OPERATION, MAINTENANCE & MONITORING (OM&M)

- Routine and non-routine maintenance
- Annual certification and notification
- Termination of operations
- Community outreach

OM&M objectives

Where mitigation measures are in place…

To verify that the measures being used to address exposures related to vapor intrusion are continuing to operate properly

Where measures are not in place…

To have a mechanism for implementation of measures when needed

- vacant lot, previous declinations, change in ownership, etc.

OM&M in general

- OM&M Plan
  - specific OM&M protocols for the mitigation systems being used
  - provisions for locations where measures may be needed, but are not being implemented at this time
- all routine and non-routine maintenance activities are expected to be documented and reported to the agencies

OM&M in general

NOTE

A system may need to be redesigned or restarted if significant changes are made to the system or building, or if the performance is unacceptable.

SSD and SMD systems: minimum requirements for routine maintenance

- commence within 18 months after start up
- frequency = every 12 to 18 months
- visual inspection of entire system
- identification and repair of leaks
- inspection of exhaust or discharge point
- air monitoring:
    - generally not required if the system has been installed properly and is maintaining a vacuum

SSD and SMD systems: common preventative maintenance

- preventative maintenance — as specified by manufacturers
- fan replacement
  - warranty period: ~ 5 years
  - life expectancy: ~ 7 to 10 years

Other mitigation systems: minimum requirements

- generally comparable to post-mitigation testing activities
- visual inspection of entire system
- system performance checks
- air monitoring may be needed to determine
    - whether existing building conditions are maintaining the desired mitigation endpoint and
    - whether changes are needed

Non-routine maintenance

Example situations

- notification from building's owner or occupant about system operations
- system becomes damaged
- notification about building renovation activities

Annual certification and notification

Annual Certification Requirements

- will depend upon regulatory program

Notification Requirements

- annual offer to property owners who decline systems, unless no longer a need for system

Institutional controls

To provide protection and notification where measures to address exposures may be needed, but are not already in place

Example: vacant parcels

If not possible to implement, other measures...

Example: arrangements with town, village or city for notification if ownership changes or development is planned

Termination of operations

- Systems may not be terminated without prior approval from the agencies
- Systems should remain in place and operational until they are no longer needed to address current or potential exposures related to vapor intrusion
- If requested, the system should be removed in a timely manner

NOTE

Subsequent use to address radon intrusion

Community outreach

Building owners and tenants should be informed on

- how the system works
- how they can check that it is operating properly
- the results of routine maintenance
- who to contact if problems or concerns

Contact people should be responsive

Annual offers to those who decline systems

NYSDOH fact sheet available

- *Radon: Frequently Asked Questions*

Examples

Example: Structure review

Looking for changes in

- building footprint (additions)
- HVAC system
- crawlspaces
- basement finishes
- floor and wall cracks/penetrations
- appliances (in basement)
- siding
- ownership

Example: Exhaust fan and discharge point

Example: Checking inspection record

Example: Fan and electrical inspections

Fan

- secure installation
- quiet operation

Electrical

- switch operation
- secure connections
- J-box closed

Example: Piping, slab and walls

- Inspect and smoke test for leaks or cracks
- Inspect valves and manometers
- Inspect and smoke test floor drains
- Clean Dranjers

Example: Smoke testing piping

Example:

Sub-slab suction point with valve and manometer

Example: Dranjer

Example: Crawlspaces

Accessible

- inspect and smoke test membrane
- compare vacuum with commissioned value

Inaccessible

- measure ventilation rate
- compare with design criteria

Example:

Measuring the ventilation rate of an inaccessible crawlspace

Non-routine maintenance: Recommissioning

		Repairs/Modifications						
Re-Commissioning Requirements		Fan change (same model/fan)	Fan change (different model)	Fan/stack relocation and installation	Fan guard installation	Housing damage	Piping changes	Piping improperly supported
FAN AND ELECTRICAL	Electric Meter	X	X	X	X	X	X	X
	Equipment Documentation	X	X					
	Fan System	X	X	X		X		
	Electrical Check	X	X					
	Labeling Inspection		X					
PIPING, SLAB AND WALLS	Piping Check			X	X[b]		X	X
	Slab Check							
	Wall Check							
CRAWL SPACE DATA	Inaccess. Crawlspace*		X[c]					
	Access. Crawlspace*							
TEST DATA AND BACKDRAFT	Manometer Reading at Fan Inlet*	X	X	X	X	X	X	
	Manometer Reading at SSPs*		X	X			X	
	Communication Test*		X					
	Backdraft Test		X					
	Redline Drawing		X	X				

Notes: [b] To be performed on modification only.
[c] If applicable.
* These tests must be performed on the system before repairs are performed, in order to document "as found" conditions.

Example

Non-routine maintenance: Recommissioning

		Repairs/Modifications						
Re-Commissioning Requirements		Leaking pipe joints	Pipe size change of inaccessible crawlspace	Pipe size change of accessible crawlspace	Inaccess. crawlspace penetration not sealed	Access. crawlspace EPDM repair	Replacement of inaccessible crawlspace valve	Replacement of accessible crawlspace valve
FAN AND ELECTRICAL	Electric Meter	X	X	X	X	X	X	X
	Equipment Documentation			X				
	Fan System							
	Electrical Check							
	Labeling Inspection		X	X				
PIPING, SLAB AND WALLS	Piping Check	X	X	X			X	X
	Slab Check							
	Wall Check							
CRAWL SPACE DATA	Inaccess. Crawlspace*		X	X[c]	X		X[d]	X[c]
	Access. Crawlspace*			X		X		X[e]
TEST DATA AND BACKDRAFT	Manometer Reading at Fan Inlet*	X	X	X	X	X	X	X
	Manometer Reading at SSPs*	X	X	X	X	X	X	X
	Communication Test*		X[a]	X[a]				
	Backdraft Test		X	X				
	Redline Drawing		X	X				

Notes: [a] Unless the inaccessible crawlspace is on its own dedicated fan system.
[c] If applicable.
[d] Valve to be set within +/-10% of original target velocity (see As-Built drawing).
[e] Set valve such that manometer reading is the same as last commissioning.
* These tests must be performed on the system before repairs are performed, in order to document "as found" conditions.

Example

Non-routine maintenance: Recommissioning

	Re-Commissioning Requirements	Repairs/Modifications						
		Inaccess. crawlspace valve position change	Accessible crawlspace valve position change	Slab SSP Valve position change	Replacement of slab SSP valve	Slab SSP penetration not sealed	Addition of SSP	Sealing floor cracks/expansion joints
FAN AND ELECTRICAL	Electric Meter	X	X	X	X	X	X	X
	Equipment Documentation							
	Fan System							
	Electrical Check							
	Labeling Inspection						X	
PIPING, SLAB AND WALLS	Piping Check				X		X	
	Slab Check					X	X	X
	Wall Check						X	
CRAWL SPACE DATA	Inaccess. Crawlspace*	X	X[C]	X[C]		X[C]	X[C]	
	Access. Crawlspace*		X				X[C]	
TEST DATA AND BACKDRAFT	Manometer Reading at Fan Inlet*	X	X	X	X	X	X	X
	Manometer Reading at SSPs*	X	X	X	X[B]	X	X	X
	Communication Test*	X	X	X			X	
	Backdraft Test	X	X	X			X	
	Redline Drawing						X	

Notes: [C] If applicable.

[B] Set valve such that manometer reading is the same as last commissioning.

* These tests must be performed on the system before repairs are performed, in order to document "as found" conditions.

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Example

Non-routine maintenance: Recommissioning

		Repairs/Modifications					
Re-Commissioning Requirements		Dranjer installation/clean out	Discovery of additional ventilation and/or combustion appliances	Switch replacement	Relocation of electrical service	Redesign	Routine Maintenance
FAN AND ELECTRICAL	Electric Meter	X	X	X	X	X	X
	Equipment Documentation					X	X
	Fan System					X	X
	Electrical Check			X	X	X	X
	Labeling Inspection			X	X	X	X
PIPING, SLAB AND WALLS	Piping Check					X	X
	Slab Check	X [c]				X	X
	Wall Check					X	X
CRAWL SPACE DATA	Inaccess. Crawlspace*		X			X	X
	Access. Crawlspace*					X	X
TEST DATA AND BACKDRAFT	Manometer Reading at Fan Inlet*	X	X			X	X
	Manometer Reading at SSPs*	X	X			X	X
	Communication Test*		X			X	
	Backdraft Test		X			X	X[f]
	Redline Drawing					X	X

Notes: [c] If applicable.

[f] Backdraft tests must be performed during routine maintenance on appliances that are located within spaces treated as inaccessible crawlspaces (spaces ventilated with air exchanges).

* These tests must be performed on the system before repairs are performed, in order to document "as found" conditions.

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Example

Common observances during routine maintenance

Our experience to date…

Performance results

- single-family homes, larger buildings
- types of systems

Scheduling visits and community relations

Time investment: prep work, field

Common reasons for non-routine maintenance requests

Our experience to date…

- Noisy or vibrating fan
- Condensation (fan or SSP)
- New wall or floor cracks
- Tripped breaker
- Structure modifications

Recommendations for documentation

- Record “As-Found” findings on checklists or field forms
- Make system adjustments, if necessary
  - record “As-Left” conditions
  - modify structure/system drawing, if necessary
- Photograph new structure and/or system conditions

Example: Red-lining system drawing