

Comment Response Summary to RR Program Guidance, RR-986 “Sub-Slab Vapor Sampling Procedures”

Based on the 21 day public comment period held between June 11 and July 2, 2014

Prepared by Theresa Evanson

July 2014

Thank you to the individuals that provided feedback on the Department of Natural Resources (Department) proposed guidance titled “Sub-Slab Vapor Sampling Procedures”. The following summarizes the comments received and the response to comments. Changes made in the document are noted under the title **Revision** in redline/strikeout. Verbatim comments are attached following the comment response summary.

Summary of Comment	Name/Organization	Response to Comment
Who were the 3 consultants who reviewed the sub-slab VI guidance?	James Hogan, ECC Horizon	SCS Engineers EnviroForensics TRC
Does purging three volumes from the sampling train via the pump at the helium sampling port satisfy DNR that the sample train between the pump and the summa canister is purged? Figure 2, caption note 3 states that the pump is used to purge the sampling port...but it is used to purge the sampling train – correct?	William M. Gregg, Summit Envirosolutions	Yes, the pump purges the full sampling train. Revision: Figure 2. Caption note 3. “Hand or electric pump with vacuum gage to purge sample train and port and create vacuum on sample lines for shut-in test;”
DNR’s Quick Look-up Table for determining indoor vapor action levels: DNR’s table should use the same chemical names as reported by the laboratories in the same order as the laboratory reports; and standards change every 6 months	Eric Dahl, METCO	The Sub-Slab Vapor Sampling Procedures guidance does not address vapor action levels. Consulting firms use laboratories around the country to test air samples. The laboratory reports are not consistent from one lab to another. The Quick Look-up Table is meant as a quick reference for the more common VOCs. We have updated our web page, http://dnr.wi.gov/topic/brownfields/vapor.html#tabx3 , to provide more information on how to determine the DNR VALs using the on-line EPA Vapor Intrusion Screening Level Calculator.

		EPA updates the Regional Screening Level Tables every six months. These tables are the basis of DNR’s VALs and therefore, DNR updates the VALs every six months.
Summa canisters should be required exclusively for vapor samples to enhance QA/QC.	Todd Rickey, TARickey Geosciences	Sec. III, D states, “After screening, a sub-slab vapor sample is drawn into the Summa canister.” The guidance does not discuss alternate sampling containers. However, alternate containers are allowed by RR-800, Addressing Vapor Intrusion a Remediation & Redevelopment Sites in Wisconsin . There are instances, such the use of on-site laboratories, where alternate containers are useful for collecting vapor samples.
RR-986 procedures need to be adapted for borehole vapor sampling. Summa canisters need to be required but 6L canisters can be problematic for transport.	Todd Rickey, TARickey Geosciences	The procedures in this guidance can be adapted to soil borehole vapor sampling. Additional guidance on collection of vapors from soil boreholes may be developed in the future.
Does the guidance allow the use of the Cox-Colvin Vapor Pin for collection of sub-slab vapor samples?	Donovan Hannu, West Bay	Yes. Section II, 1 st paragraph states: “A brass or stainless steel probe is placed in the hole and an airtight seal is created around the metal probe. . . Probes with pre-manufactured silicon seals that are hammered into the probe hole are also acceptable.” Cox-Colvin Vapor Pins are pre-manufactured brass probes with silicon seals that are hammered into the probe hole.
What is the basis for the 1 – 2 hour time for equilibration following installation of the sub-slab probe? Wouldn’t purging a sufficient volume eliminate the need for extended equilibration time?	Stephen Meer, The Sigma Group	The one to two hour equilibration comes from the EPA document, EPA/600/R-05/147, Assessment of Vapor Intrusion in Homes Near the Raymark Superfund Site Using Basement and Sub-Slab Air Samples . Very little research has been done on equilibration time after installation of sub-slab probes. The concern is that installation of the probe disturbs the sub-slab vapor concentration. However, adequate purging and repeated screening with a PID meter should help the investigator determine that the vapor concentrations are stable. The downside to too much purging is that clean air can be drawn into the sample through the cracks and natural permeability of the slab. Revision: Sec. II, 5 th paragraph: “After installation allow at least 1 to 2 hours adequate time for curing of the seal. Allow sub-slab vapors to equilibrate and for equilibration of the sub-slab vapor prior to sampling.”

		This can be achieved by allowing the probe to “rest” one to two hours OR by purging the sub-slab probe and screening the sub-slab vapors until PID readings are stable.”
For decision-making purposes, we have found that the number of sub-slab sampling events can be reduced to 2 events, one during the seasonally low water table and one during the heating season. We disagree with the statement that vapor intrusion is least likely to occur in the summer because a seasonally low water table in the summertime exposes a wider “smear zone” of soils.	James Hogan, ECC Horizon	<p>It is true that contaminants trapped near the water table can be seasonally exposed as water table drops and result in vapor intrusion to nearby buildings. Volatile contaminants trapped near the water table are most likely to occur close to the source of release – contaminant exposure due to water table fluctuation will be much less of a factor farther from the source of release . In addition, low water table does not occur in the same season at all sites. The water table fluctuation pattern may not be known at the site where the sub-slab vapor sampling is taking place. The guidance allows fewer than three sub-slab samples. Consultants can propose and DNR PMs can approve alternate sampling plans as long as there is rationale for the alternate plan.</p> <p>Revision: Sec. VI Bullet 3. “The investigator can recommend an alternate sampling plan for Department approval The DNR Project Manager has the discretion to determine the actual number of sub-slab samples collected at a specific residential property properties based on site specific conditions such as:</p> <ul style="list-style-type: none"> - vapor concentrations in the initial sub-slab and indoor air samples; - location of the residence in relationship to the contaminated soil and groundwater source; - sub-slab results from nearby residents or soil vapor probes; - season of the year when the first sub-slab sample is collected; - pattern of water table fluctuation; etc.
It is not clear that two leak tests are needed: one for the probe and one for the sampling train.	Liz Evans, DHS	Revision: Sec. III, 1 st paragraph: “Two leak tests (one for the sampling train and one for the sample probe) should be conducted for every sub-slab vapor sample in order to establish air tightness.”
Label to Figure 2 lists two #4 components.	Liz Evans, DHS	Revision: Fig. 2, Caption. “ 4. 5. Summa canister . . .”
Figure 2. Show the sampling port with a counter-sunk hole in the concrete	Liz Evans, DHS	Revision: Figure 2 has been revised to show the probe in a counter sunk hole.

<p>Access agreements often have alternate agreements for data disclosure.</p> <p>NR 716.14(3) allows DNR to approve alternate notification schedules on a case-by-case basis. It would be helpful to state that alternate plans may be proposed for Department consideration.</p> <p>An analysis of the cause and significance of every individual instance in which any contaminant concentration is observed would be meaningless.</p>	<p>Lynn Morgan, Waste Management</p>	<p><i>results are not expected to be of immediate health or welfare concern, the department may consider other schedules . . .to be sufficient.</i></p> <p>Responsible parties can request an alternate notification schedule as long as the request is justified and the request specifically addresses health concerns. The note to NR 713.14(3) explains that possible human health effects are the primary criteria for assessing an alternate notification time frame. Vapor intrusion can present an "immediate threat" to people. For example, trichloroethylene (TCE) has short-term health effects on the developing fetus.</p> <p>Revision: Sec. V, second paragraph. "Ch. NR 716.14(3) allows the Department to approve a different notification schedule on a case-by-case basis. Submit the request* prior to sampling, state the reasons for the different notification schedule and propose an alternate schedule. Health concerns should be specifically addressed in the request." (footnote)* Chapter NR 749.04(1): Appropriate fees shall accompany all requests for specific Department assistance.</p> <p>Regarding providing the Department with a "preliminary analysis of results: a "preliminary" analysis means that the assessment of site conditions may change as more information becomes available. The preliminary analysis should address the site-wide cause and significance of identified contaminants. When multiple sampling events occur, responsible parties or investigators can refer to the previous documents if there is no change in the conclusions of the "preliminary analysis".</p> <p>Revision: Sec. V, third paragraph. "The investigator's understanding of the site will evolve as more data become available. It is expected that the preliminary analysis will also evolve over time. A new analysis is not necessary with the reporting of each sampling event if there is no change from the original preliminary analysis.</p>
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<p>Sec. IV should recognize the variability of the VI pathway, allow for alternate evaluation efforts and a determination of a completed pathway before requiring installation of a mitigation system.</p> <p>Sec. IV, bullet 2. One sampling event or one sampling location above the VRSL does not necessarily warrant a mitigation system.</p>	<p>Brian Hennings, NRT</p>	<p>This comment is beyond the scope of this sub-slab sampling guidance. The Department’s guidance on vapor intrusion, RR-800, provides alternate approaches to mitigation, including long-term monitoring when VRSLs are exceeded.</p> <p>Revision: Sec. IV, Point 2, add: “Refer to RR-800, Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin, for more information on responses to vapor concentrations that exceed screening levels.”</p>
<p>Sec. 1, paragraph 2, remove word: “. . . a work plan should to be prepared.”</p>	<p>Brian Hennings, NRT</p>	<p>Revision: Sec. I, 1st paragraph. “a work plan should to be prepared”</p>
<p>Sec. II, second paragraph. Recommend edits to punctuation and inclusion of the sentence: An estimate of the thickness of the foundation slab should be measured and recorded at each sub-slab sampling location to document site conditions.</p>	<p>Brian Hennings, NRT</p>	<p>Revision: Sec. II, 2nd paragraph. “. . . create a 1” diameter hole about 1” to 2” deep into the foundation (the holes can be drilled in reverse order-). This creates a ledge for the sampling probe and allows the concrete or other sealing material to be placed around the metal probe. The thickness of the foundation slab should be measured and recorded at each sub-slab sampling location to document site conditions.</p>
<p>Does the sampler have discretion to use the Summa canister to provide the vacuum for the shut-in test?</p>	<p>Brian Hennings, NRT</p>	<p>The Department does not recommend using the vacuum of the Summa canister to perform the shut-in test because, if there is a leak, the Summa canister will be compromised and a new canister will be needed to collect the vapor sample after fixing the leak. A simple, inexpensive hand pump can be used to create the small vacuum necessary for the shut-in test. However, the investigator can choose the sampling method. Document the method used.</p> <p>Revision: Sec. III, A. “A vacuum gage must should be connected . . .”</p>
<p>Sec. III, subsec. B & D. There has been a shortage of high purity helium in recent years. Can balloon-grade helium be used? If so, would the Department require a sample of the helium be submitted for laboratory analysis of the contaminant list to assess effects on data quality?</p>	<p>Brian Hennings, NRT</p>	<p>Helium gas supply has experienced shortages in the last few years. These shortages are expected to ease with new supplies of helium. Other gaseous tracers can be used such as sulfur hexafluoride (SF₆). If the investigator believes that the tracer may contribute to the specific contaminants being tested, then a sample of the helium should be submitted to the laboratory. Otherwise, the Department does not require testing of the helium or other gaseous tracer.</p>

		<p>Revision: Sec. III, subsec. B, add footnote. “Refer to ITRC’s Vapor Intrusion Pathway: A Practical Guide”, Appendix D.4.7 for more information on gaseous tracers used in leak detection.”</p>
Can the helium leak test and purging of the sample train be accomplished using the same sample?	Brian Hennings, NRT	<p>Three volumes of air from the sample train should be purged AFTER conducting the shut-in and probe leak tests. The purge volume is a small volume of air (the internal tubing volume and the small void space in the foundation around the probe tip). The intent is to remove stagnant air or air disturbed by the installation of the probe.</p>
Sec. III, subsec. D. Recommended additional language: Vacuum gauges should be used to verify and record vacuum measurements of sampling canisters before and after sample collection. Canisters should not be used if the initial vacuum reading is less than 25 inches of mercury (in Hg). The final pressure should range from 4 – 8 inHg and care should be taken not to allow the canister to reach ambient conditions.	Brian Hennings, NRT	<p>Indoor air samples are collected over an 8 hour (commercial) or 24 hour (residential) period. To ensure that the sample has, in fact, been collected over the time period specified some vacuum should remain in the canister at the end of the sample period. However, investigators are always present when sub-slab vapor samples are collected. There is not a concern for completely filling the Summa canister (i.e., vacuum equals 0 in Hg) when collecting a sub-slab vapor sample.</p> <p>Revision: Sec. III, subsec. D. “The vacuum gage reading on the Summa canister is recorded before and after sample collection. A vacuum gauge should be used to verify and record vacuum measurements of sampling canisters before and after sample collection. Canisters should not be used if the initial vacuum reading is less than 25 inches of mercury (in Hg). Because sub-slab vapor samples are collected while an investigator is present and only the flow rate is of concern the canister can be filled to ambient pressure. (This is not the case for 8 and 24 hour indoor air samples, where some vacuum should remain in the canister at the end of the sample period to ensure that the sample was collected over the full 8 or 24 hours.)”</p>
Sec. V, first paragraph, 10 th bullet. Is the analytical laboratory required to have DNR or NELAP accreditation?	Brian Hennings, NRT	<p>No. The Department does not accredit air laboratories. Use of a NELAP accredited laboratory is recommended</p> <p>Revision: Sec. V, 1st paragraph, add footnote. “DNR does not certify or accredit air laboratories. The Department recommends that vapor and air samples be analyzed by a laboratory accredited by the National Environmental Laboratory Accreditation Program (NELAP).”</p>

<p>Sec. II, subsec. B. Recommended revision: The sub-slab probes should be removed after vapor intrusion risk has been ruled out or it is determined <u>whether further action is needed to mitigate vapor intrusion risk</u> that vapor mitigation is needed.</p>	<p>Lynn Morgan, Waste Management</p>	<p>Revision: Sec. II, B. “The sub-slab probes should be removed after vapor intrusion risk has been ruled out or it is determined whether further action is needed to mitigate vapor intrusion risk that vapor mitigation is needed.”</p>
<p>Sec. II, subsec. D. Recommended revision: If an access agreement is needed to gain access to the building, include <u>attempt to secure</u> access for multiple sample rounds and for future probe abandonment</p>	<p>Lynn Morgan, Waste Management</p>	<p>Revision: Sec. II, D. “If an access agreement is needed to gain access to the building, include attempt to secure access for multiple sample rounds and for future probe abandonment.”</p>
<p>Sec. IV. Consider modifying heading so that it refers to evaluating, rather than confirming or ruling out, vapor intrusion risk.</p>	<p>Lynn Morgan, Waste Management</p>	<p>Revision: Sec. IV, revised title. Temporal Sub-Slab Sampling Considerations to Confirm or Rule-out Evaluate Vapor Intrusion Risk</p>
<p>Sec. IV. Bullet 2. It may be clearer to recommend mitigation of the <i>vapor risk</i> rather than <i>vapor pathway</i>.</p>	<p>Lynn Morgan, Waste Management</p>	<p>Revision: Sec. IV , Bullet 2. “If sub-slab vapor concentrations exceed the department’s vapor risk screening levels (VRSL) in a residential setting , mitigation of the vapor pathway risk is recommended.”</p>

Attachment:

Verbatim Comments on Remediation & Redevelopment Program Guidance titled:
“Sub-Slab Vapor Sampling Procedures”

1. James Hogan, ECC Horizon

Who were the 3 consultants who have reviewed the Subslab VI guidance?

James P. Hogan, LPG, RG
Director
ECC HORIZON
MIDWEST OFFICE
8383 Craig Street, Suite 110
Indianapolis, IN 46250
T: 317.595.4400 x102 F: 317.595.9899
E-mail: jhogan@ecchorizon.com
Website: www.ecchorizon.com

2. William Gregg, Summit Envirosolutions

I like your guidance – concise, readable, helpful. Question regarding “D. Sample collection after leak testing” on page 8 and referring to Figure 2: Does purging three volumes from the sampling train via the pump at the helium sampling port satisfy DNR that the sample train between the pump and the summa canister is purged? I am not sure how else to purge that section of the sampling train.

Also, Figure 2, caption note 3 states that the pump is used to purge the sampling port...but it is used to purge the sampling train – correct?

William M. Gregg, P.G.
1217 Bandana Boulevard North
Saint Paul, MN 55108
651-262-4236
bgregg@summite.com
www.summite.com

3. Eric Dahl, METCO

I know this is not one of the main subjects of concern, but my biggest frustration is that the chemical names in the WDNR vapor tables do not always match up with the names that the laboratories use. So when reviewing the vapor sampling results I have to spend a significant amount of time cross-referencing my NIOSH Chemical Guide to check all the different synonyms for numerous chemicals until I finally find it in the WDNR vapor table. I think that all of the chemical names on the TO-15 VOC analysis are consistent between all of the laboratories, it is just the WDNR vapor tables do not use the same chemical names for numerous compounds. To add to my frustration, the WDNR standards change every 6 months, so I have to go through my cross referencing process every time the standards change. When I work on Minnesota sites, the MPCA has the compounds listed in their vapor tables using the exact

same chemical name as the laboratories use and also list the compounds on the tables in the same order as the laboratories. I wish that the WDNR would do this, especially considering that all of the vapor samples we collect to assess vapor intrusion are analyzed for TO-15 VOC.

Eric Dahl
METCO - Hydrogeologist
ericd@metcohq.com / phone 608.781.8879 / fax 608.781.8893
709 Gillette Street - Suite 3, La Crosse WI 54603
www.metcohq.com

4. Todd Rickey, TARickey Geosciences

I have two comments regarding the subject:

First, summa canisters (or other method, exclusively*) should actually be required to enhance sampling results' QA/QC. Due to relatively complex procedures and other potentials for sample integrity compromise, at least the container should be a constant. While an argument of "competition" from purveyors of alternative containment might object, science is the objective.

Second, RR-986 procedures need to be adapted for borehole vapor sampling, while drillers might already have such procedures, while various. Usage of summa canisters(*), in order to hold an important component part of the process constant, need to be required. However, the six-liter volume of the canisters could be problematic for transport.

Todd Rickey, P.G.
Geoscientist, Hydrogeologist
TARickey Geosciences

5. Donovan Hannu, West Bay

The purpose of this email to provide one comment regarding the Draft document entitled, "Sub-slab vapor sampling procedures (RR-986).

Bay West has collected hundreds of sub-slab vapor samples (mostly in Minnesota) and, along the way, used a variety of techniques before we landed on our current procedure that we are very happy with. We now use Cox-Colvin vapor sampling pins. A link to their website is as follows:

<http://vaporpin.coxcolvin.com/>

This method is CLOSE to the method described in the document; however, I'm not sure if the guidance document provides us the leeway to seal around the brass collection point in the manner that the Cox-Colvin pins uses. In my opinion, the Cox-Colvin pins have two gigantic advantages over the method you describe.

#1) We believe we get a better seal using these pins compared to grouting around the collection point. Our leak tests around that pin consistently pass.

#2) These pins give us the ability to collect a vapor sample immediately, instead of waiting at least 24 hours for the grout to dry.

Please let me know if you have any questions or concerns. Thanks!

Donovan Hannu, PE
Senior Engineer
direct: 651-291-3424 • cell: 651-707-3682
dhannu@baywest.com
Bay West LLC
Customer-Focused Environmental & Industrial Solutions
5 Empire Drive, St. Paul, MN 55103
24-hrs: 1-800-279-0456
www.baywest.com

6. Stephen Meer, The Sigma Group

After reviewing the draft guidance for sub-slab sampling I do have one question or clarification request: what is the basis for the 1 to 2 hour time following probe installation to allow for equilibration of sub-slab vapor? Typically there is purging of the point following installation associated with the seal test, PID readings, etc.. If sufficient volume is purged through the probe, wouldn't this eliminate the need to allow an extended length of time for equilibration (assuming that the seal is set)? If the PID readings through the probe are stable, wouldn't this be a good representation that the sub-slab vapor is in equilibrium (assuming a reading higher than 0 is reported)?

Stephen Meer, P.E.
Project Engineer
The Sigma Group
direct: (414) 643-4124
mobile: (414) 588-8910
fax: (414) 643-4210

1300 W Canal Street, Milwaukee, WI 53233

smeer@thesigmagroup.com | www.thesigmagroup.com

7. James Hogan, ECC Horizon

On behalf of ECC Horizon, please find below a list of comments and questions for consideration regarding your draft guidance document titled Sub-Slab Sampling Procedures (RR-986).

We note that the requirement to conduct 3 sub-slab sampling events to rule out vapor intrusion (Item IV.3) deviates from other state/industry-accepted guidance in which 2 or fewer samples are necessary. For decision-making purposes, we have found that the number of sub-slab sampling events can be reduced to 2 events, one during the seasonally low water table time period (i.e., typically summer) and one during the heating season (i.e., when the heater is turned on during the winter time).

The summertime sampling contradicts with your Section IV.1., which indicates that samples collected in the summer are the least likely to reveal the presence of vapor. We disagree with this statement because a seasonally low water table in the summertime typically exposes a wider “smear zone” of soils that are generally contaminated, but are submerged beneath the water table during seasonally high water table periods. As the water table lowers and exposes more of the “smear zone” to air-filled porosity, however, the contaminant compounds adhering to the soil particles have a chance to emerge into the air-filled pore space. These vapors are then free to migrate into subslab air spaces. When the water table rises back up, water re-saturates the pore space, thereby creating 100% water-filled porosity. When the porosity is 100% saturated, the contaminant off-gassing is re-entrapped until the next season when it is re-exposed.

James P. Hogan, LPG, RG
Director
ECC HORIZON
MIDWEST OFFICE
8383 Craig Street, Suite 110
Indianapolis, IN 46250
T: 317.595.4400 x102 F: 317.595.9899
E-mail: jhogan@ecchorizon.com
Website: www.ecchorizon.com

8. Elizabeth Evans, Department of Health Services

Here are our DHS comments on the DNR Draft Sub-Slab Vapor Sampling Procedures (RR-986) -
<http://dnr.wi.gov/news/input/documents/guidance/DraftRR986.pdf>

Page 5:

- 1) Under III. Leak testing section. You may want to add a sentence to the second paragraph of this section saying something like “Multiple leak tests may be needed in order to show that quality control measures have been performed.” On page 6, it sort of reads like you could pick one leak test method over another.

Page 6:

- 2) Figure 2 should be labeled with the number and name corresponding to the items in the “Components of sample train” section. In that section below the figure, there are 2 components labeled with a “4.” Also, above you suggest that the sampling port/pin will be in a countersunk hole in the concrete slab, but the figure doesn’t show this.
- 3) Under “B. Helium Shroud” section – I suggest adding a sentence like you have for the previous section, stating in a nutshell what the helium shroud is supposed to accomplish. Something like: “Use of a helium shroud will help to determine if the seal around the probe is airtight.”

Page 7:

- 4) Section C.1. – in first para you say that “...is fairly easy to use because towels soaked in IPA... can easily be placed over the ... tubing fittings.” But then in the second para you say “In all

cases a separate shut-in test should be conducted rather than relying on tracer soaked towels placed on ... fittings.” May be seen as contradictory.

Page 8:

5) Section D. Sample collection after leak testing – “purge at least three volumes of air from the sample train” – at one site, the consultants collected this in Tedlar bags to then not only screen with the PID, but also to not allow this “purged air” to just come into the indoor air where they are breathing. Is this standard practice, and if so, should it be clarified here?

Other/General Comment:

6) Should you mention anywhere about the order of sampling, if both sub-slab and indoor air samples are being taken in one area? (I realize that this may not be appropriate or needed since this is obviously only on sub-slab sampling procedures.

Elizabeth Truslow-Evans, MPH
Epidemiologist
Bureau of Environmental and Occupational Health
Division of Public Health, Wisconsin Dept of Health Services
1 W Wilson St, Rm 150
Madison, WI 53701
(608) 266-3393
<http://dhs.wisconsin.gov/eh/>

9. Carolyn Kasten, Environ

ENVIRON would like to provide the following comment on the guidance document “Sub-slab Vapor Sampling Procedures (RR-986).”

Under Section V of WDNR’s Sub-slab Vapor Sampling Procedures (RR-986), Reporting Results, one of the Department’s requirements is to include a preliminary analysis of the cause and significance of any contaminant concentrations observed, along with the 10-day notification of laboratory results. Given the extremely expeditious turnaround required for the notification of laboratory results, it will likely be very difficult to include an analysis of the contaminant concentrations detected. Our recommendation is to either eliminate this requirement or allow a 30 or 60-day period to evaluate and understand the site conditions prior to preparing this assessment.

Carolyn M. Kasten | Senior Office Administrator
ENVIRON International Corporation
175 North Corporate Drive, Suite 160 | Brookfield, WI 53045
T: +1 262 901 0114 | F: +1 262 901 0079
ckasten@environcorp.com



ENVIRONMENTAL CONSULTANTS

234 W. FLORIDA STREET, FIFTH FLOOR
MILWAUKEE, WISCONSIN 53204
(P) 414.837.3607
(F) 414.837.3608

Ms. Theresa Evanson
Wisconsin Department of Natural Resources (WDNR)
Delivered via email

July 2, 2014

RE: Natural Resource Technology Comments on Proposed RR-986 (June 2014)

Dear Ms. Evanson,

Natural Resource Technology, Inc. appreciates the opportunity to comment on proposed guidance document RR-986 Sub-Slab Vapor Sampling Procedures. We support WDNR's efforts to provide guidance on the collection of consistent quality samples for evaluation of vapor intrusion pathways. This document provides a streamlined approach to sample collection consistent with other agencies (e.g., USEPA) and allows for flexibility when evaluating the vapor intrusion pathway.

Below, we offer the following general comments/ clarifications for your consideration when you finalize this guidance.

- Use of sub-slab data: We suggest that the guidance recognize that sub-slab data is variable over sampling events, the screening levels are conservative, and sampling data should not be evaluated on a point-by-point basis. Sub-slab data is not equivalent to indoor air data, which is a direct measurement of the vapors and the pathway that occupants are exposed to. We recommend the incorporation of the following concept in Section IV: If representative sub-slab vapor concentrations exceed the department's vapor risk screening levels (VRSL) further evaluation of the vapor intrusion pathway is required to determine the completeness of the vapor intrusion pathway or the responsible party (RP) may elect to install a vapor mitigation system. Further evaluation of the vapor intrusion pathway commonly requires the collection of additional data and multiple lines of evidence (e.g., additional sub-slab sampling events, concurrent collection of sub-slab, indoor air, and ambient vapor samples). If the vapor intrusion pathway is deemed incomplete, a vapor mitigation system will not be required.
- Clarification: Is it the department's position that any sub-slab vapor concentrations observed in excess of the VISL require a mitigation system? We recommend sub slab data not be evaluated on a point-by-point basis or as a snapshot in time as it does not necessarily represent actual exposure pathways that warrant mitigation systems.
- 10-day notification of results: We recognize that NR 716.14 requires laboratory results from sub-slab sampling (as well as other environmental samples that may be collected) to be reported by the RP to the property owner, occupant, and WDNR within 10 business days of receipt. We support the intent of the rule to notify property owners (and WDNR) of contaminants on their property; however, in the case of sub-slab vapor data, the results need to be put into the context of the site specific conditions (e.g., construction of the building foundation, size and ventilation of the building) and we are concerned that 10 business days is not enough time to properly evaluate risk to the occupants. Notification without proper context could lead to unintended reaction by occupants, and/or presumptive mitigation based on incomplete site characterization and evaluation of the VI pathway.

- 10 day notification of results (continued): We suggest WDNR consider an alternate timeframe for notification of property owners of sub-slab (and all other vapor data) to allow for adequate site characterization and evaluation of the VI pathway. The results of the pathway evaluation would be presented with the notification. We are not suggesting that mitigation actions should be delayed following the collection of sample results that present an immediate risk to the occupants. However, one or two samples results above a screening level should not automatically require mitigation without complete site characterization. Sampling on properties not owned by the RP generally require an access agreement which often have alternate agreements for data disclosure but still achieve WDNR's desired outcome to inform third party property owners.

Additional specific comments have been provided below. Underlining indicates proposed additions while strikethrough indicates proposed deletions.

- Section I, second paragraph: Prior to collecting vapor samples, a work plan should ~~to~~ be prepared.
- Section II, second paragraph: Installation involved drilling a small hole (~5/8" diameter) through the foundation into the sub-slab soil, then over drilling the pilot hole to create a 1" diameter hole about 1" to 2" deep into the foundation- (The holes can be drilled in reverse order-). This creates a ledge for the sampling probe and allows the concrete or other sealing material to be placed around the metal probe. An estimate of the thickness of the foundation slab should be measured and recorded at each sub-slab sampling location to document site conditions.
- Section II, subsection D: Does documentation of abandonment need to be provided to WDNR?
- Section III, subsection A: Does the sampler have discretion to use alternative methods to complete the shut-in test (e.g., using the summa canister to provide the vacuum)? Please provide clarification in the guidance to reflect the option to use alternative methods of completing the shut-in test that accomplish the same goals.
- Section III, subsection B, footnote 4: A recent helium shortage reduced the availability of high purity helium over the last two years. Would WDNR consider the use of lower grades of helium (e.g., balloon grade) in the event that technical grade helium is not available? If helium with less than 99% purity is used during the leak testing, would WDNR require a sample of the helium be submitted for laboratory analysis of the contaminant list to assess potential affects to data quality?
- Section III, subsections B and D: When using a helium shroud to complete the leak detection test, a sample is withdrawn from the probe for screening. If a minimum of three volumes of air from the sample train were removed during the collection of that screening sample does the probe need to be purged again prior to sampling as described in the first sentence of subsection D (i.e., can the helium leak test and purging of the sample train be accomplished using that same sample)?
- Section III, subsection D: The vacuum gage reading on the Summa canister is recorded before and after sample collection. Vacuum gauges should be used to verify and record vacuum measurements of sampling canisters before and after sample collection. Canisters should not be used if the initial vacuum reading is less than 25 inches of mercury (inHg). The final pressure should range from 4-8 inHg and care should be taken not to allow the canister to reach ambient conditions.

- Section IV, bullet number 2: Please consider that one sampling event or one sampling location above the VRSLs does not necessarily warrant a mitigation system. We understand a mitigation system may be an inexpensive solution to addressing concentrations above the VRSLs; but, we ask WDNR to recognize presumptive mitigation systems can create unnecessary long term obligations. For instance, if sufficient data is not collected to evaluate actual exposure pathways and risks, but a mitigation system is installed, the RP will be responsible for operating and maintaining a system into the future. If the system is not operated and maintained, the third party property owner may have unwarranted concerns. Ideally, enough data will be collected that represents potential risks and the need for mitigation systems.
- Section V, first paragraph, 10th bulleted item: Is the analytical laboratory required to have WDNR or National Environmental Laboratory Accreditation Program (NELAP) accreditation?

Please note that absence of commentary on other aspects of this guidance does not necessarily indicate our concurrence with those items. Do not hesitate to contact us if you have any questions.

Sincerely,

NATURAL RESOURCE TECHNOLOGY, INC.



Brian G. Hennings, PG
Hydrogeologist



Jennifer M. Hagen, PE
Senior Engineer



July 2, 2014

SUGGESTIONS REGARDING DRAFT GUIDANCE FOR SUB-SLAB VAPOR SAMPLING PROCEDURES

Contact: Lynn Morgan
262-250-8711
lmorgan@wm.com

1. **Removal of Probes** (paragraph B, page 4). Sampling may be designed to assess, rather than “rule out,” risk. Please consider a modification along these lines:

“The sub-slab probes should be removed after ~~vapor intrusion risk has been ruled out~~ or it is determined whether further action is needed to mitigate vapor intrusion risk. mitigation is needed.”

2. **Access Agreements** (paragraph D, page 4). The responsible party can request, but not ensure, repeated access to a property. Please consider a modification along these lines:

“If an access agreement is needed to gain access to the building, include attempt to secure access for multiple sample rounds and future probe abandonment.”

3. **Temporarily Sub-Slab Sampling Considerations** (Section IV, page 8). First, it may be appropriate to modify the section heading so that it refers to evaluating, rather than confirming or ruling out, vapor intrusion risk.

Second, IV.2. recommends “mitigation of the vapor pathway” if screening level concentrations are exceeded. It may be clearer to recommend mitigation of the *vapor risk*, rather than the vapor pathway.

4. **Reporting Results** (Section V, page 9). This section states that under NR 716.14, the responsible party ***must*** report sampling results to the property owner, occupant and DNR within 10 days of every sampling event. However, NR 716.14(3) also allows DNR to approve alternate notification schedules on a case-by-case basis. An alternate notification schedule may be particularly appropriate in the case of sub-slab vapor sampling. In many cases, the risk of vapor exposure is based on the analysis of multiple samples from multiple points in the context of an overall environmental evaluation. A single sampling event alone is rarely conclusive regarding potential health risks. It would be helpful to state that alternative notification plans may be proposed for Department consideration.

Similarly, this section requires the responsible party to provide an analysis of the cause and significance of every observed contaminant concentration. In most cases, vapor exposure evaluations are based on multiple sampling events and points over time, as the guidelines reflect. An analysis of the cause and significance of every individual instance in which any contaminant concentration is observed would be meaningless.