

**[SLIDE 1]**Phase II Property Assessment

If you suspect that there may be environmental impacts on a property, a VAP Phase I property assessment, or Phase I, will help you identify if there is reason to believe a release of hazardous substances or petroleum occurred on the property. The Phase I will help you target areas for testing in a Phase II property site assessment, or Phase II. Remember....

- **[SLIDE 2]**The VAP is VOLUNTARY! There's no obligation to conduct a voluntary action. However, if you want to receive a Covenant Not to Sue or CNS from Ohio EPA, completing activities according to the rules is mandatory.
- Keep in mind your objectives for conducting a site assessment through VAP. This will allow you to get the information you need to make smart decisions regarding your property.

Let's get started!

**[SLIDE 3]**I am going to go over the Ten Pillars of the Ohio VAP Phase II Rule, OAC 3745-300-07:

1. Applicability;
2. Purpose;
3. Data Quality Objectives or DQOs;
4. Sampling and sample analysis;
5. Data collection activities;
6. **[SLIDE 4]**Determination;
7. Models;
8. Background;
9. Demonstration of Compliance with Applicable Standards; and
10. Phase II Report

The Phase II is an iterative process. Data collected during a Phase II may reveal new Identified Areas or confirm a remedy is needed. Identified Areas, or IAs, are the places on a VAP property that may be affected by releases of hazardous substances or petroleum. These IAs also include source areas and all affected media present. The Phase II is designed to be a flexible process that allows the volunteer the ability to adapt to circumstances as they may arise.

**[SLIDE 5]**Pillar One: Applicability

- Have you completed a Phase I that complies with the current Phase I rule? If you don't know there's been a release of hazardous substance or petroleum at a property, it is a waste of your time and money to conduct a Phase II. Complete a Phase I before proceeding to a Phase II.
- Are there other environmental programs that require assessment and clean up at the property? Are there petroleum tanks on the property or are there RCRA units subject to closure? Are there orders from Ohio EPA or US EPA that require an investigation or cleanup at a property? This may prevent your property from being "eligible" for participation in the VAP. You need to make sure eligibility issues have been identified and addressed. VAP eligibility is discussed in another portion of this VAP training.

**[SLIDE 6]** Most of you may have conducted Phase II investigations under other programs, maybe even the VAP. These other environmental programs may include the Comprehensive Environmental Response Compensation and Liability Act, known as CERCLA, Resource Conservation and Recovery Act, known as RCRA, or Leaking Underground Storage Tank programs. ASTM also has Phase II procedures and some lenders have property transaction requirements. The VAP was developed considering many of these other program elements and it continues to evolve over time. The VAP rules undergo an agency rule review and revision every five years. Changes that result from agency rule reviews are reflected in the Ohio Administrative Code.

Ohio EPA recognizes the challenges of keeping informed with program changes. We regularly host webinars, trainings and quarterly forums to help bring the CP community together for information sharing and to provide program updates. Ohio EPA also developed a Technical Guidance Compendium, or TGC that provides guidance on rule requirements. Program announcements, notices of upcoming training opportunities as well as templates and information resources can all be found at the Ohio EPA's Division of Environmental Response and Revitalization's web page. In summary, there is a wealth of knowledge at the Ohio EPA and in the CP community. We recommend you seek insights regularly from both.

**[SLIDE 7]** The Phase II is a detailed study bringing together all the information developed during the Phase I. It forms the basis for decision making as it relates to risk assessments,

remediation and engineering and institutional controls. In order to collect the information necessary to make decisions regarding these activities, a detailed, comprehensive investigation is necessary. You learned in an earlier session what it takes to conduct a Phase I. Next, you will see how the initial information is used to develop an appropriate scope of work to implement the Phase II Investigation. You will also see how each portion of the VAP process builds on the previous portion.

The success of the Phase II to adequately quantify the conditions at the site for purposes of developing a solution to manage the environmental conditions appropriately is important. Doing this is dependent upon successful and complete analysis of chemicals of concern, or COCs and IAs established during the Phase I. If the Phase I has not accurately characterized IAs and COCs, then the success of the Phase II will be hampered.

**[SLIDE 8]** The reason for undertaking a Phase II is found in the rule's applicability statement. A Phase II must be conducted if the Phase I reveals any information that establishes any reason to believe that a release of hazardous substances or petroleum may have occurred on or from the property. Also, if an off-property source area is impacting the property, a Phase II is required.

The accurate identification of potential releases is critical to the Phase II. A successful Phase II relies heavily on the Phase I as its foundation to locate IAs and to identify likely COCs.

How one identifies a release in the Phase I is the basis for determining if, and to what extent, a Phase II is required. The determination of a release is a subject for the Phase I, but its importance in establishing the scope of work for the Phase II cannot be understated. The quality of the Phase I will have a profound effect on the initial scope and eventual quality of the Phase II.

**[SLIDE 9]** Pillar Two: Purpose of a Phase II

Every journey begins with the first step. The first step of a Phase II typically begins with the investigation of the release of a hazardous substances or petroleum. The volunteer needs to conduct an investigation that collects sufficient data to be able to demonstrate that the applicable standards are met. If standards are not met, one must determine the remedial actions needed to make the VAP property meet the applicable standards.

Ohio EPA recognizes that environmental journeys are not always completed in one seamless effort. Environmental assessments often take place over the course of several years or even decades! Projects can have fitful starts and stops due to money constraints; changes to environmental laws and ownership changes. The goal of a Phase II is not punish those who were not successful in completing the assessment process from start to finish in the shortest time possible. The **goal** of the VAP Phase II is to demonstrate the property meets the applicable standards for the VAP.

**[SLIDE 10]** If there are areas on a VAP property where an active cleanup is necessary to complete construction activities or to make the site protective, a volunteer can conduct cleanup activities before completing all of Phase II requirements. Please keep in mind when conducting a remedy in an area prior to completing all other assessment activities at a VAP property that additional assessment or remedial actions may still need to be taken in that same area. Regardless of the timing of conducting the remedial activities, a CP must demonstrate that the VAP property meets the applicable standards before a No Further Action or NFA letter can be issued.

In summary, not every Phase II's first step begins with an investigation; it could begin with an active remedy taken to abate or control a release of hazardous substances or petroleum. The purpose of the Phase II is to investigate and conduct remedial activities to meet applicable standards at the VAP property.

**[SLIDE 11]** Pillar Three: Establish DQOs

Journeys often go smoothest when the destination is clearly established and a road map is prepared to reach this destination. DQOs help to clarify expectations for data collection activities and the usability of the data in the Phase II.

**[SLIDE 12]** A recent addition to the Phase II Rule is the Conceptual Site Model, known as the CSM. A CSM illustrates relationships between contaminants, transport media and receptors. A CSM helps decision makers at a VAP property know when additional actions may be necessary to meet applicable standards. The Phase II Rule requires a CSM that represents conditions at the time of the NFA letter, but you may find that developing a CSM early on in the

Phase II assessment process is beneficial. That way you can continue to revise the CSM as the Phase II investigation and cleanup progresses.

**[SLIDE 13]**It is to be expected that the scope of work for the final Phase II investigation may differ from the initial scope of work due to the iterative process of the Phase II. The scope of the investigation builds on each subsequent piece of information. This is somewhat attributed to the fact that the Phase I is based largely on literature reviews and not on physical testing. This is an important concept to keep in mind when developing the scope of a Phase II. If the CP relies on a rigid scope of work which cannot be modified, then the final product associated with the Phase II may not be sufficient to meet all the necessary requirements of the VAP rules. This can result in not having properly positioned the property for the issuance of an NFA Letter. The CP should keep in mind that the amendment of the scope of work under the VAP is a common occurrence.

**[SLIDE 14]**Pillar Four: Sampling and Sample Analysis – also known as COMMUNICATION!

Know what data you need to collect and tell the field sampling team how to collect it and how much to collect. If you aren't sure what data to collect, consult with your geologist, your risk assessor or your remediation contractor. You can always contact Ohio EPA for technical assistance, too!

**[SLIDE 15]**These are important issues to iron out with the field sampling team before going out to the field. It is also imperative that you contact your certified lab, or CL, before going out to the field to ensure that the lab is certified to analyze the samples for the COCs and at the detection limits needed. Collect samples in the containers provided by the lab and maintain the samples at proper temperatures and within the holding times allowed. Evaluate the data results the CL provides you to ensure that the data are reliable and usable for your needs. One area I will highlight from this pillar is of the rules is the use of a CL for data analysis. Please be aware that CLs are typically certified for a limited number of analytical methods.

**[SLIDE 16]**It is important to go over your COCs with your laboratory before starting the investigation. This will ensure that they are certified in each of the analyses anticipated during the investigation. Also important is the ability of the CL to be able to achieve the detection limits necessary to meet the applicable standards.

A VAP TGC document describes what can be done if there is no laboratory certified for the hazardous substance or petroleum compound under investigation. In this instance there are two options available:

1. work with the laboratory to apply for certification, a long time-consuming process, or
2. develop a remedial strategy to eliminate the complete exposure pathway associated with that compound.

In some instances where the applicable standard is below the industry recognized method detection limit for a chemical of concern, the rule will allow the detection limit to be used as a representation of the applicable standard.

**[SLIDE 17]** Pillar Five: Data Collection Activities.

Sufficient data must be collected to ensure IAs are properly assessed. If you don't have adequate data collected of the correct quantity or quality, it will be impossible to determine if the applicable standards are met or to determine if remedial activities are needed. The Phase II rule outlines seven data collection activities or considerations.

**[SLIDE 18]** First, there's old data. Prior Phase I findings must be considered when conducting new environmental assessment work. A Phase I report must be updated if it was performed over 180 days before the Phase II begins. The Phase I rule also details when an update is needed.

CL data as well as non-certified data collected during prior investigations may be usable. However, the data must be evaluated to ensure that it was collected and analyzed in a manner that meets the DQOs for the VAP. Non-certified lab data must be confirmed by samples analyzed using a CL as outlined in the Phase II rule.

As with the ASTM standard, the time frame for a Phase I to remain valid is limited. Under the VAP, a Phase I is valid for 180 days. However, it is typical for greater than 180 days to elapse between the original Phase I and the completion of the NFA Letter. Therefore, the Phase II must include an update to the original Phase I, if the 180 day time frame has elapsed. This is discussed in more detail in the Phase I presentation and in VAP TGC documents.

**[SLIDE 19]** As a means of controlling costs, it may be helpful to keep the Phase I in draft form during the Phase II. That way, the update to the Phase I can be streamlined at the time the NFA

letter is completed. When using this approach, the only areas requiring updating could be limited to the site inspection, interviews and the review of isolated information that may have changed since the original report was prepared.

Another reason to update the Phase I is that in most cases, some of the original IAs may have either been eliminated or modified. In addition, during the course of the Phase II, a new IA may have been discovered. The Phase I update can be used to address these conditions.

**[SLIDE 20]** In most cases, properties entering the VAP have some level of previous study conducted. It is cost effective and desirable to use this prior data, to the extent possible. CPs may rely on analytical data from other previous investigations, but only under certain conditions and only if the data is verified with properly obtained data analyzed by a CL. Also, no Phase II can rely entirely on historical data.

There are very specific circumstances under which previous data can be used. In general, previous data can be used when it is collected in a manner consistent with the requirements of rule 07. An example of previous data that might be suitable could be the use of ground water sampling data from a solid waste facility monitoring program. In most cases, this data would have been collected under a properly prepared work plan. This data would also have included extensive quality assurance/quality control analyses and would have been evaluated for accuracy in manner consistent with the VAP. However, it is likely this data may not have been analyzed by a CL or conducted with the intent of submittal under an NFA letter. Even in an instance where the previous data may be deemed acceptable, the CP must still collect confirmation data utilizing a CL. This portion of the rule requires that, in most cases, at least 10 percent of the sample population from each data set be confirmed, generally by collecting samples from the same locations.

**[SLIDE 21]** The second data collection activity is reviewing existing regional and property-specific physical characteristics.

It is important to understand the physical characteristics and dynamics of the property to help determine exposure pathways, affected environmental media and receptors. Some, but not all, of the characteristics outlined in the rule are:

- Major stratigraphic units;

- Physical characteristics of saturated or unsaturated soils, vertical and horizontal hydraulic conductivity;
- Regional aquifers and property specific ground water zones beneath the property;
- Confining units that may separate ground water zones or if they are connected;
- Ground water recharge and discharge areas; and
- Occurrence, flow direction and gradient of surface water or ground water.

Existing data that is required to be evaluated includes information about geologic, hydrogeologic and physical data for the property. This portion of the rule is focused on obtaining the regional or “macro” level data that exists for the property. Because much of the VAP rules relate to the identification, classification and response actions related to ground water, an understanding of regional geologic, hydrogeologic and physical parameters is important. In later parts of the investigation, the CP may need to rely on these determinations to address such conditions as:

- impact to lower ground water zones;
- connection to surface water exposure pathways; or
- ground water classification based on yield.

**[SLIDE 22]**The third activity is identifying COCs in IAs. A CP must consider the potential release of a hazardous substance or petroleum on the VAP property if:

- The Phase I identified the release;
- The hazardous substances or petroleum have been commonly used in industrial or commercial activities similar to those which occurred on the property, or
- Reasonably available information indicated the hazardous substance or petroleum are typical constituents, components, additives, degradation products.

**[SLIDE 23]**The fourth data collection activity is evaluating IAs. The dimensions of IAs are determined from the information collected during the Phase I and Phase II. An IA’s dimensions may be adjusted throughout the Phase II to best reflect the area affected by a release. VAP TGC documents are available that provide additional guidance on the identification and evaluation of IAs.

Proper completion of a Phase I is critical to success when determining IAs. As an example, if an IA has been overlooked for some reason in the Phase I, the Phase II investigation could miss this area. Also, inaccurate IA determinations could be made in the Phase II, because a source area that was not called out in the Phase I is impacting the property. Missed or inaccurately determined IAs could result in improper remedial decisions. The identification and location of IAs are critical aspects of the Phase II scope of work.

**[SLIDE 24]**The fifth activity concerns sampling environmental media. The DQOs should point out what data must be collected to address requirements under the Phase II rules. The Phase II rule outlines the minimum data collection required. Each source area, identified area or exposure unit must have data that are representative of spatial distributions of the affected area and also consider the temporal variations in the media or in the concentrations of the COCs in the media when collecting samples.

**[SLIDE 25]**For the sixth activity, the CP must identify current and reasonably anticipated property use and receptor populations. In order to determine if applicable standards are met or exceeded at a property, it is important to understand how a property is currently being used and if there will be changes to this use in the future. Residential land use standards, of course, differ from commercial/industrial land use standards. However, it is also important to understand how receptors are currently using the property and how in the future they may be exposed to COCs on the property. IAs may need to be further divided into exposure units or points of compliance will need to be redrawn, depending upon land use and type of receptors at the property. The CSM will help illustrate property use and receptors currently on the property and reasonably anticipated future uses.

Current and reasonably anticipated property uses and receptor populations can include populations that live or work on the property or may come to the property, such as visitors. Populations off the property that may become exposed are also included in this analysis, along with construction and excavation worker scenarios. Finally, ecological resources may also be exposed and must be evaluated.

**[SLIDE 26]**Once the CP understands the populations that could be exposed, the CP must conduct a pathway completeness evaluation in accordance with rule 07. The following must be

identified: all sources, source areas, and affected media contributing to the pathway, the receptors that may be impacted, and the applicable point of compliance, and the transport mechanism for the pathway. If all three components of this determination are met, then the pathway is deemed to be complete and must be identified in the Phase II Report.

As with other parts of the VAP, the effective use of the pathway completeness evaluation is based upon the quality of the data collected during the Phase I and Phase II investigations. If the CP has done a good job of conducting their underlying data collection and has been complete in their analysis, the determination of complete pathways is a relatively easy process. However, in the absence of sound data collection, the determination of complete pathways can be difficult.

**[SLIDE 27]**The seventh and last activity is proper collection of data if you are making a background demonstration. Sometimes naturally occurring metals are present at a property above the VAP applicable standards. The VAP does not require cleanup of naturally occurring substances. If your property may be located in an area of the state where some naturally occurring substances occur at higher concentrations than those in the VAP applicable standards, you may want to consider conducting a background demonstration. Additional samples will be needed for a background demonstration unless there is a background study already available that is applicable to the VAP property. We will discuss background further later in this presentation.

**[SLIDE 28]**Pillar Six: Determinations

A Phase II is an iterative process. Some activities may have to be repeated or fine-tuned through additional data collection activities. Determinations that may require fine tuning or repetition of some activities through the Phase II include:

- A pathway completeness determination;
- Ground water zones and confining units;
- Provisions for protecting groundwater meeting UPUS, if applicable. Remember, if ground water complies with UPUS, it needs to continue to comply.
- Applicable standards for all COCs, for each complete exposure pathway;
- Identification of all COCs in each IA;

- Ground water classification, if ground water exceeds UPUS;
- Ground water yield;
- Source Areas; and
- Contaminant pass-through provision.

**[SLIDE 29]**Determining the concentrations of COCs in the IAs is a vital step in completing the Phase II. Each media must be evaluated separately:

- surface water;
- sediment;
- soil; and
- ground water.

For surface water, special rules apply that are described in the rule. For other media, the rules describe the methodologies for determining concentrations of COCs.

**[SLIDE 30]**The three options for determining exposure point concentrations in soil or sediment are outlined in the rule. These are:

- Derive a representative concentration by calculating the 95 percent upper confidence limit of the arithmetic mean,
- Derive the maximum concentration biased to the suspected point of highest concentration provided that a minimum of three or more samples are collected. Screening and prior data will likely be needed to establish the location suspected of having the highest concentration, or
- Derive a representative concentration using the incremental sampling technique that is noted in this rule.

In each case, a CL must analyze all the samples.

**[SLIDE 31]**The 95 percent Upper Confidence Limit of the arithmetic mean is a statistical tool that may be used to calculate the concentration of COCs. One way to think of the 95 percent upper confidence limit is the number above which there is only a five percent chance the contamination exceeds that value in an unbiased data set in an IA. Using the 95 percent upper confidence limit as your concentration of the COC is one way to manage the condition at the property, without ignoring any of the information in the data set.

**[SLIDE 32]** Determining the concentrations of COCs in ground water requires a different analysis. Unlike soil, ground water is more fluid and mobile. For these reasons, the determination of the concentrations of the COCs in ground water takes greater scrutiny. The sampling methodologies must be capable of producing ground water quality appropriate for evaluating this environmental media and potential pathway of concern. The number of samples must be sufficient to address seasonal variations and geologic heterogeneity. Most importantly, the sample locations must be able to evaluate all reasonably anticipated pathways to ensure that applicable standards are not exceeded at the point or points of exposure.

**[SLIDE 33]** In determining sampling locations, the following must be considered:

- direction of ground water flow;
- size of the plume;
- date of the release;
- field screening techniques, and
- other information as appropriate.

As with soil and sediment, ground water sampling must be biased toward the area of highest concentration and a CL must be used. Although the rule allows for the use of non-intrusive or indirect field-testing, these methods cannot be used for comparison to applicable standards.

**[SLIDE 34]** As a general rule, when it comes to ground water sampling and analysis in the VAP, the CP should expect to use properly designed and installed monitoring wells. While other techniques may be suitable for field screening or may be acceptable in other programs, these techniques are generally not sufficient for the level of documentation typically required under the VAP.

**[SLIDE 35]** Before beginning a determination of the concentrations of COCs in the ground water, the CP should first determine if the “water” at the property is ground water. Some areas in Ohio can have shallow water-bearing zones that are discontinuous and thin. Many volunteers have installed a monitoring well that appears dry during installation, only to have it accumulate ground water in the following weeks. In this situation under the VAP, it might be determined that this condition did not result in the accumulation of actionable ground water. The VAP provides a relatively simple means of making this determination under the definition of ground

water in rule 01. Yield tests and hydraulic in-situ conductivity tests are used to make this determination.

**[SLIDE 36]**Temporal and spatial considerations must be taken into account when evaluating ground water. In particular, the yield test should be biased towards the location of highest ground water yield in the wells. Hydraulic conductivity testing does not have to be biased to only the area of highest yield. Hydraulic conductivity testing should be performed throughout the site. Testing can also be conducted throughout the year, for example quarterly, as a means of demonstrating yield. If the yield at any representative time is found to be greater than 35 percent below the threshold for that ground water classification category, then additional yield testing is not necessary to make the demonstration. Conversely, the CP does not need to conduct such testing if they intend to assume that the water under the property meets the definition of ground water.

**[SLIDE 37]**The final step in the analysis of concentrations of COCs in ground water is the determination of source areas. Off-property source areas can easily affect the ground water conditions. The ground water investigation must make a determination as to whether an off-property source area is contributing or solely responsible for the concentrations of COCs on the property. This portion of the analysis is important, because the response actions required when co-mingled plumes are present are very different than when the source is solely on-property. This is detailed in the ground water rule.

Sampling procedures are critical to the successful collection of the data necessary to meet the purpose of this rule. Unlike other environmental investigations you may have conducted outside the VAP, investigations following this rule require a close look at quality assurance and quality control to ensure that the objectives of this rule are met.

**[SLIDE 38]**Pillar Seven: Models

During a voluntary action Phase II it may be difficult, impractical, or impossible to collect samples off the VAP property. This makes it difficult to determine concentrations of COCs in ground water or soil off-property. Models are often used in these circumstances to determine if off-property receptors are exposed to contamination that is emanating from the VAP property. Models also help determine if on-property receptors may be exposed to

contaminants above applicable standards. The volunteer or CP must identify all models relied upon during the Phase II.

**[SLIDE 39]** Models must be either accepted within the scientific community and peer reviewed, or scientifically valid for the process being modeled and code-verified. The modeling must adequately address the intended purpose of the modeling evaluation. The model must also be evaluated to determine its sensitivity to the input parameters. The modeling evaluation and results must be documented in the Phase II report or in a specific modeling report attached to the Phase II report.

Examples of situations when models can be useful are:

- Predictions of ground water plume travel. Examples of this would be to demonstrate that ground water will not leave the property and to demonstrate that off-property receptors will not be impacted by the emanation of ground water from the property in the future;
- Predictions of indoor air concentrations of volatiles emanating from either soil or ground water;
- Predictions of concentrations of COCs in soil that would impact ground water at concentrations above unrestricted potable use; and
- Predictions of the dilution of COCs that would occur when ground impacts surface water.

A particular area where modeling can be useful is described in the VAP TGC document, "Use of Modeling to Estimate the 95 percent UCL for Demonstrations of the Protection of Ground water". This TGC document establishes that the 95 percent Upper Confidence Limit can be used to make the demonstration that ground water underlying the property meets the unrestricted potable use standard. This may be helpful at properties where low levels of COCs are present above the unrestricted potable use standard, but most of the site meets the unrestricted potable use standard. Keep in mind, as described in this TGC document, the site must always comply with the anti-degradation provision of the rules.

Models must also be used in an appropriate and reasonable manner for the environmental media and the intended purpose. This means that the model must be selected with the site-specific needs in mind. As an example, using a model designed for the determination of ground water flow in sand and gravel water table aquifers would most likely

not be acceptable for making ground water flow predictions in fractured bedrock environments. The TGC document describes how literature values can be used to estimate degradation rates in fate and transport models. As indicated above, the key factor is selecting literature-based values that are consistent with the other information collected during the Phase II.

**[SLIDE 40]** According to rule 07, depending on the intended purpose of the modeling evaluation or type of model, the model may need to be calibrated and/or field-validated. This level of investigation into the model's site-specific applicability is often not needed when a demonstration that the rule has been adhered to within the Phase II. The requirement is that the sensitivity of the model's output be measured relative to:

- the model input parameters;
- the effect that these site-specific inputs may have on the results, and
- ultimately, the demonstration for which the model is being used.

This is an area often misunderstood by environmental professionals. Consultants may want to focus on the supporting information, but as scientists, it is often as important to address the information that does not support a particular conclusion. By presenting this conflicting information and demonstrating why it is not applicable, the CP ultimately presents a stronger argument for their conclusion than would otherwise have been possible.

**[SLIDE 41]** Pillar Eight: Background

In some places in Ohio metals may naturally occur in concentrations that are above the generic standards. These background levels may be used as the applicable standard after demonstrating they are naturally occurring, and not the result of current or past activities involving the treatment, storage or disposal of hazardous substances or petroleum.

Background levels are determined in accordance with the Phase II rule. If there are no locations on the property where background sampling is appropriate, you may determine soil background levels from off-property investigations as outlined in the Phase II rule. Ohio EPA is actively developing representative background soil data sets from urban counties around Ohio. Contact Ohio EPA VAP staff for more details on these background soil study reports.

Background data can be very useful when dealing with hazardous substances or petroleum that may be naturally occurring. Often hazardous substances or petroleum are detected in excess of applicable standards, but the analyte may not be attributable to a release at the property or surrounding properties. This rule allows the CP the latitude to determine the background concentration of such analytes. In theory, if the background of that analyte is the basis for the exceedance, then the particular COC can be eliminated from further analysis. The basis for this interpretation lies in the concept of increased risk. Applicable standards are derived to represent the acceptable level of INCREASED risk of cancer (in the case of carcinogenic effects). If the condition of the area has already established an existing level of risk and the property has not contributed that increased level of risk, then the existing risk is not the responsibility of the volunteer, and not subject to further investigation or remediation. The methods for establishing background concentrations are specifically detailed in the rule and require adequate sampling of the media in question. The elimination of background analytes can often have a positive effect on the property investigation, resulting in the elimination of false positives that would require remediation in the absence of this procedure.

Rule 07 also establishes acceptable locations where background samples can be collected. VAP guidance states that slag cannot be used to determine background conditions in soil. According to the TGC document, native fill can be used determine background conditions, even when underlying other fill materials, as long as the COCs being investigated did not come from the overlying fill. In general, background samples have to be collected from areas that would not have the potential to have been impacted by point source releases of the analyte being evaluated for background concentrations. For example, if the lead is the focus of the background determination, the samples used for the statistical determination cannot come from an area where lead may have been released, such as adjacent to an underground storage tank system that contained leaded gasoline.

**[SLIDE 42]** Pillar Nine: Demonstration of Compliance with Applicable Standards

Putting it all together: this is the point in the Phase II where the CSM and the data come together. This is the crucial last stage of the investigation. It brings together all the underlying Phase II activities in a manner that allows for a determination if remediation, engineering or

institutional controls are necessary or if applicable standards have been met. Because the data has been collected in a defensible way and all IAs and COCs have been investigated, this final determination allows the CP to meet the requirements of the rule. This also positions the site for the preparation of the NFA letter.

At this point you have collected data to determine if applicable standards are met or determined that a remedy is needed. You've collected data to assess existing exposure pathways and reasonably anticipated exposure pathways. The data collected also ensure the points of compliance (POC) for soil, ground water and other environmental media are met as necessary.

**[SLIDE 43]** These points of compliance include, as appropriate:

- The POC for soil at unrestricted residential properties is a minimum depth of ten feet.
- The POC for soil at restricted properties is a minimum depth of 2 feet.
- The POC for excavation or construction activities. This POC is equal to the maximum depth of excavation activities. We recommend you consult with the local building department to determine the depth of utilities in the area.
- The POC for soil which considers the leaching potential of COCs or the source areas in soil. This POC is the top of that first ground water zone that complies with UPUS.
- The POC for soil which considers other identified complete exposure pathways such as soil to indoor air or the migration of COCs in soil to surface waters or sediments.

**[SLIDE 44]** The CP must verify that:

- all data collected for demonstrating compliance with applicable standards, meets the DQOs,
- models are used in accordance with the Phase II rule,
- statistical methods used are appropriate and valid,
- multiple chemical adjustment was conducted appropriately,
- non-CL data or studies are confirmed using certified data, and
- whether a remedy was implemented.

**[SLIDE 45]** Pillar Ten: Phase II Report

The Phase II Report is the final step in the process. The completion of the report is the comprehensive final report under the VAP. It incorporates all the underlying documents, including the

- the Phase I and any updates,
- the Phase II Investigation Work Plan,
- the report for any Risk Assessment performed,
- post remediation confirmation sampling, and
- any other activities that lead up to the determination that applicable standards have been met. Applicable standards must be met for all COCs in all media and for each complete exposure pathway, both on and off property.

**[SLIDE 46]** The Phase II written report must be completed in a format prescribed by Ohio EPA. It must include the following:

- Legal description of the property;
- Dates over which the Phase I and Phase II were conducted and the name and job title of each person conducting the Phase II;
- Summary of any amendments to the Phase I;
- Limitations of the Phase II;
- A graphic or written CSM that describes the relationships between contaminants, transport media and receptors for the time a NFA letter is issued;
- **[SLIDE 47]** Summary of sampling procedures;
- Summary of data collection activities;
- Summary of background determinations;
- Summary of all determinations made under this rule;
- Summary of all models used;
- If a USD is relied upon, a summary of the USD determination activities;
- **[SLIDE 48]** If a property-specific risk assessment was conducted, a copy of the written risk assessment report must be attached or included in a section of this Phase II report;
- Summary of remedial activities;

- Discussion of how the property complies with applicable standards for each exposure pathway and if remedial activities have been or are being implemented to meet or maintain applicable standards;
- Maps and cross-sections of all borings, monitoring wells and sampling locations. The map must depict existing topography, geologic cross sections, locations of IAs, locations of exposure units, and locations where remedial activities have been implemented;
- A bibliography; and
- All supporting documents in appendices.

Thank you.