

NJDEP Responses to Vapor Mitigation System Questions

1. *Is an aluminum downspout an approved material to vent vapor mitigation systems? Will VOCs being vented compromise the aluminum or caulk?*

Answer: Yes, aluminum downspout material is permitted to be used for the exhaust stack from the fan for a sub-slab depressurization system (SSDS) per USEPA Radon Guidance (*Radon Reduction Techniques for Existing Detached Houses: Technical Guidance (Third Edition) for Active Soil Depressurization Systems*; EPA/625/R-93/011). The connections between lengths of the material are sealed with caulking and secured with sheet metal screws. To seal the connection a bead of silicone caulk is placed along the inside of the female end, then the connecting end is inserted. Another bead of caulk is placed on the outside of the seam of these pieces, making the assembly air-tight. Sheet metal screws are then installed through both pieces to prevent the piping from separating. The seam is checked for leakage with various methods depending upon ambient conditions. During routine O&M system inspections, fitting seams are checked where caulk was used in the assembly. The VOCs being vented from the sub-surface through the system do not represent a concern for deteriorating the caulking or in any way compromising the system due to their low concentrations. Use of aluminum downspout material or PVC pipe are the two materials of construction options to residents to exhaust the sub-slab vapors through pipe running up the side of their house.

2. *How do you make a rectangular aluminum downspout fit securely into a round PVC pipe that is attached to the system fan?*

Answer: In order to fit a 3x4-inch rectangular aluminum downspout to a 4-inch round PVC fitting downstream from a system fan, one end of the rectangular downspout is made round by using a rubber mallet, a 3" round PVC cap, and scrap 2x4 aluminum. The downspout is quite malleable and is easily made round; the PVC cap helps to make the downspout perfectly round and at the right diameter for the assembly. A bead of silicone caulk is then put along the inside of the fitting collar when assembling the downspout and fitting. Another bead of caulk is also put on the outside of the seam of these pieces, making the assembly air-tight. During routine operations and maintenance system inspections, that seam is inspected as well as all fitting seams where glue or caulk was used in the assembly. As long as the outside caulk bead is complete, the assembly is leak-free. A model of this fitting can be seen at the Pompton Lakes Remediation Project Information Center at 223 Wanaque Avenue in Pompton Lakes.

3. *How are back draft tests supposed to be conducted before and after the installation?*

Answer: Backdraft tests are performed on all appliances and heating systems that exhaust combustion gasses during their operation. These appliances include heaters, clothing dryers and hot water heaters. Backdraft tests are performed prior to and after installation of the mitigation system to check if a pre-existing backdraft condition exists in the home and to ensure the mitigation system has not created a backdraft condition. The backdraft test that is performed is a "simple smoke visualization test". Chemically generated smoke (inert smoke-like fine powder) is released around the exhaust vents or intakes of the above listed appliances and the stream of smoke should move toward the opening indicating air flow movement. This test should be performed with the exterior and interior doors and windows closed, and with any exhaust fans on (kitchen, bathroom, clothing dryer and heater. This procedure is described in the USEPA document "*Radon Reduction Techniques for Detached Houses*" (EPA/625/R-93/011), Section 11.5.1.

4. *What if a resident is hard of hearing and therefore can not hear if the system alarm goes off?*

Answer: USEPA/NJDEP has directed – and DuPont has agreed – that building-specific modifications shall be implemented to the sub-slab depressurization system and related components when disabilities or significant concerns of the occupants necessitate it. For example, DuPont will install the alarm system in an appropriate place on the first floor for people that have hearing problems or difficulties walking up or down stairs. Other modifications may be required based on the system design and discussions with the occupants.

5. *What is the normal or average life of a fan? If it breaks, who repairs it, who pays and when?*

Answer: The normal average lifespan of a radon fan is 8-10 years. This lifespan of the fans will vary based on site-specific conditions. In situations where high moisture conditions exist, the lifespan of a fan will be reduced. Installations with a condensate by-pass will extend the life of a fan. If a fan malfunctions or breaks down, immediately call the contact person listed on each system so repairs can be scheduled. All costs for repairs and replacement of fans and parts for the mitigation system are the responsibility of DuPont.

6. *How long will a fan last if the condensate bypass was not used?*

Answer: Experience by the NJDEP has shown that the lifespan of a fan without the condensate bypass can be as short as 8 months. However, DuPont is installing condensate bypasses on the fans for all mitigation systems.

7. *What about the aluminum stack being a lightning rod?*

Answer: The NJDEP is not aware of any situations where aluminum venting pipes used for vapor intrusion mitigation systems were struck by lightning and caused damage to a structure. However, if a building owner would prefer that a PVC pipe be utilized instead of an aluminum downspout, that alternative is acceptable.

The USEPA, in their Technical Guidance document, *Radon Reduction Techniques for Existing Detached Houses* (EPA/625/R-93/011), allows the use of 3x4" aluminum rain gutter downspouts for the vent pipe (Section 4.6.5). Diagrams in the EPA Technical Guidance (Figure 21 and 27, for example) document the use of 4" Round-to-3x4" Rectangular adapters to join the 4" round PVC pipe coming off the fan with the 3x4" rectangular aluminum downspout. This is consistent with DuPont's design.

8. *If you already have a radon system, is the same uncovered fan being used also for the vapor mitigation system?*

Answer: In situations where a building already has a radon system installed, DuPont is required to evaluate the effectiveness of the system to mitigate the vapor intrusion pathway using the same protocols that are applied to every other building. The specific provisions that must be incorporated into the final system design have been enumerated in the Vapor Intrusion Mitigation System Inspection Checklist (available on the NJDEP's website at:

http://www.nj.gov/dep/srp/community/sites/dupont_pompton_lakes/). A weather proof protective

housing is not required if the fan is rated for outside use. In addition, the NJDEP's Bureau of Environmental Radiation has instructed DuPont on the procedures they must conduct to meet the radon requirements for buildings with radon systems.

9. *When will NJDEP inform DuPont whether or not the mitigation system is the same as a radon system and must meet the same standards, specifically if it is pulling out radon from under our homes?*

Answer: While the individual components of a radon system and a sub-slab depressurization system for vapor intrusion are quite similar (if not the same), the performance specifications are different. Thus, the USEPA/ NJDEP does not consider the mitigation systems for radon and vapor intrusion to be the same. However, the Vapor Intrusion Mitigation System Inspection Checklist was developed using the NJDEP's Bureau of Environmental Radiation inspection checklist, USEPA's *Radon Reduction Techniques for Existing Detached Houses* (October 1993) and related document, and the ASTM *Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Housing* (E-2121-03). In order for O'Brien and Gere to perform work on upgrading existing radon mitigation systems in Pompton Lakes they would need to contract with a certified radon mitigation business which will act as a consultant while O'Brien and Gere perform the necessary work.

10. *Is the town receiving the same amount of revenue for the permits from DuPont for O'Brien and Gere's work as if an individual homeowner applied?*

Answer: The NJDEP is not involved with the permit applications and fees required by the Borough of Pompton Lakes for the installation of the mitigation systems. This information must be obtained from the Borough of Pompton Lakes.

11. *How frequently do O'Brien and Gere check the systems after they are running?*

Answer: As required by USEPA/NJDEP, DuPont collects a post-mitigation indoor air sample a minimum of 30 days after the system is installed and running. A second post-mitigation indoor air sample is required if the first sample is not collected between November 1st and March 31st. In addition, DuPont shall inspect the vapor intrusion mitigation systems at each building on a quarterly basis for the first year. Assuming that the system does not require re-commissioning, DuPont can reduce the frequency of inspections to annually after the first year.

12. *What happens to rain water if there is no porous material under the slab for it to percolate through?*

Answer: If the rain water can not percolate into the ground, then it will either pond on the surface and eventually evaporate or it will run off via overland flow to a storm sewer, detention basin, surface water body or some area of the ground where infiltration is possible.

13. *If the unit is too noisy after a time of adjustment, will O'Brien and Gere be obligated to adjust it to a level acceptable to the homeowner?*

Answer: DuPont is required to install the mitigation system so there is not excessive noise or vibration while maintaining the depressurization of the sub-slab. DuPont has used vibration dampeners and remote installations to reduce the noise and vibration of the systems to the homeowner. Since the fan is an electrical device, there will be some noise and vibration, so it will be impossible to eliminate all

noise. The installation should be acceptable to the homeowner while maintaining the objective of the mitigation system.

14. *Where is DuPont's licensed electrical contractor licensed? DuPont has refused to reveal the source of the contractor's licensure and the contractor has in fact committed numerous violations of the New Jersey Electrical Code. These violations remain uncorrected.*

Answer: Provisions dealing with the licensing of the electrical contractor are handled by the municipality (Codes Office). The NJDEP understands that a copy of the electrical contractor's license is on file at the municipality. The NJDEP is unaware of any violations related to the electrical work for the mitigation systems. Apparently, several deficiencies were noted by the Borough inspector, but these problems have been resolved. If the homeowner believes there are deficiencies in the electrical work or any violations that remain uncorrected, the borough inspector and DuPont should be immediately contacted to answer any questions and repair any deficiencies.

15. *This again raises the issue of conflict of interest and actions not in the best interest of the residents of Pompton Lakes. These devices will be installed in our homes for many years to come; shouldn't we have the choice as to what options are available to us?*

Answer: The NJDEP and EPA have addressed vapor intrusion issues at numerous sites and have found that the mitigation systems are effective in reducing exposure to chemical vapors. There are a large number of technical and performance specifications that must be incorporated into the mitigation system in order for the vapor intrusion pathway to be properly eliminated and protect the health of the occupants. These specifications are dictated by the USEPA and NJDEP. However, DuPont has agreed to work with the building occupants to adjust the system design and accommodate individual requests as long as they are reasonable and don't impact the overall effectiveness of the mitigation system. Some of these provisions include:

- The external location of the fan and vent pipe
- Type of external vent pipe (aluminum downspout or PVC pipe)
- The internal location of suction points, piping and alarm systems
- The color of the aluminum downspouts

Nothing in these actions represents a conflict of interest. All activities are designed to protect human health and address personal concerns.

16. *Monitoring of Residents Homes – Whether test results are positive or negative, regular monitoring of the homes is required. How often will monitoring take place?*

Answer: As required by USEPA/NJDEP, DuPont collects a post-mitigation indoor air sample a minimum of 30 days after the system is installed and running. A second post-mitigation indoor air sample is required if the first sample is not collected between November 1st and March 31st. In addition, DuPont shall inspect the vapor intrusion mitigation systems at each building on a quarterly basis for the first year. Assuming that the system does not require re-commissioning, DuPont can reduce the frequency of inspections to annually after the first year.

Since DuPont was unable to gain access to a majority of the structures within the PVMA for the purpose of installing the mitigation systems, the USEPA/NJDEP directed DuPont to complete the vapor intrusion investigation of the remaining structures that were not actively moving towards mitigation (see Vapor Intrusion Investigation, Phase II Program at http://www.nj.gov/dep/srp/community/sites/duPont_pompton_lakes/vi_addendum.pdf).

This investigation includes the collection of sub-slab soil gas and indoor air samples at each structure. Depending on the results of the samples, structures may require mitigation, long-term monitoring with indoor air sampling, the collection of additional data (short-term), or no further action. Irrespective of the results, DuPont has agreed to install a mitigation system in any structure over the groundwater plume at any point in the future.

Property owners that refuse access for investigative sampling (indoor air and sub-slab soil gas) and mitigation installation will receive annual notices from DuPont requesting access. No further monitoring will be required by DuPont for these structures until access is given.

Who will pay for the monitoring?

Answer: All activities related to the investigation, mitigation and monitoring of the vapor intrusion pathway for the properties within the PVMA and EIA are paid for by DuPont and conducted by their consultants.

If it is shown that a resident's home requires system installation and maintenance after this initial phase of testing, will DuPont be required to pay for that system and installation?

Answer: Yes.

Will it be specifically designed for each resident?

Answer: Yes. The design of each mitigation system is specific to each individual structure.

17. *Currently, O'Brien and Gere is installing sump pump covers made of plywood. However, it is common knowledge that rain water coming through the pipe will rot the plywood. Attempts to address this faulty installation have fallen of deaf ears.*

Answer: The Vapor Interim Remedial Measures Workplan (VIRMWP), as approved by the USEPA/NJDEP, does not require the use of specific material in sealing the existing sumps. In addition, the NJDEP *Vapor Intrusion Guidance* document does not address this particular issue. The technical specifications require DuPont to properly seal existing openings (cracks, sumps, etc.) and prevent vapors from intruding into the living space. The use of pressure treated, exterior grade plywood is meeting that design condition.

While this material has a higher resistance to the effects of water than standard plywood, the NJDEP does not dispute that the potential for the plywood to degrade over time is possible. Thus, DuPont is required to inspect the sump pump cover at every visit to ensure the structural integrity and check for leaks. DuPont is required to replace the cover if any problems are detected.

18. *Can the homeowner be supplied with a hand-held monitoring device?*

Answer: The USEPA/NJDEP does not require DuPont to supply homeowners with hand-held monitoring devices. The monitoring program implemented by DuPont, as well as the alarm and suction point manometers, are sufficient to ensure that the mitigation system is running properly. If an occupant is concerned about the mitigation system, a 24-hour phone number is provided by DuPont to answer your questions and inspect/repair the system, if necessary.

19. *Some residents have noted discrepancies in the blueprints created by O'Brien and Gere that are not being addressed.*

Answer: The USEPA/NJDEP recognizes that modifications to the design plans may have to be made during the system installation due to unexpected complications specific to each structure. DuPont is required to document these changes in the final Remedial Measures Report that is generated for each property. If occupants are concerned about possible changes in the approved plans, they should contact Mindy Mumford (NJDEP) at (609) 777-1976. The NJDEP, in cooperation with the USEPA, is conducting follow-up inspections of the mitigation systems at a number of structures.

20. *What about the possibility of mitigation from below the foundation of the homes, rather than drilling holes in the existing slab? This method has proved successful in other states, is less intrusive and therefore potentially safer. As far as we know, it has not even been explored as a possibility by the polluter for all residents, although we have recently learned that a home on Jefferson Avenue in Pompton Lakes will receive this type of installation.*

Answer: The Vapor Interim Remedial Measures Workplan (VIRMWP), as approved by the USEPA/NJDEP, requires that the mitigation system design depressurize the entire slab of the building. For existing buildings, the most common methods to accomplish this design criterion are sub-slab depressurization (SSD) and submembrane depressurization (SMD) systems. Both mitigation systems are highly effective at eliminating the vapor intrusion pathway and extensively utilized by DuPont in the PVMA. An example of a typical SSD design is found in the VIRMWP. However, each structure is individually designed and will likely vary in some provisions from this example.

Alternative designs are available for mitigating vapor intrusion and some of these alternatives have been installed at the DuPont Pompton Lakes site based on site-specific factors. A property along Jefferson Avenue had a SSD system installed where horizontal perforated pipes were placed below the building slab. This approach is only appropriate for new construction (as was the case with the Jefferson Avenue building).

21. *Who is responsible for tax relief for people whose property was trespassed by corporate polluters? Why are Pompton Lakes' residents paying some of the highest property taxes in the country to live on contaminated land? Why is no one being held responsible for allowing exorbitant tax rates to go on for over two decades? Why do these taxes remain so high while resident's property values cannot possibly be the same as they would be if they were not contaminated?*

Answer: All issues dealing with real estate taxes should be discussed with your municipal officials.

22. *Shouldn't there be monetary compensation for homeowners whose property has the potential to never be remediated in their lifetime?*

Answer: Monetary compensation for contaminated properties should be discussed with DuPont officials.

23. *The aesthetics of the exterior of the system are also a concern. DuPont agreed in an open public meeting to enclose the system in a false stone chimney. Nothing has been done.*

Answer: As noted in Question #13, the USEPA/NJDEP require a large number of technical and performance specifications for the mitigation systems. In addition, DuPont has agreed to work with the building occupants to adjust the system design and accommodate individual requests as long as they are reasonable and don't impact the overall effectiveness of the mitigation system.

Installation of a false stone chimney is not a technical or performance-based specification for the mitigation systems. Therefore, the NJDEP can not require DuPont to utilize false stone chimneys. This issue should be discussed with DuPont.

24. *Some residents are in the process of selling their homes. These homes were tested by O'Brien and Gere via air-sampling only and received a "non-detect reading" for chemicals of concern. In some of these cases a "clean closure" letter has been provided to the potential buyer. These letters state that the home is clean of hazardous chemicals. However, air-sample testing can fluctuate on a regular basis due to numerous conditions such as time of year, weather, ground water condition, atmospheric pressure and also when certain utilities in the home such as heat and central air conditioning units are being used. How is it appropriate to issue a "clean closure" letter on a home without conducting Sub-Slab Testing? The town of Pompton Lakes should issue an ordinance mandating full disclosure of contaminated properties to the potential buyer.*

Answer: There are numerous factors that must be evaluated when determining whether the vapor intrusion pathway is a concern at a particular property. The issues raised in the question (as well as many others) all must be assessed as part of a methodology referred to as a "multiple lines of evidence" approach. No single line of evidence (i.e., an indoor air sample) is sufficient to decide whether there is or is not a vapor intrusion problem.

The USEPA/NJDEP has not issued any indoor air "clean closure" letters to any property owner within the PVMA. In 1997 NJDEP began issuing Clean Closure letters to Pompton Lakes Borough homeowners whose properties were cleaned up by DuPont relative to the soil remediation activities conducted along the Acid Brook.

Indoor air result letters sent by NJDEP to property owners within the PVMA continue to recommend the installation of the vapor mitigation system. Sub-slab soil gas vapor result letters sent to property owners in the Expanded Investigation Area where the levels are below the Site-Specific Sub-Slab Soil Gas Comparison Levels state that "exposure pathway for vapor intrusion is not complete and therefore no further investigation is necessary at this time." Upon installation of a vapor mitigation system and approval of the submitted Remedial Measures Report by DuPont to NJDEP/USEPA, the property owner will receive a letter stating that "the pathway for subsurface vapors to enter the structure and impact indoor air quality has been eliminated with the implementation of the sub-slab depressurization system."