

CP Training Remediation

I am here to talk to you today about the remediation requirements of the Voluntary Action Program. I would also talk a fair bit regarding the Operation & Maintenance Plans and Agreements that are associated with implementation of a remedy. Finally, we would also examine the VAP requirements as they deal with Risk Management Measures and Plans and the Uniform Environmental Covenants Act. I would also like to thank Eric Sainey, Hydrogeologist with the Ohio EPA's central office Voluntary Action Program who helped me immensely in putting this presentation together for you.

My presentation focuses on different scenarios you may encounter while you conduct voluntary actions that require remediation. We will also define the different categories of remedial activities under the VAP rules. As you know, the end goal of a property assessment through a Phase II property assessment is to identify concentrations of chemicals of concern, be it hazardous substances or petroleum, that exceed VAP applicable risk goals in relevant environmental media. The applicable risk goals for most properties under the VAP are 1E-5 for excess cancer and Hazard Index of 1 for excess non-cancer risk. This is where a decision has to be made to implement some kind of remedial activity at the property so that compliance with applicable standards and/or risk goals can be demonstrated. Before a Certified Professional can issue a no-further action letter under the VAP, you have to demonstrate that applicable standards and applicable risk goals are met in all environmental media. This does not always mean that a remedy has to be completed in its entirety before the NFA letter is issued. We will address this in further detail later on. If applicable standards are exceeded in any media or if the overall risk at the property is exceeded, than a remedial measure must be employed to mitigate that risk and/or achieve compliance with the applicable standard. Remedial activities must be conducted to meet applicable standard when a Phase II property assessment conducted in accordance with VAP rules, reveals that concentrations of chemicals of concern, be it hazardous substances or petroleum, in any environmental media do not comply with either:

- a) Generic numerical standards per VAP rules as promulgated in Tables in OAC rule 3745-300-08;
- b) Property specific risk assessment/risk derived applicable standards in accordance with OAC rule 3745-300-09;
- c) Background levels as determined in accordance with VAP rule OAC 3745-300-07, or
- d) Any other applicable standard as defined by VAP rules.

For each existing complete exposure pathway or reasonably anticipated complete exposure pathway for all environmental media, an applicable standard needs to be developed during the Phase II property assessment and the ensuing property-specific risk assessment, if applicable. For the complete pathways in which the property fails to comply with an applicable standard, the Certified Professional needs to implement a remedy in accordance with the VAP remediation rule to meet applicable standards for such pathways or otherwise render the pathway incomplete.

Question #1 – Atul, can you explain the difference between exceedance of applicable standards and exceedance of risk goals?

Answer #1 – Certainly, that is a good question. As you know, VAP is a risk-based corrective action process. That means corrective action or a remedy is only triggered when an overall risk goal is exceeded. This risk goal is defined as 1E-5 for carcinogenic risk and Hazard Index of 1 for Non-carcinogenic risk. This risk is calculated as being cumulative across all pathways, media, receptor populations, and chemicals of concern. Hence, if this risk is exceeded, then a remedy must be implemented to meet the overall risk goals. Keep in mind that individual applicable standards could be met at a property while the overall risk is still exceeded. However, there are certain situations where exceedance of an applicable standard for a particular pathway can trigger a remedy by itself. In these situations, a holistic approach to calculating risk cumulatively will not help matters or avoid implementation of a remedy. Some examples of situations where exceedance of an applicable standard can trigger a remedy are Protection of Groundwater Meeting Unrestricted Potable Use Standards (POGWMUPUS) when the underlying clean groundwater has to be protected from future degradation, exceedance of direct contact standards in the direct contact zone of compliance, etc.

You don't always have to implement a remedy and achieve compliance with applicable standards in all environmental media before you issue the No Further Action letter. In fact, the VAP remediation rule, i.e., OAC 3745-300-~~15~~11 states that any property that needs a remedy to meet applicable standards but the property has not yet achieved applicable standard consistent with a permanent remedy when the no further action letter is issued, then the no further action letter must demonstrate that the remedy is protective of public health and safety in the environment. This can be done thru implementation of interim remedial measures. These interim measures must remain protective of public health and safety in the environment until the permanent remedy is implemented. In addition, in such a case, you have to demonstrate when you issue the No Further Action letter that the property will achieve applicable standard consistent with the permanent remedy within a reasonable time frame. What is a reasonable time frame? A reasonable time frame is usually interpreted to not exceed 5 years from the time of issuance of the No Further Action letter. Also, it should be kept in mind that any interim remedial measure must be documented and maintained through an operation and maintenance plan under an operation and maintenance agreement. Keep in mind that when you read the VAP rules, the rules refer to the Volunteer for specific obligations with regards to VAP remediation requirements. This is because the rule applies to the Volunteer but as Volunteer's representative, you, as a Certified Professional, are responsible for satisfying those remedial obligations prior to issuance of the NFA letter.

Question #2: You mentioned you have performed a lot of remediation on VAP properties. Can you give us a few examples of the remedies you have employed?

Answer #2: Yes, we have performed major remedial activities to ensure that properties meet applicable standards. Some of these were performed with state funding from the Clean Ohio Fund/Program. Hence, there was the added requirement of documentation of the implementation, oversight, and efficacy of the permanent remedy. Some examples of remedial activities that we have previously included in VAP NFA letters are: excavation and removal of impacted soils, in-situ treatment of contaminated soils using bioremediation techniques, monitored natural attenuation, engineering controls such as the use of asphalt parking lots and

soil caps, and institutional controls such as land use restriction. Some examples of institutional controls are restrictions against future ground water use, commercial/industrial land use restrictions, restrictions against permanent human occupancy of sub-surface structures like basements, etc. As a side note, if you complete a remedy before you issue a No Further Action letter, you must include verification samples that show the remaining media has met the applicable standard. An example would be confirmatory soil samples collected after the excavation and removal of impacted soils. Such results would be included within the No Further Action letter upon submittal.

Your question provides me with the perfect segue for the next topic: types of remedial activities. Remediation can be of many types.

1. Active Remediation - Active remediation consists of those remedial activities that will reduce either the mass, toxicity, mobility or concentration of the chemical of concern. The most common of active remediation that comes to mind is excavation and disposal of soils contaminated from hazardous substances or petroleum from the property. Other types of active remediation include, but are not limited to: air sparging, soil washing, pump and treat, steam stripping, soil vapor extraction, and engineered in-situ bioremediation. Active remediation also includes other short term activities such as soil removal and proper disposal, construction of engineered controls such as a cap or a groundwater gradient reversal system such as a pump and treat operation.

2. Passive Remediation - Passive remediation consists of those remedial activities that are relying upon in situ natural methods that are documented in peer reviewed scientific literature which reduce the mass, toxicity, mobility or concentration of a chemical of concern over distance and time through natural attenuation processes. An example of passive remediation is monitored natural attenuation. Natural attenuation processes are a generic term for the following physical processes:

- 1) adsorption
- 2) absorption
- 3) advection
- 4) dispersion
- 5) diffusion
- 6) dilution from recharge
- 7) volatilization

Some other types of natural attenuation processes could be the following chemical processes:

- a) aerobic biodegradation
- b) anaerobic biodegradation
- c) chemical oxidation processes
- d) hydrolysis and other reactions

It should be noted that in the VAP, a reliance on natural attenuation to achieve compliance with applicable standards must be supported with plenty of environmental monitoring data. The remedy itself is defined as “monitored natural attenuation or MNA” rather than simply “natural

attenuation”. The environmental data must be collected over space and time to prove that the applicable standards will be met during the time period of the performance of the remedy.

3. Engineering Controls - Compliance with applicable standards can also be demonstrated by utilizing an engineered control at the property. An engineering control relies on the notion that a complete exposure pathway is blocked, thereby eliminating the potential for exposures. Examples of such engineered controls or engineering controls include, but are not limited to: parking lots acting as soil caps, soil caps to prevent leaching of chemical of concern into underlying ground water, soil caps to eliminate contact of the receptors within the direct contact zone of compliance, foundations and slab of buildings that are engineered to eliminate direct contact to the occupants of the property and/or eliminate or reduce leaching of chemicals of concern. Keep in mind that if your remedy relies upon an engineering control, then you have to prepare and submit an operation and maintenance plan that is associated with the engineering control. We will talk more in detail regarding the operation and maintenance plan later on.

4. Institutional Controls - Institutional controls are placed on the property to achieve compliance with an applicable standard. These controls may be used to eliminate a particular pathway. Few key points to note about institutional controls:

- 1) Institutional controls must be established by recording a deed restriction ([environmental covenant](#)) that imposes a restriction on the property.
- 2) Institutional controls must be transferable with the property and recorded with the county recorder in the same manner as a deed to the property.
- 3) Institutional controls must be effective at eliminating or mitigating exposure to hazardous substances and/or petroleum contamination at the property, and finally
- 4) Institutional controls must be capable of being monitored, maintained, and enforced by the owner or operator of the property.

Some examples of institutional controls include deed restriction ([environmental covenant](#)), to restrict various activities such as land use, groundwater use, sub-surface construction, and restrictions against human activity patterns at a property.

As mentioned earlier, the remedy does not have to be in place when the NFA letter is issued. However, if compliance with applicable standards is not achieved at the time of NFA letter issuance, then certain measures such as “interim measures” must be implemented at the property. At a minimum, these interim measures must mitigate the existing and reasonably anticipated exposure pathways to human receptor population until a permanent remedy is established to meet and maintain applicable standards. Some examples of these interim measures include installation of a perimeter fence, installation of an interceptor trench to capture migrating groundwater contamination, temporary soil cover, temporary property security restricting access, utilizing existing structures at the property restricting exposure to chemical of concern, etc.

This may be a good time to point out some key differences between risk mitigation measures (RMM) / risk mitigation plan (RMP) and operation and maintenance plan. An NFA letter may rely on certain risk mitigation measures to achieve compliance with applicable standards. Risk mitigation measures are contained in a risk mitigation plan. Such risk mitigation measures or a

risk mitigation plan may be implemented as a separate condition of a covenant not to sue and does not necessarily require an operation and maintenance plan or agreement. Keep in mind that regardless of how the Risk Mitigation Plan is implemented, periodic reporting to the Ohio EPA regarding implementation of the risk mitigation measure/risk mitigation plan is required. An example of such a situation could be if potential construction activities are being limited at a certain area of a property to meet compliance with applicable standards and documented through a property specific risk assessment. In such a case, the potential construction activities could be controlled through implementation of a risk mitigation plan which could be recorded as a condition of a covenant not to sue and does not require a separate operation and maintenance plan or agreement.

Risk mitigation measures may apply during a voluntary action to mitigate any exposure to construction workers while implementing remedial activity before the issuance of the NFA letter. Risk mitigation measures may also apply if the point of compliance is going to be breached during or after conduct of the voluntary action.

Risk mitigation plans are a means of documenting the risk mitigation measure. Risk mitigation measures can also be defined as health and safety precautions that are taken to mitigate or eliminate human exposure. They are measures taken to protect people working in construction or excavation, working with an environmental media and working with chemicals of concern above target risk or hazard goals. Risk mitigation measures may also be employed to reduce potential risks during point of compliance breaching activity.

The risk mitigation plan can be included in the operation and maintenance plan and agreement as part of the NFA letter or the risk mitigation plan can be implemented as a direct condition of the covenant not to sue. Keep in mind that as part of the risk mitigation plan, periodic reporting activities would need to be conducted to notify the Ohio EPA of continued implementation of the risk management plan. The risk mitigation plan must be implemented when risk remedial measures are employed. Per OAC 3745-300-~~15(G)~~11(F), a risk mitigation plan must include:

1. A description of it's purpose
2. A summary of the health risks caused by the chemical of concern
3. A description of the specific precautions that are to be taken against the exposure
4. Directions for handling of environmental media that may contain chemical of concerns
5. A timeline as to when the risk remedial measures would be implemented. This should be consistent with the property specific risk assessment.
6. Locations at the property where the risk mitigation plan will be implemented. Again, this needs to be consistent with the property risk assessment.
7. A property map showing what is subject to the risk mitigation plan
8. Provisions for giving notice of the risk mitigation plan to contractors and subcontractors and their employees.
9. A summary of the precautions that each contractor must require of, and communicate to, its employees and subcontractors.
10. For a property where a covenant not to sue is requested, provisions for annually notifying the director of Ohio EPA on whether the RMP was implemented and details on its implementation.

11. Termination criteria for the risk management plan, as appropriate.

An operation and maintenance plan (O&M) is required as part of a no further action letter if the no further action relies on either or both of the following:

- 1) Engineering control that involves operation or maintenance necessary to maintain applicable standards at the property following the issuance of the no further action letter. Examples of such engineering controls are caps, whether asphalt or soil, that prevent direct contact and/or leaching to underlying groundwater or a groundwater pump and treat system.
- 2) Any remedial activity that was not completed prior to the issuance of the no further action letter. Keep in mind that if the remedial activities are not completed prior to issuance of the no further action letter, than they must be completed within a reasonable time frame from the issuance of the NFA letter. Such remedies may include engineering controls, or other kinds of active or passive remediation. O&M plans also apply to interim measures as a remedial activity.

When a remedy is required to have an operation and maintenance plan, the certified professional must develop and implement an operation and maintenance plan that includes the following components:

1. A summary of the applicable standards of the property and the purpose of the remedial activities.
2. A plan for implementing the remedial activities, including normal operation and maintenance.
3. A plan for evaluating the effectiveness of the remedial activities.
4. A description of equipment required to operate and maintain the remedial activities.
5. A plan for adjustments to normal operation and maintenance. Examples of adjustments that may be necessary to maintain the effectiveness of the remedial activity, but which may not be within the scope of normal operation and maintenance, include changing the pumping rates of pumps installed in water extraction wells or the installation of additional wells or larger pumps to achieve gradient control. Adjustments do not include installation of a different form of an engineering control or interim measure from that specified in the operation and maintenance plan. This would be considered a modification of remedial activity and may require an issuance of a new no further action letter itself.
6. A plan for addressing potential problems with the remedial activities. This should also include a description of the means for detecting the problems with the remedial activities including a schedule for periodic inspection of the remedial activities. This should also include a contingency plan that details the measures that will be taken to maintain the property's compliance with applicable standards.
7. The operation and maintenance plan must contain a description of all records that will be kept for the purpose of documenting the effective implementation of the remedy.

8. The operation and maintenance plan must include a plan for termination of the remedial activities including a description of the data and information that will be collected to support the termination criteria.

Question #3: If I have a risk mitigation plan in addition to an O&M plan for a particular project, how do I submit the risk mitigation plan within the framework of the NFA Letter?

Answer #3: Good question. If you have a risk mitigation plan and O&M plan, the VAP recommends that the CP submit the RMP within the O&M plan and include the document as an appendix. You could have the RMP included as a condition of the covenant; however, if at some point in the future you wish to alter the plan, it is much simpler to make changes if it is contained as an appendix to an O&M plan. However, if your property does not have an O&M plan, you may include the RMP as a condition of the covenant and avoid the fee associated with requesting and filing an O&M agreement.

That said, once an operation and maintenance plan is in place, at least once annually, following the issuance of the no further action letter, the certified professional or other persons responsible for the plan must submit a report to the director of the Ohio EPA that demonstrate the efficacy of the remedy being proposed under the O&M plan. In addition, any contingency measures or other results from all evaluation activity must be included in this report. Furthermore, this report must include a confirmation that the remedy, whether it be an engineering control, interim measure, active remediation or passive remediation, is still in place for the property to comply with the applicable standards.

The operation and maintenance plan, when it is required, must be prepared and implemented prior to the issuance of the no further action letter. The no further action letter must include the operation and maintenance plan. A copy of the operation and maintenance agreement must also be submitted to the director of the Ohio EPA along with the No Further Action Letter.

Once an operation and maintenance plan is prepared and submitted along with the NFA letter to the director of Ohio EPA, an operation and maintenance agreement must be entered into with the director of Ohio EPA by the Volunteer. At a minimum, the operation and maintenance agreement must include the following:

1. An operation and maintenance plan for the property
2. A provision that the volunteer is agreeing to implement the operation and maintenance plan.
3. A provision requiring periodic reporting to the Director of Ohio EPA of monitoring results in evaluation of the effectiveness of the remedial activity subject to the operation and maintenance plan.
4. A provision requiring notification to the director of Ohio EPA within a specified time of all adjustments made to normal operation and maintenance and documentation of any contingency plan activities.
5. A provision requiring that proposed modifications to a remedial activity must be submitted to the director of Ohio EPA for review and approval.

6. A provision requiring that prior notification within a specified time frame is provided to the respective buyers or transferees of the property of the remedy subject to the operation and maintenance plan.
7. A provision requiring notice to the director of Ohio EPA of the transfer of the property and transfer of the operation and maintenance plan and agreement and the terms and conditions of the transfer.
8. The establishment and description of financial assurances that the remedy subject to the operation and maintenance plan and agreement will remain operational and functional.
9. A provision for inspection of the property by Ohio EPA or it's representatives to determine compliance with the operation and maintenance plan and agreement
10. Mechanisms for providing reports to Ohio EPA including but not limited to daily logs, laboratory analytical data and supporting records, a procedure for reporting emergencies, maintenance records, and a description of the reports that will be provided to Ohio EPA and the frequency for reporting.

VAP has a generic template for drafting Operation and Maintenance Agreements. Keep in mind that an Operation and Maintenance Plan and draft agreement is required to be submitted with a NFA letter to the Ohio EPA. Operation and Maintenance agreement negotiations between the Volunteer (or whoever will be responsible for implementation) and Ohio EPA VAP Legal staff are generally conducted following submittal of the No Further Action Letter.

A “uniform environmental covenant” law was adopted in Ohio effective December 31, 2004. This law changed portions of VAP statute and created a new procedure for creating use restrictions, including deed restrictions such as commercial/industrial land use restrictions or restrictions against ground water use. This law known as the Uniform Environmental Covenants Act or UECA applies to properties that are subject to a no further action letter submitted with a request for a covenant not to sue. UECA does not apply to NFA letters that do not request a covenant not to sue from the director of Ohio EPA. When subject to UECA, “activity and use limitations” (AUL or Use Restrictions) are established through “environmental covenants” instead of declarations or up front deed restrictions. VAP has guidance on UECA which includes language for the most common generic type of activity and use limitations that appear to apply to most projects. These AULs are land use restrictions such as commercial/industrial land use restrictions, restrictions against groundwater use or restrictions against construction of sub-surface structures such as basements for routine human occupancy. The certified professional is required to include an “environmental covenant” with a NFA letter. Note that it is encouraged that you discuss the proposed language in the “proposed environmental covenant” with Ohio EPA prior to finalizing the “proposed environmental covenant” and sending it in to the agency with the No Further Action letter. Also, at this time, it is beneficial to discuss the implications of the language in the proposed environmental covenant with your Client and the Volunteer and make sure they understand what the obligations are with respect to maintaining the Activity and Use Limitations. The recording of this environmental covenant happens within 30 days of the issuance of covenant not to sue. The VAP also has a template for environmental covenants that can be used to prepare the environmental covenant to be submitted with the no further action letter to the agency.

As some of you may know, the Voluntary Action Program has a compendium of technical decisions that are utilized by Ohio EPA in setting program guidance and facilitating NFA letter reviews and issuance of Covenants to Volunteers. These technical decisions are catalogued in a compendium entitled “Technical Decision Compendium” and available on-line at the website address listed on the screen. This compendium is an excellent resource for Certified Professionals and Volunteers for rule interpretation and program decisions on various aspects of the Voluntary Action Program. I highly encourage all of you to review various technical decision documents in this compendium. Also, note that not all technical decision documents in this compendium are current. Some of the documents have been archived as a result of newer or better information or as a result of clarification of a rule or a rule change itself over the years VAP has been in existence. The archived technical decisions are presented in this compendium for information purposes only and to maintain a logical order of development of a technical decision. Do not use the archived technical decision document to base remedial decisions on your property or to advise your Client or Volunteer.

This compendium currently has four Technical Decisions that specifically relate to the VAP remediation rule. Let’s examine these in some detail:

(These are now called guidance documents, and “Technical Guidance Compendium.”)

1. The first technical decision is titled “Using a passive remedy to ensure compliance with applicable standards for potential “future” exposure scenarios”. The question posed here is whether a passive remedy implemented through an Operation and Maintenance Plan can be used to ensure that applicable standards will not be exceeded for potential “future” exposure pathways for both on and off-property receptors. The short answer is that yes, a passive remedy can be implemented at a property to ensure that applicable standards will not be exceeded in the future for both on and off-property receptors. Keep in mind that similar to an active remedy, a passive remedy will also require an O&M Plan to demonstrate that the assumptions under which the passive remedy was determined to be effective continue to be valid. However, as with any other remedy, the volunteer or the Certified Professional on behalf of the Volunteer must demonstrate that the passive remedy is an appropriate remedial activity for the property.

2. The second technical decision document deals with injection wells used to inject fluids for remedial purposes. A well is defined as a bored, drilled or driven shaft, or a dug hole, whose depth is greater than the largest surface dimension according to OAC 3745-34-01(LL). Fluid means material or substance which flows or moves whether in a semisolid, liquid, sludge, gas, or any other form or state per OAC 3745-34-01(AA). As you should know by now, OAC 3745-300-15(C) requires a voluntary action to comply with other laws of the State when conducting remedial activities under the voluntary action program.

For remedial projects, a formal permit may not be necessary if the fluids to be injected do not exceed primary drinking water standards. However, as a CP, you must, on behalf of the Volunteer, apply and receive a Class 5X26 exemption for a remediation project. A summary and information on how to obtain Class 5X26 exemption for a remediation project can be found at the website on your screen.

3. You may have wondered what the hazardous waste reporting requirements are for shipment of hazardous waste (e.g., contaminated soil that is either characteristically hazardous or contains a listed hazardous waste) to off-site licensed permitted Hazardous Waste Treatment/Storage/Disposal facilities from your VAP property. The third Technical Decision speaks specifically to this issue. As we said earlier, when completing remedial activities under the VAP, you must comply with other applicable regulations, rules, et cetera. of other divisions or agencies, to basically satisfy all applicable laws of the State. One such requirement is the filing of a hazardous waste annual report. Whenever the volunteer either generates 1000 kg of hazardous waste in a month or is otherwise subject to OAC 3745-52-34(A) and ships the hazardous waste off-site, they must comply with the annual reporting requirements found in OAC 3745-52-41. Examples of typical hazardous wastes at VAP sites may include contaminated media for example, soil and groundwater, spent filter media like wastewater treatment sludge, spent carbon units, contaminated personal protective equipment and hazardous wastewater. Information regarding how to file an annual report can be found at the website on the screen. You can also call the Division of Hazardous Waste Management (DHWM) at (614) 644-2917 and ask to speak to an Environmental Specialist about annual report information. In addition, treatment, storage, and disposal (TSD) facilities receiving the waste are also required to file annual reports in Ohio (biennial in most other states) regarding hazardous waste received from off-site.

Ohio EPA-DHWM uses this information to cross check and make sure that all generators of hazardous waste who should have filed an annual report did so. Therefore, if the remedy resulted in the generation of hazardous waste subject to these reporting requirements and an annual report is not filed, the volunteer will likely receive a Notice of Violation from Ohio EPA. Again, always comply with the rules and regulations of other divisions or agencies when completing remedial activities at a VAP property.

4. The final technical decision deals with installation of a fence as a remedy. The question that frequently arises is if fencing is used to restrict access to a property as a remedial activity, should it be incorporated into an institutional control or is fencing better treated as an engineering control? The short answer is if a Volunteer chooses to install and maintain a fence for use as part of its remedial activities, the Volunteer should treat the fence as an engineering control and not as an institutional control (now referred to as “activity and use limitations”). If a fence is implemented as part of an activity and use limitation and it at any point is damaged or compromised, then the covenant not to sue (CNS) is immediately declared void by law, pursuant to ORC 3746. However, if the fence is used as part of an engineering control and it is damaged or compromised, the Volunteer has the opportunity to repair or replace the fence as directed by the property’s operation and maintenance plan. In addition, pursuant to ORC 3746, the Volunteer is afforded a final opportunity to correct issues related to a property’s non compliance with an engineering control (known as the opportunity to cure) before Ohio EPA begins the CNS revocation process. This opportunity to cure is not available to correct a property’s noncompliance with activity and use limitations, when the CNS has been voided. There are numerous possible scenarios that could cause a fence to be damaged or compromised. For example, heavy storms, intruders, or even normal wear and tear could lead to the compromising of the fence. In addition, unforeseen circumstances may require temporary removal of a fence (or portions of a fence), such as for the movement of large machinery or vehicles into or outside the

fenced area. By using a fence as an activity and use limitation, the Volunteer loses its ability to modify the fencing or cure any defects that would void the CNS for the property. Alternatively, a Volunteer who installs and maintains a fence as an engineering control has an opportunity to inspect and make any necessary repairs to the fence, thus avoiding the automatic voidance of the CNS.

Let's talk about the finer points of remediation with the help of a case study. We have been performing remediation at this property for the past 8 months. A former electroplating facility, located in Columbus, consisting of approximately 4.5 acres was impacted by chlorinated solvents and heavy metals due to releases from an electroplating system, an underground storage tank system, numerous above ground storage tanks, as well as a diesel fuel spill. Initially, we were contracted to perform a Phase I Environmental Site Assessment to evaluate the property to determine if releases of hazardous substances and/or petroleum have occurred, are underlying, or are emanating from the property. The procedures used in performing this Phase I Property Assessment were based on the requirements in the Ohio Administrative Code (OAC) Rule 3745-300-06 and the ASTM Standards on Environmental Site Assessments for Commercial Real Estate (E1527-00). They included: acquisition and review of state and federal databases and records regarding the property ownership, use, and environmental compliance, a property inspection, review of adjoining property's records and cursory inspection of these properties, review of previous environmental assessment studies, interviews with current and former occupants of the subject property, and a review of geologic and hydrogeologic data from prior property investigations and public records. The results of the Phase I investigation recognized eleven Identified Areas (IAs). Two of these identified areas were site-wide considerations pertaining to the subsurface soil and groundwater which underlies the property and were identified based on the medium to light industrial operations which were conducted at the property for approximately 90 years. The remaining identified areas were specific to particular areas of the property and included; Former Location of a Degreaser, Former UST area, Former RCRA Storage Pad, Former Wastewater treatment System, Stained Concrete Area, Fenced Area Southwest of the Building, Gasoline Leak Area, Presence of Asbestos-Containing Material, and the Area of Former Production Lines used in the anodizing process. On the basis of the observations made and the information reviewed during the course of the Phase I Property Assessment, a recommendation was made to perform additional investigations to further assess the potential impacts identified in the Phase I ESA.

Based on recommendations from the Phase I ESA, we next performed a Phase II Property Assessment at the electroplating facility. As part of the Phase II investigation, a soil and groundwater sampling and analysis plan was developed for the property based on the Identified Areas and chemicals-of-concern described in the Phase I report. Next, a total of 31 soil borings and 10 permanent groundwater monitoring wells were installed on the property. From these borings and wells, 31 subsurface soil samples and 13 groundwater samples were collected and submitted for laboratory analysis. The samples were analyzed for various chemicals of concern which included Volatile Organic Compounds, Semi-Volatile Organic Compounds, Petroleum Hydrocarbons, and Various Metals. The analytical results from these samples were then compared to applicable VAP standards in order to establish the nature and extent of any subsurface contamination present on the property.

The results of the Phase II investigation showed that chemicals of concern were present in the shallow groundwater in two of the identified areas of the property at levels which exceeded the associated VAP standards. This investigation also showed the presence of Petroleum Hydrocarbons in the soil media in the Gasoline Leak area of the property in exceedance of VAP standards. Additionally, contamination by individual chemicals of concern found in the soil media were determined to be below associated VAP standards for commercial/industrial use. However, the detection of multiple chemicals of concern in several areas of the property would require further analysis to determine the risk to potential receptors at the property.

The results of the Phase II investigation were then incorporated as part of a site specific Risk Assessment Analysis performed in order to determine the need for any type of remedial activities at the property. Based on conclusions drawn from the Phase II investigation and the Risk Analysis, three distinct types of remediation were implemented at the property in order to meet all applicable standards. The three types of remedial activity were active, passive, and institutional. Active remediation was performed in the Gasoline Leak area of the property by the excavation and removal of more than 10 tons of soil which was contaminated with Petroleum Hydrocarbons. The excavated soil was disposed of at a licensed soil recycling center and the excavation was backfilled and returned to grade with clean soil and gravel.

In order to reduce the levels of Tetrachloroethylene (TCE) in the Former UST Area of the property, a less intrusive enhanced bioremediation technology was chosen. In this area, microbes and nutrients were introduced to the subsurface through a network of injection wells installed in the Former UST Area. Through a process of chemical oxidation, the microbes effectively degraded the TCE and reduced the level of contamination to below VAP standards. This process of passive remediation allowed for cost-effective remediation without interruption of the normal warehouse operations in this area of the property.

Finally, an institutional remedy was also implemented at the former electroplating facility. This institutional remedy came in the form of deed restrictions which were placed on the property. These deed restrictions restrict the use of groundwater on the subject property and also restrict the use of the property to commercial/industrial use.

I hope the above case study demonstrates that you can utilize various remedial alternatives to reach your overall goal of compliance with VAP standards across pathways, receptors, chemicals, and media at your VAP property.

Now that we have covered all the basics of remediation rule of the Voluntary Action Program, I wanted to give you a list of top 20 mistakes commonly made by certified professionals while applying this rule. This list is partly on personal experience with the VAP remediation rule, feedback from the Ohio EPA VAP staff, and experiences of fellow certified professionals such as you. This list is not in any order of priority.

1. Failure to not implement a remedy or propose implementation of the remedy through an Operation and Maintenance Plan when applicable standards and/or applicable risk goals are exceeded in environmental media at the property.

2. Failure to include an Operation and Maintenance Plan when the remedy is not complete at the time of NFA letter issuance
3. Failure to include an Operation and Maintenance Plan when the remedy is an engineering control
4. Failure to declare the building slab or foundation or parking lot as an engineering control when its presence is used to argue reduction in rainwater infiltration and thus subsequent reduction in leaching of chemicals of concern.
5. Failure to mitigate construction worker risks if excess risk exists during the remediation or construction phase of the project. Let me explain what this means, if the remedy is a two foot soil cap to prevent direct contact exposure and to prevent leaching of chemicals of concern and the construction worker will be exposed to chemicals of concern at depth, then the risk to the construction worker must be mitigated through a risk mitigation measure.
6. Failure to memorialize risk mitigation measures through a risk mitigation plan
7. Failure to record risk mitigation plan within the Operation and Maintenance plan or as a condition of the Covenant Not to Sue
8. Failure to demonstrate efficacy of the remedy at the conclusion of the remedy through sampling of environmental media. In the case of groundwater, multiple rounds of confirmatory sampling may be required.
9. Failure to implement interim remedial measures to protect human health and safety while a permanent remedy is being implemented
10. Failure to properly characterize the soils, sediment, or groundwater for disposal to an off-site landfill. Of particular concern here is the characterization for determining hazardous characteristics or listing. Keep in mind that RCRA regulations could apply to pre 1980 releases if the soils or groundwater, once excavated, are considered listed waste per RCRA regulations.
11. Failure to appropriately document the implementation of the remedy. Quite commonly, the remedy is implemented in full compliance with laws of the State. However, a paper trail is not properly established to aid Ohio EPA reviewers in issuing a Covenant Not to Sue.
12. Failure to obtain proper permits while implementing the remedy. Some common permits that may be required to implement remedial activities are air permits, permits to discharge contaminated surface or groundwater, permits to inject bioremediation nutrients, NPDES general construction permit when more than 1 acre is disturbed for remediation purposes, etc.
13. Failure to prepare and implement a storm water pollution prevention plan when excavation and disposal of soils is the chosen remedy. While conducting a voluntary action, care should be exercised to comply with all environmental laws, not just those of the voluntary action program.
14. Failure to record deed restrictions and the correct restrictions that correlate to the property-specific risk assessment.
15. Failure to provide multiple rounds of sampling data when monitored natural attenuation is the chosen remedy for groundwater contamination.
16. Failure to make a provision for financial assurance mechanisms under the Operation and Maintenance agreement for ongoing implementation of the remedy.

17. Failure to provide a detailed description of a contingency plan under the Operation and Maintenance plan if the chosen remedy does not succeed.
18. Failure to implement applicable response requirements as remedial actions for the type and classification of groundwater when groundwater is contaminated.
19. Failure to verify the Urban Setting Designation still exists at a property when the USD is used to change the applicable response requirements or remedial activities for that groundwater contamination.
20. Finally, failure to not properly plug and abandon any groundwater monitoring wells in accordance with Ohio Department of Natural Resources protocol that were used to implement the remedy or conduct the Phase II property assessment.

I hope the above discussion has been helpful to you as you continue your good work on VAP projects across the State. I have enjoyed being here today and being able to share my experiences with you. Thank you.