

DNR Case Closure Continuing Obligations: Vapor Intrusion

RR-042

August 2015

This document is intended to help responsible parties and environmental consultants determine which vapor intrusion continuing obligations to apply **at the time of the case closure request**. Section NR 726.15(2)(h) through (L), Wis. Adm. Code, lists five continuing obligations that may be applicable at sites closed with residual contamination in order to protect the vapor intrusion pathway. This document discusses when to apply those continuing obligations. The continuing obligations discussed in this document are listed in the order found in Form 4400 – 202, Case Closure - GIS Registry. The list of continuing obligations can be found in Section 5 under “Site Summary” of that form. The headings and numbering used in this document parallel those found in Form 4400 – 202. While each of the five continuing obligations is discussed individually, combinations of these conditions may be applicable to a given contaminated property.

This document only addresses continuing obligations or closure conditions pertaining to the vapor intrusion pathway. This document presumes that all necessary actions, including a complete site investigation, source treatment or removal, and any other remedial action necessary to qualify for site closure have been completed. For information on screening and investigating the vapor intrusion pathway, please refer to RR-800, [Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin](#).

In accordance with s. NR 722.15(d)5, Wis. Adm. Code, the Department has authority to require continuing obligations at the time of remedial action plan approval. Specific criteria for closure of sites with vapor contamination can be found in s. NR726.05 (8), NR 726.13 and NR 726.15, Wis. Adm. Code. Post-closure actions related to continuing obligations can be found in ch. NR 727, Wis. Adm. Code. Sections NR 727.09(4) and (5), Wis. Adm. Code, set out criteria for removal or modification of continuing obligations when all applicable standards have been met and all requirements imposed have been satisfied or nullified.

An attachment to this document, “Considerations for Applying Vapor Intrusion Continuing Obligations”, summarizes recommended criteria for applying continuing obligations at sites with residual volatile organic chemical (VOC) contamination. The numbers in the “Considerations” attachment are only recommendations. All decisions for applying continuing obligations are made on a site-by-site basis using professional judgment.

Section 5 of Case Closure – Geographic Information System (GIS) Registry Form 4400-202 Continuing Obligations

I. **Case Closure Situation (ix): Vapor Mitigation System (VMS) required due to exceedances of the vapor risk screening levels or other health-based concern.**

A. Application

Section NR 726.15(2)(h), Wis. Adm. Code, states that the Department may require installation and operation of a vapor mitigation system for facilities where sub-slab levels



attain or exceed the vapor risk screening level¹. In lieu of a vapor mitigation system (VMS), responsible parties can choose to implement a long-term vapor intrusion monitoring program at buildings in order to demonstrate that remedial actions have addressed vapor risk and there is no future exposure risk to occupants. Site closure is not usually granted at properties where long-term monitoring is being implemented. A property where sub-slab vapor concentrations exceed screening levels is not eligible for closure unless the vapor exposure pathway has been interrupted or mitigated in accordance with s. NR 726.05(8)(b)2, Wis. Adm. Code.

Interruption or mitigation of the vapor exposure pathway usually involves installation of a VMS within the affected building(s). A VMS should be installed, operated and maintained if sub-slab vapor concentrations exceed vapor risk screening levels (VRSL). Vapor mitigation systems are usually installed in residential, commercial and industrial settings when sub-slab vapor concentrations exceed the applicable VRSL. However, there may be exceptions to this depending on building use and construction. For example, warehouses that are occupied for very short durations or buildings where large overhead doors are open most of the time when people are present.

Reliance upon a VMS to interrupt or mitigate contaminated vapor movement into a building at the time of closure will result in placement of a continuing obligation upon the property owner to operate and maintain the VMS post-closure. The most common types of VMS² include:

1. *Passive venting systems* that can be converted to active systems. In general, passive venting systems are only appropriate to interrupt or mitigate vapor intrusion at newly constructed buildings where the venting system is designed and installed beneath the entire building foundation before construction³.
2. *Sub-slab depressurization systems (SSDS)*. These are the most commonly installed VMS. Through the installation of pipes and fans, these systems actively remove vapors from beneath the building foundation and vent the vapors to the outdoors.
3. *Sub-membrane depressurization systems*. These systems are most often installed over dirt floors and block walls. An impermeable membrane covers the entire surface to be depressurized and is sealed to the building foundation. Perforated PVC pipe underlies the membrane or a piping system depressurizes the block wall. The PVC piping extends outside the building and is connected to a fan which depressurizes the space between the membrane and the sealed area.
4. *Sub-slab pressurization systems*. Fans on these systems force air beneath the building foundation to create a positive pressure to displace vapors away from the building. These systems are rarely used due to problems with system effectiveness and high energy costs.
5. *Building pressurization systems*. These systems rely on a building's heating, venting and air conditioning (HVAC) system to maintain positive indoor pressure relative to the sub-slab pressures. Proper operation of these systems requires regular maintenance and air

¹ Vapor risk screening level is defined in NR 700.03(66w). The VRSL is the vapor action level divided by the appropriate attenuation factor. The vapor action level is defined in NR 700.03(66p). The vapor action level is the concentration of a contaminant in indoor air at or above the 1-in-100,000 excess lifetime cancer risk or at or above a hazard index of 1 for non-carcinogens.

² Additional information on types of VMS can be found in the ITRC guidance, [Vapor Intrusion Pathway: A Practical Guide](#).

³ Criteria to determine when to require upgrading a passive system to an active system will be a topic of a future guidance.

balancing of the building on a periodic basis. Building pressurization systems are appropriate for certain commercial and industrial buildings but should not be relied upon at residential buildings.

6. *Ventilated unoccupied parking garages.* Underground or first floor parking garages that meet the building codes and separate the occupied floor levels from the ground surface may be used to control vapor migration into the occupied space above.
7. *Other engineered VMS.* Any other engineered system, which may include building design, operations and existing engineering controls or HVAC systems that can be shown to protect the building occupants from vapor intrusion.

B. Documentation

Regardless of the vapor control system used at a building, the responsible party (RP) should provide information on design, implementation, proper operation and a long-term operation, maintenance and monitoring plan. The following list summarizes basic information that should be submitted to the Department prior to the submittal of, or accompanying, the closure request. Specific requirements can be found in ch. NR 724, Wis. Adm. Code.

1. *Documentation of system installation* and effective operation, including: as-built drawings; photographs; documentation of pressure field extension; post-installation indoor air sampling at residential buildings; system monitoring showing proper operation; alarm systems (if installed); etc.
2. *Operation and Maintenance (O&M) Plan*, including: actions necessary to maintain the system; frequency of inspection; monitoring; system adjustment; logs for recording all O&M efforts; photographs showing points in the system that need inspection or maintenance; etc.

C. Notification and Other Requirements

1. *Installation of Vapor Mitigation System.* Vapor mitigation system design plan, as-built documentation and the operation, maintenance and monitoring plan should be provided to the property owner, if the owner is not the RP, at the time these documents are provided to the Department. Notify the property owner(s) that they must operate the VMS until no longer required by the Department, in accordance with s. NR 724.13(1)(c), Wis. Adm. Code. Property owners should also be notified of O&M responsibilities that they may become responsible for following site closure.
2. *Pre-closure request.* Chapter NR 725, Wis. Adm. Code, requires that notification be given to parties affected by residual contamination and continuing obligations prior to closure. Where a VMS is needed to interrupt or mitigate the vapor exposure pathway, the current property owner (if the owner is not the RP) must be notified that sub-slab vapor risk screening levels are exceeded and that operation and maintenance of a VMS is necessary in order to limit or prevent vapor intrusion. Department Form 4400 – 286 should be used to provide notification of continuing obligations and residual contamination. If occupants will be affected by the system, or required to operate a system, they should also be notified.
3. *Post-closure approval.* As a condition of closure, the Department may require the property owner to maintain inspection logs and to keep those logs on the premises. The Department may also require post-closure submittal of VMS operation, maintenance and monitoring records on a periodic basis. Use the Department provided Form 4400-305,

Continuing Obligations Inspection and Maintenance Log, to record inspection and maintenance activities required by the closure letter (s. NR 727.05(1)(b)3, Wis. Adm. Code). Notification of the Department may be required for changes to building construction, including additions to or partial removals of the building.

II. Case Closure Situation (x): Vapor: Dewatering System needed for VMS to work effectively

A. Application

Section NR 726.15(2)(j), Wis. Adm. Code, states that the Department may require installation and operation of any systems necessary for the proper operation of a VMS based on site-specific hydrogeologic circumstances. This continuing obligation specifically refers to situations where groundwater may intersect a building foundation and interfere with proper operation of a VMS. This continuing obligation may require the operation of groundwater pumping and discharge systems (dewatering) in order to address the vapor risk at specific buildings. In addition, the groundwater itself is usually contaminated in these situations. A continuing obligation may be required in order to address the proper handling and disposal of the contaminated groundwater.

The continuing obligation requiring operation and maintenance of the dewatering system is always accompanied by a continuing obligation to maintain a VMS (refer to section I above).

B. Documentation

1. *Discharge to a Publically Owned Treatment Works.* There may be wastewater discharge requirements or even permitting requirements for hydrologic control systems that are paired with VMS. This is because the discharged groundwater is usually contaminated. The local wastewater treatment authority is responsible for approving a discharge of contaminated water to a sanitary sewer. If a local wastewater discharge permit has been issued, the closure request should include the following information:
 - a. A copy of the permit,
 - b. Necessary steps to comply with the permit including sampling and testing of the groundwater, if required, and
 - c. Any other conditions imposed by the wastewater discharge permit.

This information will be referenced in the Department issued closure letter as an ongoing continuing obligation. The property owner is responsible for any testing, analysis or other requirements applied to the discharged water.

2. *Discharge to a location other than a POTW.* If a wastewater discharge is planned for any location other than a POTW, Regional Department wastewater staff should be consulted to determine the appropriate regulatory framework for the discharge. Any Department wastewater requirements (such as treatment, discharge location, monitoring and reporting requirements, etc.) should be documented in the closure request by referring to or attaching the wastewater approval document with the closure request.

C. Notification and Other Requirements

1. *Pre-closure request.* Notification is provided to the current property owner (when that person is not the responsible party) and to any other property owner where a vapor mitigation system is necessary and a dewatering system is needed to enable the vapor mitigation system to operate effectively. The notification should include the operation, maintenance and monitoring responsibilities that will be expected of the property owner post-closure.
2. *Post-closure approval.* As a condition of closure, the Department may require the property owner to maintain inspection logs of the water control system and to keep those logs on the premises. The Department may require post-closure submittal of the operation, maintenance and monitoring records for the dewatering system on a periodic basis. Use the Department provided Form 4400-305, Continuing Obligations Inspection and Maintenance Log, to record inspection and maintenance activities required by the closure letter.

III. **Case Closure Situation (xi): Vapor: Compounds of Concern in use: full vapor assessment could not be completed**

A. Application

Section NR 726.15(2)(i), Wis. Adm. Code, states that the Department may require installation and operation of a VMS where the site is using compounds of concern in their daily operations. In addition, the Department may require restrictions on the use or occupancy of the property to ensure that closure will be protective. If this restriction is applied, the Department must be notified and the vapor intrusion pathway must be fully evaluated prior to changing the use of the property to a residential setting.

This continuing obligation is applied when the contaminant that poses a vapor intrusion risk is also stored or used within the building. For example, at dry cleaner facilities where perchloroethylene (PCE) is used as a cleaning solvent and is also present beneath the building foundation at concentrations that exceed the VRSL. Land use will be restricted to commercial/industrial use in these settings (see section IV below). Under this continuing obligation, the Department may restrict the use or occupancy of the property, including requiring that the property owner notify the Department if land use changes from the current use to any other commercial or industrial use.

This continuing obligation is applied at properties that may require more thorough reassessment regarding the vapor pathway when land or property uses change. This reassessment may be necessary for several reasons. Buildings where solvents are used may have high concentrations of VOC beneath the foundation. Where very high sub-slab VOC concentrations exist, VMS must be closely controlled to ensure adequate pressure field extension in order to meet indoor air commercial/industrial screening levels. It is only anecdotal at this point, but there is some evidence that blower fans wear out more quickly in high VOC environments. Off-gassing from building materials is not technically “vapor intrusion.” None the less, chemical exposures due to off-gassing may be unacceptable for the subsequent use of the building. Possible follow-up actions that may be considered if land use conditions change include (s. NR 726.15(2)(j), Wis. Adm. Code):

1. *Evaluate the effectiveness of the mitigation system.* For instance, if a SSDS has been installed, evaluate pressure field extension and reassess the VMS to determine that it is functioning properly.
2. *Reassess the vapor intrusion pathway* if a VMS was not installed before site closure occurred.

3. *Indoor air testing, if necessary.* The need for indoor air testing after a land use change should be determined based on the new land/property use.

A site requesting closure where contaminants of concern are in use at the facility and where a site investigation of the vapor pathway cannot be completed is not eligible to receive a Voluntary Party Liability Exemption (VPLE). Contact the Department if a structural impediment or other reason prevents the vapor intrusion conditions (and, in some cases soil or groundwater contamination) from being thoroughly investigated at a VPLE site.

B. Documentation

Chemical use within the building should be documented in the closure request. Contaminant source zones often underlie building foundations at these facilities and it is difficult or impossible to remove or treat the full source zone under current conditions. In most cases a VMS is installed prior to closure at these properties (even if the production processes continue post-closure) to ensure that the vapor pathway is interrupted. All the requirements for the continuing obligation of the VMS discussed in section I above will apply if a VMS is operating at the time of closure.

C. Notification and Other Requirements

1. *Pre-closure request.* Notification is to be provided to the current owner of the source property when that person is not the RP conducting the cleanup. The property owner will be notified that because the compound of concern is still in use, a complete investigation of the vapor pathway may not be practicable.
2. *Post-closure approval.* The Department must be notified at least 45 days prior to a land-use change in situations where closure is approved and the contaminant of concern continues to be used as a product within the site or facility. The vapor intrusion pathway must be evaluated prior to changing land-use to a residential setting and may be necessary before changing land use to another commercial or industrial use.

IV. Case Closure Situation (xii): Vapor: Commercial/industrial exposure assumptions used

A. Application

Section NR 726.15(2)(k), Wis. Adm. Code, states that the department may restrict use or occupancy of the property for sites or facilities based on specific exposure assumptions for vapor intrusion, to ensure that closure is protective. The continuing obligation is applied at buildings where commercial/industrial vapor risk screening levels are used to achieve site closure. The continuing obligation restricts property to non-residential⁴ uses. This continuing obligation may be used in conjunction with implementation of a VMS. That is, vapor mitigation systems may be needed at these buildings where commercial/industrial screening levels are applied. , For the purpose of establishing land use classification as related to vapor risk, commercial/industrial land use is assumed wherever the current property use is not residential,.

B. Documentation

The closure request should document exposure assumptions used to assess the VI pathway and current land use of the building (that is, residential, commercial or industrial). If future changes in land use are expected, this should also be documented in the closure request.

⁴ s. NR 700.03(49g), Wis. Adm. Code, states “residential setting” means any dwelling designed or used for human habitation, and includes educational, childcare, and elder care settings.

C. Notification and Other Requirements

1. *Pre-closure request.* Notification is provided to the property owner (when that person is not the responsible party) that the property use may be restricted to commercial/industrial use. Additional actions may be necessary if the property use changes to a residential setting in the future.
2. *Post-closure approval.* In cases where land-use is restricted to commercial/industrial uses, the property owner is expected to notify the Department at least 45 days prior to changing land/property use to residential use, in accordance with s. NR 727.07(5), Wis. Adm. Code. If land use changes to a “residential setting”, the vapor intrusion pathway may need to be reassessed. This may include indoor air testing at the building, to determine if occupants are protected from chemical vapor exposure. Additional actions may be necessary to protect the vapor pathway.

V. **Case Closure Situation (xiii): Vapor: Residual volatile contamination poses future risk of vapor intrusion**

A. Application

Section NR 726.15(2)(L), Wis. Adm. Code, states that where residual soil or groundwater contamination from VOCs exist at a site or facility where no building is present, the agency may require measures to eliminate or control vapor intrusion into a future building. The purpose of this continuing obligation is to eliminate, to the extent possible, vapor intrusion risk to occupants of future buildings developed at properties with residual contamination. “Future buildings” include construction of new buildings or expansion of existing buildings where the foundation is placed near or over residual contamination. Site specific conditions and professional judgment will determine whether a continuing obligation for future vapor risk is selected for a property. Submit data and include a specific discussion of the potential for future vapor risk, particularly if the conditions discussed below are present at a property. Data from multiple-lines of evidence can be used to establish the magnitude (high to low) for risk of vapor intrusion to future buildings.

Where this continuing obligation is required, the Department expects that vapor control technologies will be designed into the new building prior to construction unless the risk of vapor intrusion is assessed and the Department agrees that vapor control technologies are not needed. When this continuing obligation is imposed, the Department will usually expect that the VMS will be designed and installed at future buildings. Regardless of the approach to vapor intrusion control, information must be provided showing the risk of vapor intrusion has been addressed through the proposed building design, in accordance with NR 727.07(6), Wis. Adm. Code.

Soil and/or groundwater contaminated with PCE and/or trichloroethylene (TCE) can be the source of vapor migration onto an undeveloped, adjacent property where no building exists at the time of closure. The site investigation should establish that vapor migration onto the adjacent property is or is not a risk to a possible future building. This determination should consider contaminant concentration in soils and groundwater; distance between the source property contamination and the adjacent property; soil type; underground utilities and other relevant information.

B. Residual contaminant levels to be considered when selecting continuing obligations for future buildings

The following situations should be considered when selecting a continuing obligation to protect future buildings from potential exposure to vapors.

1. *NAPL presence*. Current or historical evidence of petroleum non-aqueous phase liquid (NAPL) in soil or at the groundwater table that has not been remediated and may pose a vapor risk to future buildings⁵. This includes floating product, laser induced fluorescence (LIF) response, or similar indicators of petroleum NAPL.
2. *Soil*. Soil RCLs for the “indoor air” pathway are not available. Guidelines are provided below and in the attached table, “Considerations for Applying Vapor Intrusion Continuing Obligations,” to help determine when a continuing obligation for future exposure to vapors may be necessary if residual soil contamination remains on a property. Professional judgment should be used to determine when site-specific conditions require the application of this continuing obligation.
3. *Groundwater*. Vapors arise from VOC contamination located at/near the water table. Groundwater contaminant concentrations from water table wells should be used to determine if there is a risk for vapor intrusion. Calculated groundwater VRSLs should not be used to rule out vapor intrusion at future development sites. Variation in groundwater elevation and contaminant concentration over time should be considered when determining whether to require a VMS at future buildings. Consider site geology and soil stratigraphy when applying the recommendations below and in the “Considerations” table. Use professional judgment in considering this continuing obligation where residual groundwater contamination remains on a property.
4. *Contaminant concentration to be considered when applying a continuing obligation for future exposure to vapors*. The following situations should be considered when selecting a continuing obligation for future exposure to vapors. Site specific conditions and professional judgment will determine the potential for a risk of vapor intrusion to future buildings.
 - a. Chlorinated VOCs
 - i. *Soil*. PCE or TCE (or other non-aerobically degradable VOC that presents a health risk) is present above a groundwater protective residual contaminant level (GW-RCL) anywhere within the vadose zone and a building can be placed above the soil contamination. Vadose zone soils include soils at the water table that are seasonally exposed due to water table fluctuations.
 - ii. *Groundwater*.
 - 1) Concentrations at or above enforcement standard (ES) for PCE or TCE (or other non-aerobically degradable VOC that presents a health risk) exist on a property.

⁵ Expect highly weathered diesel NAPL to have low VOC content and to pose a low vapor risk.

- 2) Groundwater contaminated with PCE or TCE (or other non-aerobically degradable VOC that presents a health risk) above preventive action level (PAL) may come in contact with the foundation of a future building.

b. Petroleum VOCs (PVOC)

- i. *Petroleum NAPL*⁶ exists near any location where a building can be placed on the property (including the “smear zone”). Indicators of NAPL include any of the following:
 - 1) LNAPL floating on the water table, LIF survey results, etc.
 - 2) Soil
 - a. Benzene (B) ≥ 10 mg/kg
 - b. Naphthalene⁷ ≥ 5 mg/kg
 - c. Total PVOC⁸ ≥ 250 mg/kg
 - 3) Groundwater
 - a. Benzene (B) > 1 mg/l
 - b. Total PVOC > 30 mg/l
- ii. *Soil*. Significant soil contamination less than NAPL indicators is located within five feet of a possible future building foundation.
- iii. *Groundwater*.
 - 1) Significant dissolved petroleum VOCs are present at concentrations less than NAPL indicators and a future building foundation can be placed within five feet or less of the contaminated groundwater.
 - 2) Dissolved petroleum VOCs at concentrations above PAL may come in contact with the foundation of a future building.

C. Documentation

The closure request should document contaminant conditions that indicate a continuing obligation for future exposure to vapors is necessary. If there are no conditions that indicate the need for this continuing obligation, this should also be stated in the closure request.

D. Notification and Other Requirements

1. *Pre-closure request*. Notification is provided to the property owner (when that person is not the responsible party) that the Department must be notified at least 45 days prior to expanding existing or constructing future buildings. In addition, vapor control technologies may need to be used in expansion of existing buildings or construction of future buildings unless an assessment shows that remaining contaminant levels do not present a vapor intrusion risk.
2. *Post-closure approval*. Because additions or changes to an existing building located near remaining contamination can affect vapor movement into that building, the Department must be notified at least 45 days prior to any future expansion of an existing building or

⁶ See ITRC PVI Guidance, <http://www.itrcweb.org/PetroleumVI-Guidance/>, for more information on NAPL indicators.

⁷ The naphthalene NAPL screening value is based on the non-industrial direct contact soil RCL. NAPL may exist at lower concentrations of naphthalene, based on site-specific conditions.

⁸ Total PVOC = the sum of benzene, ethylbenzene, toluene, xylenes (BETX), methyl tert-butyl ether (MTBE), and all trimethylbenzenes (TMBs).

construction of entirely new buildings on a contaminated property closed with this continuing obligation (in accordance with s. NR 727.07(6), Wis. Adm. Code). The notification should include information that demonstrates:

- a. The installation of appropriate vapor control technology at the building, or
- b. An evaluation and data showing there is no risk from the vapor intrusion pathway.

This document is intended solely as guidance and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations and is not finally determinative of any of the issues addressed. This guidance does not create any rights enforceable by any party in litigation with the State of Wisconsin or the Department of Natural Resources. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts. This publication is available in alternative format upon request. Please call 608-267-3543 for more information.

Considerations for Applying Vapor Intrusion Continuing Obligations

(Numbers in this table are only recommendations. All decisions for applying continuing obligations are made on a site-by-site basis using professional judgment.)

Continuing Obligation Options Case Closure-GIS Registry Form 4400-202	Criteria for Application of VI Options	
	Chlorinated VOCs	Petroleum VOCs
(ix) O&M of VMS needed to protect VI pathway	Sub-slab > VSRL	Sub-slab (each compound, respectively): BETX, N, MTBE, TMBs > VRSL
(x) Hydrologic control for VMS to operate effectively	Sub-slab/sump air > VRSL At highest level, water table intersects building foundation	Sub-slab/sump air BETX, N, MTBE, TMBs > VRSL Water table intersects foundation
(xi) Compounds of Concern in use	Sub-slab > VRSL Solvent use in building at time of closure	Sub-slab: BETX, N, MTBE, TMBs > VRSL Petroleum products used within building
(xii) Commercial/Industrial Exposure Assumption	Sub-slab > Commercial/industrial VRSL Solvent NOT in use at time of closure	Sub-slab: BETX, N, MTBE, TMBs > Commercial/industrial VRSL
(xiii) Future Construction. Includes remodeling or additions on an existing building. (assumes: 1) there are no preferential pathways between the new building and residual VOC source and 2) the groundwater plume is stable or receding)	<u>If any of the following exist:</u> <u>Soil:</u> GW-RCL for PCE/TCE met or exceeded anywhere in vadose zone on property <u>GW</u> ≥ ES on property <u>GW</u> ≥ PAL if contaminated groundwater may contact building foundation	<u>NAPL:</u> (any of the following indicators) near where a building can be placed on the property: 1. Soil: B > 10 mg/kg; N > 5 mg/kg; Total PVOC > 250 mg/kg 2. Groundwater: B > 1 mg/l; Total PVOC > 30 mg/l 3. Presence of petroleum product (e.g., floating product, LIF survey results) <u>Soil:</u> significant contamination less than NAPL indicators and a building foundation can be placed within 5 feet of the contamination <u>Groundwater:</u> (significant dissolved petroleum less than NAPL indicators) 1. Building foundation can be placed within 5 feet or less of contaminated groundwater 2. Dissolved petroleum VOC ≥ PAL if contaminated groundwater may contact building foundation

Notes:

1. Perform remedial action/source control prior to closure request when operation of a vapor mitigation system (VMS) in order to protect the vapor pathway, as required by NR 726.05(8).
2. If a VMS is installed and operating, documentation of the system installation and effectiveness is required by NR 724.15.
3. An O&M plan, including all requirements of NR 724.13(2)(k) must be submitted with the closure request. An O&M plan should have been provided to the property owner and DNR at the time of VMS installation.