	Keep computers, TVs and furniture away from thermostats.	7/30/01	10/30/01	
Building Staff	The success of this IAQ PM program is not only measured by the air sampling and observations made during the assessment, but also the response from building staff, in particular, their perception of the building's indoor environmental quality. The questionnaires that the Team program uses are an important tool used to measure staff perceptions. Past response rates to questionnaires has been poor. We strongly suggest that the school administration announce their endorsement of the program and encourage staff participation, *even if staff commonly believe there are no IAQ problems.*	7/30/01	10/30/01	

Alpha ES Return Visit 2 Work Plan **09/27/04**

Items to be completed by IAQ Team

1) Verify accuracy and completeness of supply and exhaust equipment information in building maintenance plan. Special emphasis on electrical information.
2) Record all thermostat temperature settings and air temperatures at stats before work commences (*Pre*). After PM work is completed, record stat settings and air temperatures (*Post*).
3) ***Before*** PM cleaning or HVAC work is performed - Record volumetric flow rates of six unit ventilators at random. Record volumetric flow rates of three restroom ceiling exhausts. Record volumetric flow rates from ***all*** supply and return devices in the main office suite and rooms K1/K2.
4) Provide annual Preventive Maintenance (PM) service to ventilation units: HEPA vacuum interior, replace filters as needed, repair damaged insulation, evaluate mechanical condition/operation and cleanliness, complete minor repairs, identify necessary major repairs. Record activities on individual service record pages for each piece of equipment. Note any cleaning and repair work completed on equipment. Also indicate total time and parts spent on repair work.
5) Verify roof labels are still legible on ventilation equipment. Re-label if needed.
6) Complete annual PM routines on all exhaust fans.
7) Complete annual PM routine on the air station.
8) The following special projects should be completed by the Team during this visit:
    a) During the walkthrough, outdoor air dampers were fully closed in several univents. Verify proper operation of outdoor air dampers (determine if dampers are designed to close fully or to a minimum position). If necessary, determine feasible means for modifying univents to ensure continuous outdoor air supply.
    b) Check all condensate drains penetrating exterior walls – extend any drains that are directing condensate against the walls.
    c) Some univent condensate drain pans have been installed without the rear screws, resulting in poor drainage. Check (and correct) positioning of condensate drain pans in all univents – pans should be tilted to allow adequate drainage.

Items to be completed by Building Services

1) Continue to systematically inspect all areas for moldy ceiling tiles, sagging and/or broken ceiling tile grids, missing ceiling tiles, and excessively stained ceiling tiles. Replace moldy ceiling tiles

immediately using guidelines found in the building maintenance plan. Replace missing, damaged, and stained ceiling tiles (replace water-stained tiles after leaks have been repaired).

2) Remove unapproved products, if found, from the building. Refer to the list of MCPS approved products.
3) Ensure that secondary containers, such as spray bottles and buckets, are labeled with labels that include the product name and hazard. Systematically survey all building service areas for unlabelled secondary containers. Place adequate labels on these items.
4) Continue to be vigilant about regularly scheduled ventilation filter changes for all floor and ceiling univents and air handlers, and thoroughly implement the cleaning schedule as described in the building maintenance plan.

Items to be completed by Staff

1) Be vigilant about reporting water leaks and problems with ventilation equipment to building services. Unit ventilators and air handlers need to operate during times of occupancy.
2) Keep the top and bottom grilles of floor-mounted unit ventilators clear of books, papers, potted plants, furniture, and other obstructions.
3) Ensure that thermostats are free of obstructions.
4) Refer to the list of approved products prior to bringing items such as cleaning solutions, soaps, and air fresheners into the building. Remove unapproved products.

APPENDIX D Indoor Environmental Quality (IEQ) Building Reports

This appendix contains the initial and final assessment performed at the time of the institution of this BMP. Any following indoor environmental quality reports and/or assessments should be included in this appendix in chronological order.

In actual BMPs, site visit reports for all PM visits are inserted here.

APPENDIX E TRAINING and INFORMATION

This appendix covers information required by the chemical inventory list and associated training requirements. Other required training documents are also in this appendix. Additionally, IAQ awareness training and the Tools for Schools action kit are included. All records for these training programs shall be kept in this appendix.

(For *Tools for Schools*, please refer to the U.S. EPA Action Kit that is included with this Building Management Plan)

* Additional copies of the MCPS Approved Products List can be downloaded at: http://www.mcps.k12.md.us/departments/iaq/products.htm

In actual BMPs, copies of awareness training presentations and associated records are inserted here. Two hardcopies of the MCPS Approved Products List are also inserted.