3745-300-07 **Phase II property assessments for the voluntary action program.**

[Comment: For dates of non-regulatory government publications, publications of recognized organizations and associations, federal rules, and federal statutory provisions referenced in this rule, see rule 3745-300-15 of the Administrative Code titled "Incorporation by reference - voluntary action program."]

(A) Applicability.

(1) A phase II property assessment shall be conducted in accordance with this rule if a phase I property assessment conducted in accordance with rule 3745-300-06 of the Administrative Code reveals any information that establishes any reason to believe that a release of hazardous substances or petroleum has or may have occurred on or from the property, or there is reason to believe that a release from an off-property source area is impacting the property. This rule does not apply when a release is in an area that is demonstrated to be de minimis in accordance with paragraph (E)(2)(a) of rule 3745-300-06 of the Administrative Code.

(2) Factors affecting eligibility of a property. The volunteer shall utilize information from phase I or phase II property assessments to determine that a property is eligible for the voluntary action program in accordance with rule 3745-300-02 of the Administrative Code at the time of the no further action letter issuance.

(B) Purpose of a phase II property assessment.

(1) The purpose of a phase II property assessment is to conduct an investigation sufficient to determine whether all applicable standards are met or to determine that remedial activities conducted in accordance with rule 3745-300-11 of the Administrative Code demonstrate or result in compliance with applicable standards.

(2) A volunteer may elect to conduct remedial activities at any point during a phase II property assessment without first deriving standards, provided that the remedial activities comply with rule 3745-300-11 of the Administrative Code, and provided that the volunteer completes the activities in paragraph (E) of this rule.

(C) Data quality objectives for phase II property assessments. The volunteer shall develop and implement data quality objectives consistent with U.S. EPA's "Guidance on Systematic Planning Using the Data Quality Objectives Process" according to the limitations and intended uses of those objectives. To achieve the

purpose in paragraph (B) of this rule, the volunteer, at a minimum, shall complete one iteration of the following steps:

(1) Identify the goals of the phase II property assessment, including the applicable standards that need to be achieved to demonstrate compliance with this chapter.

(2) Identify the data and information necessary to support the objectives of the phase II property assessment. Evaluate historical information from the phase I property assessment and determine if data gaps are present that should be addressed.

(3) Define the boundaries of the phase II property assessment, including spatial and temporal limits.

(4) Determine the identified areas that need to be investigated or addressed, factoring in current and reasonably anticipated future use of the property.

(5) Develop an approach to identify chemicals of concern (COCs), complete exposure pathways, and current and reasonably anticipated future receptors.

(6) Specify how the data and information collected in the phase II property assessment shall be used in the decision-making process to assess identified areas. Clarify performance and acceptance or rejection criteria for the data.

(7) Identify whether additional data or information are necessary to evaluate exposure pathways if using exposure units in a property-specific risk assessment conducted in accordance with rule 3745-300-09 of the Administrative Code.

(8) Develop a sampling and analysis plan to obtain the data.

(9) Develop a conceptual site model that illustrates the relationships between contaminants, transport media, and receptors during various phases of the voluntary action as needed. The conceptual site modelshall describe the exposure scenarios that identify the environmental media, COCs, current and reasonably anticipated future land use and receptor populations, and a determination of exposure pathway completeness.

(10) The final conceptual site model, which represents conditions at the time of the no further action letter issuance, shall be included in the phase II property

assessment report that is completed in accordance with paragraph (J) of this rule.

(D) Sampling and sample analysis. The volunteer shall identify the samples and analytes that the certified laboratory shall analyze, and the volunteer shall ensure the following:

(1) The sampling procedures employed at the property are consistent with the sample quality requirements of the certified laboratory.

(2) Data from the certified laboratory are adequate for use in the voluntary action. At a minimum, the volunteer shall do the following:

(a) Notify the certified laboratory when samples are to be used for a voluntary action and when certified laboratory data are required.

(b) Ensure that the certified laboratory is certified for and capable of performing the analyses that are required for the property, including those necessary to form the basis of the no further action letter.

(c) Communicate to the certified laboratory the applicable standards required for the property and ensure that the certified laboratory is capable of detecting the COCs in environmental media at or below the applicable standards for the property. Cumulative adjustments for multiple chemicals and pathways shall be evaluated to determine the applicable standards that shall be achieved to evaluate compliance with applicable standards.

(d) Use appropriate detection limit to represent any applicable standard where the certified laboratory is not capable of detecting the COCs at or below the applicable standard until such time that a lower detection is achieved.

(3) Acceptable quality assurance and quality control procedures are established and employed when field data are collected during the phase II property assessment. The field quality assurance and quality control procedures shall serve to minimize sources of error, minimize the potential for cross contamination, and maximize the representativeness of the data collected. At a minimum, the field quality assurance and quality control procedures shall include the following:

(a) Review of the laboratory's quality assurance program plan and standard operating procedures for consistency with field quality assurance and quality control procedures.

(b) Develop field quality assurance and quality control procedures including but not limited to the following items:

(i) Equipment decontamination.

(ii) Trip blanks, equipment blanks, field blanks, and duplicates.

(iii) Calibration of field instruments, which includes procedures for instrument correction and re-calibration when necessary.

(iv) Documentation and record maintenance.

(v) Sample handling, preservation, and holding times.

(vi) Chain-of-custody.

(E) Phase II property assessment data collection activities. The sampling activities conducted under this paragraph shall be performed in accordance with the sampling procedures in paragraph (D) of this rule. Data collection and data evaluation may be conducted iteratively in accordance with the conceptual site model as required by paragraph (C)(9) of this rule. The volunteer shall collect sufficient data to make the determinations in paragraph (F) of this rule, in accordance with the following:

(1) Use of existing information from phase I assessments and data from laboratories not certified under this chapter.

(a) Phase I property assessment and other existing information. The person who conducts a phase II property assessment shall utilize all information from a phase I property assessment conducted in accordance with rule 3745-300-06 of the Administrative Code and any other information known to the owner, or the volunteer if different from the owner, which is relevant to the proper characterization of environmental conditions on, underlying, or emanating from the property.

(b) Use of data from prior phase I environmental site assessments. Prior phase

I environmental site assessments and studies not conducted in accordance with rule 3745-300-06 of the Administrative Code may be relied upon, provided that all of the following are met:

(i) The information gathered and the method used to collect and evaluate the data are consistent with paragraph (A) of rule 3745-300-06 of the Administrative Code.

(ii) The prior phase I environmental site assessment is amended in such a way as to comply with rule 3745-300-06 of the Administrative Code.

(iii) The prior phase I environmental site assessment is amended to comply with paragraph (E)(1)(c) of this rule, if more than one hundred eighty days has elapsed after completion of the phase I environmental site assessment.

(c) Amending phase I property assessments. The volunteer shall ensure that all requirements in paragraphs (C) and (E) of rule 3745-300-06 of the Administrative Code are performed within one hundred eighty days before the phase II property assessment begins, or that no change in environmental conditions at the property occurred after the actions required by paragraphs (C) and (E) of rule 3745-300-06 of the Administrative Code were conducted. A change in environmental conditions means new information about known or suspected releases to environmental media that result in additional identified areas at the property that are subject to phase II property assessment, or previous identified areas that need further phase II property assessment due to new information.

(i) During a determination of whether to re-evaluate requirements in paragraphs (C) and (E) of rule 3745-300-06 of the Administrative Code, best professional judgment shall be used to decide which requirements in paragraphs (C) and (E) of rule 3745-300-06 of the Administrative Code shall be re-evaluated to determine whether additional phase II property assessment is required.

(ii) If any provisions in paragraphs (C) and (E) of rule 3745-300-06 of the Administrative Code require re-evaluation, documentation of the additional information gathered to comply with this paragraph shall be included in an updated phase I property assessment report.

(d) Use of non-certified laboratory data. Data generated by laboratories not certified under this chapter, non-certified data, and studies not conducted in accordance with this rule may be used to partially comply with this rule, provided that all of the following are met:

(i) The information gathered is consistent with the purposes of this rule, and the methods used to collect and evaluate the data are consistent with the purposes of this rule.

(ii) The data are evaluated to ensure quality and consistency with the requirements for data collected in a phase II property assessment conducted in accordance with this rule.

(iii) The data are confirmed by samples analyzed by a laboratory with a current certification under this chapter for the analysis. The confirmatory samples shall be collected as follows:

(a) For ground water, surface water, and air, provided that the samples are collected from the same sampling points that were used in the previous study, a minimum of ten per cent of the sample population of each data set in the previous study shall be confirmed.

(b) For all environmental media not addressed in paragraph (E)(1)(d)(iii)(a) of this rule, or if the sampling points used in the previous study cannot be used, or are not used, the volunteer shall do the following:

(i) Collect a minimum of ten per cent of the sample population, or at least eight samples, whichever is greater as confirmation samples, for each data set in the previous study.

(ii) Qualitatively compare the non-certified laboratory data set and the certified laboratory data set and demonstrate that the two are not significantly different. To make this demonstration, the volunteer shall utilize any method that is accepted as an academic or industry standard.

(iv) The data or information used in support of a no further action letter are consistent with existing property conditions.

(v) If the requirements of paragraphs (E)(1)(d)(i) to (E)(1)(d)(iv) of this rule cannot be met, the volunteer shall determine the concentrations of COCs in identified areas or exposure units in accordance with paragraph (F)(6) of this rule.

(2) A review and evaluation of existing regional and property-specific geologic, hydrogeologic, and physical characteristics of the property and the surrounding area by an evaluation of characteristics in paragraphs (E)(2)(a) to (E)(2)(o) of this rule. The volunteer shall review reasonably available information from previous on-property investigations or other sources of information. Property-specific data shall be collected as needed. The collection of additional data or information shall be by methods consistent with this rule. The evaluation of information and collection of additional data shall be consistent with the data quality objectives developed in accordance with paragraph (C) of this rule. The review and evaluation shall address and include the following, as necessary:

(a) The characteristics of major stratigraphic units and the associated depositional environments. A description of the continuous profile of the stratigraphic units beneath the property, including the thickness and lateral extent of each unit and the depth to bedrock.

(b) Property-specific physical characteristics of saturated or unsaturated soils or bedrock including but not limited to the following:

(i) Porosity.

(ii) Effective porosity.

(iii) Bulk density.

(iv) Moisture content.

(v) Grain size analysis.

(vi) Soil pH.

(vii) The vertical and horizontal hydraulic conductivity of saturated and unsaturated zones.

(viii) The contaminant attenuation capacity and mechanisms of attenuation of soil or bedrock including but not limited to the following:

(a) Ion exchange capacity.

(b) Organic carbon content.

(c) Mineral content.

(d) Soil sorptive capacity.

(c) Identification of regional aquifers and ground water zones beneath the property, and a determination of the productivity of such aquifers.

(d) Identification of confining units that may separate ground water zones and the ability of the confining units to transmit or retard the movement of ground water, including an evaluation of the hydraulic interconnectedness of such zones in the subsurface.

(e) Identification and characterization of ground water recharge and discharge areas, and the amount of recharge and discharge.

(f) Estimates of infiltration rates or evapotranspiration rates.

(g) A description, and the potential orientation, of geomorphology and structural geologic features that may influence the ground water flow system or unsaturated flow conditions, including but not limited to topographical features, geologic stratification, faults, joints, or fractures.

(h) The occurrence, flow direction, and gradient of surface water or ground water.

(i) The absence or presence of commingled COCs from multiple source areas.

(j) The natural quality of ground water and surface water.

(k) Any anthropogenic influences that may affect or alter the natural geology and hydrogeology underlying the property or may provide preferential

migration pathways, including but not limited to, utilities, fill material, pavement, buildings and building foundations, or grading activities.

(l) Identification of ground water use, availability or special designations such as drinking water source protection areas for a public water system using ground water or sole source aquifer designations.

(m) Identification of the presence of legally-enforceable restrictions on the use of ground water including, without limitation, local rules and ordinances.

(n) Identification of regional availability of surface water or ground water and reasonable alternative sources of drinking water.

(o) Any other characteristics or information that may be useful to meet the data quality objectives of the phase II property assessment or to determine compliance with applicable standards or the need for remedial activities.

(3) The volunteer shall identify the COCs in the identified areas by an evaluation of the following:

(a) Hazardous substances or petroleum identified in a phase I property assessment conducted in accordance with this rule or rule 3745-300-06 of the Administrative Code.

(b) Hazardous substances or petroleum that are or were commonly used in industrial or commercial activities similar to the activities conducted at the property.

(c) Hazardous substances or petroleum that, based on reasonably available information, may be typical constituents, components, additives, impurities, and degradation products of hazardous substances or petroleum identified in paragraphs (E)(3)(a) and (E)(3)(b) of this rule.

(d) Constituents of hazardous substances for which a method or technology of analysis is not available to measure the concentration of the hazardous substance. The volunteer shall obtain certified data for each constituent or set of constituents which are representative of a hazardous substance even if the constituents are not listed as a hazardous substance.

(e) Naturally occurring hazardous substances or petroleum that occur in one environmental medium are considered potential COCs if current or past activities involving the treatment, storage, or disposal of hazardous substances or petroleum are suspected to have caused the transfer of these naturally occurring hazardous substances or petroleum to other environmental media. Examples include the following:

(i) An acid spill that results in the leaching of metals naturally found in soil to the underlying ground water.

(ii) The mobilization to ground water of metals naturally found in soil when the mobilization is the result of anaerobic ground water associated with the biodegradation of an organic solvent ground water plume.

(4) Evaluate identified areas.

(a) The volunteer shall evaluate all identified areas and determine within each identified area the following:

(i) All source areas that are present.

(ii) All affected media that are present.

(b) The volunteer shall consider information from a phase II property assessment to determine if the existence, location, and dimensions of each identified area designated pursuant to a phase I property assessment require adjustment. If the existence, location, or dimensions of the identified areas require adjustment or redesignation to reflect the phase II property assessment information, the volunteer shall make the appropriate adjustments to the identified areas and shall redesignate the identified areas in the phase II property assessment.

(5) Sampling environmental media.

(a) The volunteer shall collect samples from environmental media affected by a release in accordance with the data quality objectives and sampling procedures developed under paragraphs (C) and (D) of this rule. Sampling objectives shall be reliable and representative for the environmental media sampled, as necessary to make the determinations in paragraphs (F)(1) to (F)(10) of this rule.

(b) During the determination of how to conduct sampling under paragraph (E)(5)(a) of this rule, the volunteer shall ensure that the data collected are sufficient to make the determinations in paragraphs (F)(1) to (F)(10) of this rulefor all points of compliance an receptors, and meet the stated data quality objectives. The volunteer shall ensure that the data are representative and shall consider the following:

(i) The vertical and horizontal spatial distribution of sampling locations.

(ii) Temporal variations in the media or in the concentrations of COCs contained in the media.

(6) Identification of current and reasonably anticipated property use and receptor populations.The volunteer shall identify the current and reasonably anticipated uses of the property using the data quality objectives as provided in paragraph (C) of this rule. The volunteer shall also identify all receptor populations reasonably anticipated to be exposed to COCs on the property, and all off-property receptor populations reasonably anticipated to be exposed to COCs from the property. Receptor populations that shall be identified for the purpose of making the determinations contained in paragraph (F)(1) of this rule include, at a minimum, the following:

(a) The volunteer shall identify the current and reasonably anticipated uses of the property using the data quality objectives provided in paragraph (C) of this rule.

(b) The volunteer shall identify all receptor populations reasonably anticipated to be exposed to COCs on the property, and all off-property receptor populations reasonably anticipated to be exposed to COCs from the property. Receptor populations that shall be identified in order to make the determinations in paragraph (F)(1) of this rule include, at a minimum, the following:

(i) Populations that live on the property.

(ii) Populations that work on the property.

(iii) Populations on the property as visitors, commercial consumers or recreational participants.

(iv) Populations on or off the property that may be exposed to COCs in

environmental media as a result of construction activities.

(v) Populations on or off the property that are reasonably anticipated to be exposed to COCs from the property through ground water migration, surface water migration, dust emissions, volatilization, and other mechanisms which transport COCs off the property.

(vi) Important ecological resources that, considering the land use and the quality and extent of habitat on the property and adjoining properties, reasonably would have been associated with the property or adjacent properties were it not for the presence of COCs from the property.

(7) The volunteer may need to conduct data collection activities necessary to determine background levels in accordance with paragraph (H) of this rule.

(F) Determinations under the voluntary action program.

(1) Pathway completeness determination.

(a) The volunteer shall evaluate the current and reasonably anticipated exposure pathways and shall identify the following.

(i) All source areas or affected media contributing to the pathway.

(ii) The receptors identified under paragraph (E)(6) of this rule and any applicable points of compliance.

(iii) The transport mechanisms for the pathway.

(b) The volunteer shall determine which current and reasonably anticipated pathways are complete. Exposure pathways shall be based on property-specific data collected in accordance with the procedures described in this chapter and shall be evaluated in accordance with the procedures described in this chapter. A pathway is considered to be complete if all three of the pathway components described in paragraphs (F)(1)(a)(i) to (F)(1)(a)(iii) of this rule are present. All exposure pathways determined to be complete under this paragraph shall be identified in the phase II property assessment report.

(c) If the volunteer determines that any of the exposure pathways on or adjoining the property are not reasonably anticipated to be complete for the COCs, the phase II property assessment report shall include a written justification for the elimination of those exposure pathways from further consideration.

(2) Determination of ground water zones and confining units.

(a) The volunteer shall determine ground water zones and confining units beneath the property, as necessary, for the purposes of ground water protection or classification. The information listed in paragraph (E)(2) of this rule shall be used, as necessary, to determine the extent to which saturated zones in the subsurface should be divided or grouped into ground water zones. The volunteer shall determine whether any confining units are present, and, if present, how such confining units separate the ground water zones.

(b) During the evaluation of whether the uppermost saturated zone is a ground water zone, the volunteer may assume that the saturated zone contains ground water, or may provide a demonstration that the saturated zone does not contain ground water. If the volunteer chooses to make a demonstration that the uppermost saturated zone does not contain ground water, the volunteer shall bias the following determinations to the area of highest expected outcome of the testing:

(i) Determine the ground water yield in accordance with paragraph (F)(8) of this rule, using a sufficient number of properly developed wells that are constructed to the minimum standards of a two-inch diameter, five-foot long manufactured screen placed in the saturated zone in a six-inch diameter borehole.

(ii) Determine the in situ hydraulic conductivity of the saturated zone using appropriate field test methods. Sampling points shall be sufficient in number to represent the hydraulic conductivity of the saturated zone underlying the property.

(3) Determination of whether the provisions for protection of ground water that meets unrestricted potable use standards apply, or whether ground water classification is required. If a ground water zone is determined to meet unrestricted potable use standards, the provisions in paragraph (F)(4) of this rule and paragraph (D) of rule 3745-300-10 of the Administrative Code apply to the ground water zone underlying the property. If a ground water zone is

determined to exceed unrestricted potable use standards, the classification of the ground water zone shall be determined in accordance with paragraph (B) of rule 3745-300-10 of the Administrative Code. Either generic or property-specific unrestricted potable use standards may be used to make this demonstration. For each ground water zone underlying the property, the volunteer shall demonstrate whether the ground water in the zone meets or exceeds unrestricted potable use standards by use of one of the following methods:

(a) Sample the ground water within the zone to determine whether the ground water in that zone meets or exceeds unrestricted potable use standards. The volunteer shall collect one or more ground water samples to determine the concentration of COCs in the ground water.

(i) Ground water samples shall be collected in accordance with paragraph (F)(6)(d) of this rule from one or more ground water monitoring wells located immediately down-gradient of the source area or down-gradient and as close as possible to the source area. The samples shall be analyzed by a certified laboratory for the concentrations of the COCs at the property. If more than one ground water sample is collected from a well, the second sample shall be collected within forty-eight hours to ninety days after collection of the first ground water sample.

(ii) To evaluate whether more than one ground water sample is warranted to determine if the ground water meets or exceeds the unrestricted potable use standards, the volunteer shall consider all temporal variations that could impact the determination of whether the provisions apply to the ground water zone. If additional ground water sampling events are warranted due to temporal variations, then a sufficient number of additional ground water samples shall be collected over an appropriate time period to adequately characterize a representative concentration of the COC in ground water. Temporal variations include, but are not limited to, the following:

(a) Seasonal variations that result in either increased or decreased recharge and thus fluctuations in the water table elevation.

(b) Other variations that result from the impact of geologic heterogeneity (permeability, fractures, etc.), contaminant source heterogeneity, or the transient nature of contaminant transport.

(iii) A minimum of two ground water samples are needed to determine that the ground water in a zone exceeds the unrestricted potable use standards, unless one or both of the following conditions apply:

(a) The concentrations of the first sampling event exceed unrestricted potable use standards by at least one order of magnitude.

(b) The concentrations of the first sampling event exceed unrestricted potable use standards and historical ground water data at the property indicates that releases from source areas have impacted the ground water zone underlying the property in excess of unrestricted potable use standards.

(iv) During a demonstration of whether ground water meets or exceeds unrestricted potable use standards, a cumulative adjustment for multiple chemicals shall be conducted in accordance with paragraph (A)(2)(b) of rule 3745-300-08 of the Administrative Code. The cumulative adjustment for multiple chemicals is required for both generic and property-specific risk-derived unrestricted potable use standards. However, the generic unrestricted potable use standards based on maximum contaminant levels or other regulatory established criteria under paragraph (E)(3) of rule 3745-300-08 of the Administrative Code shall not be included in the cumulative adjustment for multiple chemicals in the ground water zone. The risk for potable use of ground water shall not be summed with the risk from exposure pathways other than potable use of ground water.

(v) Ground water with free product exceeds applicable standards for unrestricted potable use of ground water.

(b) The volunteer may justify that sampling of a ground water zone underlying the property is not necessary to determine that the ground water in the zone does not contain concentrations of any COCs that exceed unrestricted potable use standards. Based on this justification, the volunteer may apply the provisions to protect ground water that meets potable use standards in paragraph (F)(4) of this rule and paragraph (D) of rule 3745-300-10 of the Administrative Code. As part of this justification, the volunteer shall document that it is reasonable to assume ground water does not exceed the unrestricted potable use

standards based on a weight-of-evidence approach using relevant property-specific information, including the following, as necessary:

(i) The nature, type, concentration, and mass of the COCs released, and the time of release.

(ii) The type, concentration, and mass of COCs present in the the following:

(a) Subsurface soil or bedrock above the ground waster zone that requires protection.

(b) Subsurface soil or bedrock between grond water zones.

(iii) The physical and chemical characteristics of the soil or bedrock beneath the property including, but not limited to, the secondary features, soil or bedrock type, heterogeneity of the subsurface soil or bedrock, or the integrity of any confining units that separate ground water zones.

(iv) The separation distance between the source area and the ground water zone, or the separation distance between ground water zones.

(v) The results of modeling conducted in accordance with paragraph (G) of this rule, as applicable.

(vi) The presence or absence of off-property source areas that may have impacted ground water on, underlying, or emanating from the property. The impact of off-property source areas shall be determined in accordance with paragraph (F)(9) of this rule.

(vii) Any other lines of evidence the volunteer believes support the determination that the ground water in a zone underlying the property does not contain concentrations of any COCs above unrestricted potable use standards.

(4) Demonstration of continuing compliance with the provisions to protect ground water meeting unrestricted potable use standards.

(a) When the provisions for protecting ground water apply to a ground water zone in accordance with paragraph (D) of rule 3745-300-10, the volunteer shall demonstrate that COCs shall not migrate to the ground water zone at concentrations that exceed unrestricted potable use standards. To demonstrate this, the volunteer shall do either of the following:

(i) Demonstrate that the COCs in the subsurface do not exceed values that would result in unrestricted potable use standards being exceeded in the ground water zone.

(ii) Demonstrate that the provisions to protect ground water that meets potable use standards shall not be violated, using a weight-of-evidence approach. As part of this weight-of-evidence approach, the volunteer shall document that it is reasonable to assume the ground water zone will not exceed unrestricted potable use standards in the future using relevant property-specific information, including the following, as necessary:

(a) The nature, type, concentration, and mass of the COCs released, and the time of release.

(b) The type, concentration, and mass of COCs present in the subsurface soil or bedrock above the ground water zone that requires protection or between ground water zones.

(c) The physical and chemical characteristics of the soil or bedrock beneath the property including, but not limited to, the secondary features, soil or bedrock type, heterogeneity of the subsurface soil or bedrock, or the integrity of any confining units that separate ground water zones.

(d) The separation distance between the source area and ground water, or the separation distance between ground water zones.

(e) The results of modeling conducted in accordance with paragraph (G) of this rule, as applicable.

(f) The presence of man-made structures on the property that reduce or prevent infiltration and leaching of any COCs to

the ground water zone. Man-made structures which inhibit infiltration are considered engineering controls and shall be maintained under an operation and maintenance plan in accordance with rule 3745-300-11 of the Administrative Code.

(g) Any other lines of evidence the volunteer believes support the determination that the ground water in a zone underlying the property shall not exceed concentrations of any COCs above unrestricted potable use standards.

(b) If it cannot be demonstrated in accordance with paragraph (F)(4) of this rule that COCs shall not leach or otherwise migrate into the ground water zone underlying the property, the volunteer shall implement a remedy in accordance with rule 3745-300-11 of the Administrative Code that prevents the ground water zone underlying the property from exceeding unrestricted potable use standards.

(5) Determination of applicable standards. Applicable standards shall be determined for all COCs with respect to all exposure pathways determined to be complete under paragraph (F)(1) of this rule for which the volunteer intends to demonstrate compliance with applicable standards in accordance with paragraph (I) of this rule. The volunteer shall determine and derive the applicable standards for each complete exposure pathway in accordance with this chapter.

(a) The volunteer shall determine the applicability of generic numerical standards at the property in accordance with paragraph (A)(1)(a) of rule 3745-300-08 of the Administrative Code. If generic direct-contact soil standards for restricted land uses are used to meet applicable standards, institutional controls shall be used to limit the property's land use as described in paragraphs (B)(2)(d) and (C)(2)(c) of rule 3745-300-08 of the Administrative Code. The institutional controls shall be implemented in accordance with rule 3745-300-11 of the Administrative Code.

(b) When a property-specific risk assessment is performed at the property, the volunteer shall determine the applicability of standards derived through a property-specific risk assessment conducted in accordance with paragraph (A) of rule 3745-300-09 of the Administrative Code.

(c) The volunteer shall determine the applicability of any other standards in this rule or in rule 3745-300-08, 3745-300-09, 3745-300-10, or

3745-300-11 of the Administrative Code.

(d) The volunteer shall consider the performance of a remedy employed at the property when the remedy's use is intended to meet or maintain applicable standards. The remedy shall be implemented in accordance with rule 3745-300-11 of the Administrative Code.

(e) The volunteer does not need to determine applicable standards in accordance with rule 3745-300-08 or 3745-300-09 of the Administrative Code for COCs when the concentrations of the COCs from the property are at or below background levels determined in accordance with paragraph (H) of this rule.

(f) The volunteer does not need to determine applicable standards for COCs, if any of the following apply:

(i) The COCs were the result of a release in a de minimus area or a previously addressed area as determined in accordance with paragraph (E)(2)(a) of rule 3745-300-06 of the Administrative Code.

(ii) The volunteer makes the determination that infrequent detections of COCs are a product of artifacts in the data and may not be related to the site operations or disposal practices. The determination shall be based on a demonstration of sufficient weight of evidence. Examples of evidence for consideration include the following:

(a) Historical information reported in the phase I property assessment report and other historical data from the property.

(b) The concentrations at which the detections are reported, provided that detection limits are not elevated due to matrix interferences.

(c) The detections do not indicate the presence of previously unknown areas of high concentration.

(d) The COC is not detected in any other sampled environmental media.

(e) The likelihood that the detected constituents are degradation or by-products of COCs on the property.

(iii) The COCs are demonstrated by the certified laboratory to be tentatively identified compounds without an indication of historical use on the property or evidence that the COCs might be degradation compounds or by-products of one or more other COCs used at the property.

(iv) The COCs are demonstrated through appropriate quality assurance and quality control data to be the result of contamination due to field sampling activities or laboratory processes.

(v) The COCs are essential human nutrients that are present due to the release or potential release of a hazardous substance or petroleum, and may be toxic only at very high concentrations. These chemicals include iron, magnesium, calcium, potassium, and sodium.

(vi) The COCs are determined to contribute to less than one per cent of the estimated risk or hazard attributed to a pathway-receptor combination in accordance with the procedures in U.S. EPA's "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A)" following a procedure analogous to section 5.9.5 of the document.

(6) Determination of the concentrations of chemicals of concern (COCs) in identified areas or in exposure units. The volunteer shall determine the concentrations of the COCs in accordance with paragraphs (F)(6)(a) to (F)(6)(e) of this rule as necessary to make the determinations in paragraph (F) of this rule. Exposure unit determinations shall consider current and future land use exposure scenarios in accordance with paragraph (D)(3)(b) of rule 3745-300-09 of the Administrative Code, and sampling shall be appropriate for the exposure scenario. All samples collected in accordance with this paragraph shall be analyzed by a certified laboratory, and certified data provided, in order to support the determinations.

(a) To determine the concentrations of the COCs in surface water, the volunteer shall follow a sampling and analysis plan developed in accordance with the following:

(i) Ohio EPA's "Biological Criteria For the Protection of Aquatic Life:

Volume II: User's Manual For Biological Field Assessment Of Ohio Surface Waters."

(ii) Ohio EPA's "Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices."

(b) To determine the concentrations of the COCs in sediments to compare the concentrations to the applicable standards identified in paragraphs (G) and (H) of rule 3745-300-08 of the Administrative Code, the volunteer shall sample the sediments in the identified areas in accordance with the procedures in Ohio EPA's "Sediment Sampling Guide and Methodologies." The data collected shall be analyzed by a certified laboratory to determine the representative concentration or maximum concentration in the identified area. To determine representative or maximum concentrations in identified areas, the volunteer shall derive the concentrations in accordance with paragraph (F)(6)(c) of this rule.

(c) To determine the concentrations of the COCs in soil to demonstrate compliance with applicable standards, the samples collected shall be analyzed by a certified laboratory, and certified data provided, to determine the representative concentrations or maximum concentrations of the COCs in the identified area or exposure unit. To determine representative or maximum concentrations of the COCs in identified areas or exposure units, the volunteer shall do one of the following:

(i) Derive the representative concentration by calculating the ninety-five per cent upper confidence limit of the arithmetic mean. The ninety-five per cent upper confidence limit of the arithmetic mean shall be calculated for each data set. Data sets shall be comprised of a sufficient number and quality of samples as to derive a normal, log-normal, or other applicable frequency distribution. In addition to compliance with paragraph (D) of this rule, the volunteer shall use techniques for sampling normal or log-normal distributions based on appropriate equations in U.S. EPA's "Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites," or by other peer-reviewed statistical methodology for normal or log-normal distributions. Calculating the representative soil concentration using the ninety-five per cent upper confidence limit is inappropriate for vapor intrusion demonstrations.

(ii) Derive the maximum concentration within the identified area. The volunteer may use the maximum concentration in the data set to

represent the identified area concentration, provided that the volunteer can reliably bias sampling activities both vertically and laterally within the identified area to the point of highest concentration. A sufficient number of samples shall be collected in order to evaluate all source areas and exposures for each receptor determined in accordance with paragraph (F)(1) of this rule, provided that a minimum of three or more samples are collected from each identified area and are analyzed by a certified laboratory, and certified data are provided.

(iii) Derive the representative concentration using the incremental sampling technique based on guidance provided in Mason's "Preparation of Soil Sampling Protocols: Sampling Techniques and Strategies," Gerlach and Nocerino's "Guidance for Obtaining Representative Laboratory Analytical Subsamples from Particulate Laboratory Samples" and the interstate technology regulatory council's "Incremental Sampling Methodology." The volunteer may use the representative concentration from incremental sampling conducted in the identified area or exposure unit, provided that the samples are analyzed by a certified laboratory.

(d) To determine the concentrations of the COCs in ground water to demonstrate compliance with applicable standards, the volunteer shall perform sampling activities in compliance with the following criteria:

(i) The method of sample collection shall be capable of producing ground water quality appropriate to evaluate the pathway of concern.

(ii) The volunteer shall collect a sufficient number of samples to adequately characterize a representative concentration of the COCs in ground water. To determine the number and timing of samples collected, the volunteer shall consider temporal variations that could result in an exceedance of applicable standards. Temporal variations include, but are not limited to the following:

(a) Seasonal variations that result in either increased or decreased recharge and thus fluctuations in the water table elevation.

(b) Other variations that result from the impact of geologic

heterogeneity (permeability, fractures, etc.), contaminant source heterogeneity, or the transient nature of contaminant transport.

(iii) Sample locations shall be appropriately located to evaluate all reasonably anticipated pathways to ensure applicable standards shall not be exceeded at the points of compliance or receptors based upon the following:

(a) The direction of ground water flow.

(b) The size of the plume.

(c) The date of the release.

(d) Field screening techniques and methods.

(e) Other methods or information, as appropriate.

(iv) One or more sampling locations shall be biased toward the location that is, or would be anticipated to be, the area of highest concentration of COCs. If sample locations cannot be reliably biased towards the area of highest concentration, the volunteer shall take samples from a number of additional sample locations sufficient to determine the area of highest concentration.

(v) All samples collected in accordance with this paragraph shall be analyzed by a certified laboratory.

(vi) To determine compliance with applicable standards, the volunteer shall evaluate the data from each location separately.

(vii) If it is necessary to take a ground water sample directly beneath a source area, the volunteer shall use methods for monitoring well installation, construction, sampling, and maintenance that shall not cause cross-contamination between ground water zones.

(viii) Methods and procedures shall be followed, according to the limitations and intended uses of the methods and procedures, and based on either of the following:

(a) Documents that provide techniques for data collection, field testing, and sampling which conform to the following:

(i) Are field-validated.

(ii) Are documented and peer-reviewed.

(iii) Ensure the representativeness of samples taken following the technique.

(iv) Are proven capable of achieving the data quality objectives identified in paragraph (C) of this rule.

(b) Ohio EPA's "Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring." If any portion of the "Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring" document would be inconsistent with the purpose of the phase II property assessment and this chapter, that portion should not be used.

(e) To determine the concentrations of the COCs in either soil gas or indoor air, for a demonstration of compliance with applicable standards, the volunteer shall conduct sampling activities in compliance with the following criteria:

(i) The method of sample collection shall be capable of producing results appropriate to evaluate the pathway of concern.

(ii) The volunteer shall collect a sufficient number of samples to adequately characterize a representative concentration of the COCs in either soil gas or indoor air. To determine the number and timing of samples to collect, the volunteer shall consider temporal variations including, but not limited to, the following:

(a) Temporal variations in the water table elevation, or concentrations of hazardous substances or petroleum in ground water.

(b) Temporal variations that result from interior building pressure changes as a result of the use or non-use of heating,

ventilation, and air conditioning (HVAC) systems during different heating and cooling seasons.

(iii) Sample locations shall be appropriate to evaluate all current and reasonably anticipated exposure pathways. The volunteer shall reasonably bias sampling activities in the identified area to the location that is, or is reasonably anticipated to be, the area of highest concentration of COCs. The selection of sample locations shall take under consideration the following:

(a) Distribution of COCs.

(b) Building occupancy, including locations and receptors.

(c) Building partitions and the layout of HVAC systems.

(d) Preferential pathways, which may include, but are not limited to, utility conduits, sumps, wall joints, and floor openings.

(e) Other variations that result from the impact of geologic heterogeneity, such as permeability and fractures.

(f) Other information, as appropriate.

(iv) All samples collected in accordance with this paragraph shall be analyzed by a certified laboratory.

(v) Methods and procedures shall be followed, according to the limitations and intended uses of such methods and procedures, and shall be based on either of the following:

(a) Documents containing data collection, field testing, and sampling techniques which conform to the following:

(i) The data collection, field testing, and sampling techniques are field-validated.

(ii) The data collection, field testing, and sampling techniques are documented and peer-reviewed.

(iii) The data collection, field testing, and sampling

techniques ensure the representativeness of samples taken when the techniques are followed.

(iv) The data collection, field testing, and sampling techniques are proven capable of achieving the data quality objectives identified in paragraph (C) of this rule.

(b) Ohio EPA's guidance document regarding sample collection and evaluation of vapor intrusion to indoor air.

(f) Non-intrusive or indirect field testing may be used to assist in the selection of sampling locations, but these techniques shall not be used to demonstrate that concentrations of concern meet or exceed applicable standards.

(7) Classify the ground water. To classify ground water zones in accordance with paragraphs (A) and (B) of rule 3745-300-10 of the Administrative Code, the volunteer shall conduct the following data collection activities:

(a) The volunteer shall determine if the ground water zone is being used. To make the determination, the volunteer, at a minimum, shall do the following:

(i) Identify any visual evidence of ground water use in areas where ground water has or is reasonably anticipated to have concentrations of COCs in excess of unrestricted potable use standards.

(ii) Review Ohio department of natural resources water well log information for the properties on which ground water contains or is reasonably anticipated to contain concentrations of COCs in excess of unrestricted potable use standards.

(b) To determine that the yield of a ground water zone falls below the criterion for critical resource ground water as described in paragraph (B)(1) of rule 3745-300-10 of the Administrative Code, the yield of the ground water zone shall be based on one or more of the following sources of information or methods:

(i) The ground water resource maps published by the Ohio department of natural resources or other published and verified data for the

ground water zone being classified.

(ii) Determined from a sufficient number of properly developed wells constructed to the minimum standards of an eight-inch diameter manufactured screen in a twelve-inch diameter borehole, in accordance with paragraph (F)(8) of this rule. The well screen shall extend through at least eighty per cent of the thickness of the ground water zone, or the volunteer shall otherwise demonstrate that shorter screen lengths would not produce yield that results in a different classification of the ground water.

(c) To determine that the yield of a ground water zone falls below the criteria for class A ground water in paragraph (B)(2) of rule 3745-300-10 of the Administrative Code, the yield of the ground water zone being classified shall be determined in accordance with paragraph (F)(8) of this rule and shall conform to the following:

(i) For an unconsolidated ground water zone, a determination of yield based on a sufficient number of properly developed wells, that are constructed to the minimum standards of a four-inch diameter manufactured screen in an eight-inch diameter borehole or a two-inch diameter manufactured screen in a six-inch diameter borehole. When wells with dimensions of a two-inch diameter manufactured screen in a six-inch diameter borehole are used to determine yield, the yield shall be multiplied by a factor of 1.15 for purposes of this paragraph. The well screen shall extend through at least eighty per cent of the thickness of the ground water zone, or the volunteer shall otherwise demonstrate that shorter intake lengths would not produce yield that results in a different classification of the ground water.

(ii) For a consolidated ground water zone that is monitored using wells with screens, a determination of yield based on a sufficient number of properly developed wells, that are constructed to the minimum of a four-inch diameter manufactured screen in an eight-inch diameter borehole or a two-inch diameter manufactured screen in a six-inch diameter borehole. When wells with dimensions of a two-inch diameter manufactured screen in a six-inch diameter borehole are used to determine yield, the yield shall be multiplied by a factor of 1.15 for purposes of this paragraph. The well screen shall extend through at least eighty per cent of the thickness of the saturated portion of the ground water zone, or the volunteer shall otherwise demonstrate that

shorter intake lengths would not produce yield that results in a different classification of the ground water.

(iii) For a consolidated ground water zone that is monitored using wells with open hole intakes, a determination of yield based on a sufficient number of wells that are properly constructed and developed to appropriate minimum standards of an eight-inch diameter borehole or a six-inch diameter borehole. When wells with a six-inch diameter borehole are used to determine yield, the yield shall be multiplied by a factor of 1.15 for purposes of this paragraph. The open hole intakes shall extend through at least eighty per cent of the thickness of the ground water zone, or the volunteer shall otherwise demonstrate that shorter intake lengths would not produce yield that results in a different classification of the ground water.

(d) To compare the yield of the ground water zone being classified to another ground water zone present below the property in accordance with paragraph (B)(2)(c) of rule 3745-300-10 of the Administrative Code, the yield of the other ground water zone, which is the likely source of water used for potable purposes within one mile of the property, shall be determined based on the lowest yield of any wells within one mile of the property. If no wells used for potable purposes exist within one mile of the property, the ground water resources maps published by the Ohio department of natural resources may be used to determine the yield of another ground water zone present under the property, which would likely be the source of water used for potable purposes within one mile of the property should a well be developed.

(8) Determination of ground water yield. When testing is conducted to determine the yield of a ground water zone underlying a property, the volunteer shall conduct sufficient testing to determine the representative yield available from the ground water zone for potable purposes. The determination shall be made in accordance with the following:

(a) Temporal considerations. The volunteer shall demonstrate either of the following:

(i) The statistical average yield for the ground water zone over a twelve-month period.

(ii) The maximum yield for the ground water zone, provided that yield

tests are biased towards the period of the highest yield.

(b) Spatial considerations. The volunteer shall bias the yield testing locations to the area of highest yield.

(9) Determination of ground water source areas. To determine whether ground water contamination is attributable to source areas located on the property, source areas located off the property, or a combination of the two, the volunteer shall conduct ground water sampling sufficient to determine the following:

(a) The releases from source areas located on the property that contribute or contributed to the COCs in excess of unrestricted potable use standards in ground water.

(b) The extent to which releases from on-property source areas have affected the ground water.

(c) If releases from off-property source areas may have affected the ground water.

(d) The extent to which releases from off-property source areas have affected the ground water.

(e) Compliance with rule 3745-300-10 of the Administrative Code.

(10) Determination of contaminant pass-through provision. When a release from an off-property source area has affected the property, the volunteer is not responsible for compliance of applicable standards at or beyond the property boundary due to the excess contribution of COCs caused by the off-property release, except when any of the following apply:

(a) The owner of the voluntary action property was an owner or operator of any property, other than the voluntary action property, where any source area was located during the owner's ownership of or operation on any such property, and hazardous substances or petroleum have emanated from the off-property source area onto the voluntary action property.

(b) The volunteer, or owner if different from the volunteer, caused or contributed to the source areas or the off-property release.

(c) The volunteer, or owner if different from the volunteer, has entered into an agreement with any person with the purpose or effect of creating a less stringent applicable standard than would otherwise be applicable in this rule.

(d) The volunteer is a parent, subsidiary, or other commonly owned entity of any party identified in paragraphs (F)(10)(a) to (F)(10)(c) of this rule.

(G) Use of modeling.

(1) The volunteer shall identify all models relied upon as part of the phase II property assessment activities to determine a property's compliance with applicable standards or used to evaluate remedial activities conducted in accordance with rule 3745-300-11 of the Administrative Code. The modeling shall be conducted in accordance with this rule.

(2) The model shall conform to the following:

(a) The model shall be either of the following:

(i) Generally accepted within the scientific community and peer reviewed.

(ii) Scientifically valid for the processes being modeled and code-verified. To be code-verified, the model shall be shown to produce reliable and mathematically accurate results for all functions of the model.

(b) The model shall be used with assumptions and limitations reasonably consistent with conditions throughout the modeled area. The assumptions and limitations of the computer code, mathematical solution, technology utilized and computer code structure shall be consistent with the conditions throughout the modeled area and the application of the model.

(c) The model shall be used in a manner consistent with the model's documentation and intended use.

(d) The model shall be appropriate for the environmental media and application being modeled.

(3) Uses and limitations of modeling:

(a) A model may be used as a predictive tool to support a demonstration of ongoing compliance with applicable standards, or to evaluate whether an exposure pathway is reasonably anticipated to be complete, subject to appropriate calibration and field verification.

(b) A model may not be used in lieu of conducting sufficient sampling of environmental media in accordance with paragraph (E)(5) of this rule to document existing environmental conditions.

(4) The modeling shall adequately address the intended purpose of the modeling evaluation, such as to show compliance with applicable standards or to evaluate remedial activities conducted in accordance with rule 3745-300-11 of the Administrative Code. Depending on the intended purpose of the modeling evaluation or type of model, the model may need to be calibrated to the geologic, hydrogeologic, or physical conditions throughout the modeled area. The model may need to be field-verified to determine if favorable comparisons exist between the modeled conditions and observed field conditions for the area being modeled. In some cases, field verification may require monitoring and evaluation under an operation and maintenance plan.

(5) The modeling shall be evaluated to determine the sensitivity of the model to the input parameters or other components of the model (for example, boundary conditions). The volunteer shall consider the sensitivity of the input parameters when a model is utilized to determine whether a property meets the applicable standards, or when remedial activities conducted in accordance with rule 3745-300-11 of the Administrative Code are evaluated. Input parameters or other components of the model determined to be sensitive to the modeling results shall be either of the following:

(a) Based on scientifically-valid conservative assumptions. The inputs shall be based on property-specific data, or information from peer-reviewed literature and best professional judgment.

(b) Accounted for through an uncertainty analysis to quantitatively determine compliance with applicable standards or to evaluate remedial activities conducted in accordance with rule 3745-300-11 of the Administrative Code. The inputs for the uncertainty analysis shall be based on the following:

(i) Property-specific data collected in accordance with this rule.

(ii) Scientifically-valid and appropriate assumptions using either best professional judgment or information from peer-reviewed scientific literature or publications.

(6) The modeling evaluation and the results shall be documented within the phase II property assessment report or within a separate modeling report that addresses paragraphs (G)(1) to (G)(5) of this rule. If a separate modeling report is written, the separate modeling report shall be attached to the phase II property assessment report.

(H) Determination of background levels. Background levels may be used as the applicable standard after a demonstration is made that the COCs are not the result of current or past activities that involve the treatment, storage, or disposal of a hazardous substance or petroleum. The volunteer shall provide a demonstration as part of paragraph (J)(8) of this rule that COCs for which a background determination is being made comply with this paragraph. Background levels that are determined in accordance with this paragraph are considered applicable standards under this rule.

(1) Background levels in soil. If the background levels, as determined in accordance with this rule, for a COC do not meet the applicable standard derived for the property in accordance with rule 3745-300-08 or 3745-300-09 of the Administrative Code, the volunteer can select, as the applicable standard, a comparison that demonstrates that the concentration of any such COC on the property is at or below background levels.

(a) To determine background levels in soils, the samples shall be taken in soil media native to the property and may not be taken in areas identified in paragraph (H)(1)(b) of this rule. Native fill may be used to determine background levels when the native fill was not moved from or is not currently in an area described in paragraph (H)(1)(b) of this rule. If no areas on a property are appropriate under this rule to sample for background, to determine background levels, the volunteer may collect samples from a nearby, representative off-property location which would comply with this paragraph or refer to an appropriate Ohio EPA "Evaluation of Background Metal Soil Concentrations" summary report.

(b) The following areas are inappropriate to sample to determine background levels:

(i) The following types of fill areas:

(a) Engineered fill.

(b) Structural fill.

(c) Industrial fill.

(ii) Areas in which management, treatment, handling, storage, or disposal activities of any of the following are known or suspected to have occurred:

(a) Hazardous substances or petroleum.

(b) Solid or hazardous wastes.

(c) Waste waters.

(d) Material handling areas.

(iii) Areas within three feet of a roadway. This restriction applies only when the a COC is one that normally would be associated with the activities conducted on the roadway.

(iv) Parking lots and areas surrounding parking lots or other paved areas. This restriction applies only when the COC is one that normally would be associated with the activities conducted in the parking lots.

(v) Railroad tracks or railway areas or other areas affected by runoff from railroad tracks or railway areas. This restriction applies only when the COCs are those that normally would be associated with the activities conducted on or around the railroad tracks.

(vi) Areas of concentrated air pollutant depositions or areas affected by runoff from the areas of concentrated air pollution depositions.

(vii) Storm drains or ditches that presently receive or historically received industrial or urban runoff.

(viii) Spill areas.

(c) Background levels shall be representative of the zones or depth intervals to which the background levels may be applied.

(d) The following method shall be followed to determine a representative numerical value for background levels in soils at a property:

(i) Collection of background level samples. At a minimum, eight soil sampling points shall be used to calculate a background level within each zone, or soil horizon which shall be compared to samples taken to determine the concentrations of COCs in identified areas.

(ii) Determination of the numerical value for background concentrations for COCs at the property. The volunteer may use any statistically valid methodology to determine a background concentration whereby the statistical means of the distribution of background and the impacted area data sets are compared. The volunteer may refer to U.S. EPA's "Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA sites" and U.S. EPA's "Statistical Methods for Evaluating the Attainment of Cleanup Standards" for guidance. Alternatively, a statistical method that may be applied to establish background concentrations is as follows:

(a) The background mean, referred to as

$$\bar{X}_b$$

shall be calculated by dividing the sum of the total background readings by the total number of background readings:

$$\bar{X}_b = \frac{X_1 + X_2 + X_n}{n_b}$$

(b) The background standard deviation, referred to as S_b shall be calculated by taking the square root of the sum of the squares of each reading minus the mean, divided by the

degrees of freedom, which is the total number of background samples minus one (n_b - 1):

$$S_b = \sqrt{\frac{(X_1 - X_b)^2 + (X_1 - X_b)^2 + (X_n - X_b)^2}{n_b - 1}}$$

(c) The coefficient of variation, referred to as C_v shall be calculated by dividing the background standard deviation by the background mean:

$C_v = S_b / X_b$

The coefficient of variation is used as a means to evaluate the data distribution. Normally distributed background data should generally have C_v less than 0.5 for granular soils, and less than 0.75 for cohesive soils, or an explanation accounting for higher C_v values. If the C_v exceeds 1.0 and the volunteer determines that the data are not distributed normally, the data may be normalized by an appropriate transformation and a maximum allowable limit may be calculated for the transformed data in accordance with paragraph (H)(1)(d)(ii)(d) of this rule. If C_v exceeds 1.0, the volunteer shall conduct a thorough evaluation to account for this variability. If the C_v exceeds 1.0 and the volunteer determines that a data point does not accurately represent background conditions or if a quality assurance and quality control problem exists which has invalidated the data point, the invalidated and inaccurate data points may be dropped, or additional samples shall be collected and analyzed to ensure a sufficient representative data population is maintained.

(d) For normally distributed data apply:

$$\overline{X}_b + 2 * S_b$$

of background data as the maximum allowable limit or upper limit, where 2 x SrepresentsS$_b$ represents two times the standard deviation and

$\bar{X}_b$

represents the background mean.

Each sample point from the background data set shall be compared to the calculated maximum allowable limit or upper limit analyzed from background data. If a value from the background data set is found to be an outlier which is not representative of background conditions, this outlier shall be replaced by another sample that is not an outlier to maintain at least eight samples for the background determination for soils.

(2) Determination of soil background levels from off-property investigations. Upon demonstration that it is not possible to find sampling locations in accordance with paragraph (H)(1) of this rule, the volunteer may use information from off-property investigations in accordance with this paragraph to determine the background concentrations of COCs at the property. To evaluate the applicability of the data collected as part of the off-property investigation, the criteria in paragraphs (H)(1)(b) and (H)(1)(c) of this rule shall be satisfied to consider the data as potentially applicable to determine background levels in soils for the purposes of this rule. If the information is not representative of conditions at the property, the volunteer may not use this method to demonstrate background levels in soil. Appropriate off-property investigations that may be used for the purposes of this paragraph include investigations that user data demonstrated to be reliable and representative of background levels for the property. At a minimum, to be reliable and representative, the investigations shall do the following:

(a) Investigations shall be conducted on soil that is representative of the soil type at the property for which the background level is being determined and are located within the state of Ohio.

(b) Investigations shall employ data demonstrated to be reliable and representative that, at a minimum, meet the following criteria:

(i) Employ data quality objectives consistent with paragraph (C) of this rule.

(ii) Employ quality assurance and quality control procedures that serve to minimize sources of error and the potential for cross contamination of field samples, and that maximize the representativeness of the data collected.

(iii) Employ data collection and sampling techniques that are consistent with the criteria listed in paragraphs (D)(1) to (D)(3) of this rule.

(c) Employ methods to calculate background levels consistent with the methods described in paragraph (H)(1)(d) of this rule or otherwise use methods that are demonstrated to be statistically verifiable.

(3) Ground water background levels.

(a) Property-specific determination of ground water background levels. If the background levels, as determined in accordance with this rule, for a COC do not meet the applicable standard derived for the property in accordance with rule 3745-300-08 or 3745-300-09 of the Administrative Code, the volunteer can select, as the applicable standard, a comparison that demonstrates that the concentration of any such COC on the property is at or below background levels. To determine background levels in ground water, samples shall be taken up-gradient at appropriate locations and depths which are unaffected by contamination from activities involving treatment, storage or disposal of hazardous substances or petroleum. Background sampling points may include points not hydraulically up-gradient of the identified areas where either of the following occurs:

(i) Hydrogeologic conditions do not allow the volunteer to determine which direction is hydraulically up-gradient.

(ii) Sampling at other points provides an indication of background ground water quality that is representative or more representative than that provided by the up-gradient points.

(b) The number and kind of samples collected to establish background in ground water shall meet the following criteria:

(i) Be appropriate for the method used to determine whether concentrations of COCs exceed background, following generally accepted principles.

(ii) As large as necessary to ensure with reasonable confidence that a contaminant release to the ground water from a property shall be detected.

(c) The method chosen shall be applied separately for each COC and shall comply with the following performance standards:

(i) Capable of accounting for data below the limit of detection using the lowest practical quantitation limit that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the volunteer. The practical quantitation limit shall be below the potable ground water standard.

(ii) Provide procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

(iii) If a statistical method is chosen, the method shall be appropriate for the distribution of chemical parameters or hazardous constituents. If the distribution is shown to be inappropriate for a normal theory test, then the data shall be transformed or a distribution-free theory test shall be used. If the distributions for the COCs differ, more than one statistical method may be needed.

(iv) Complies with the performance standards provided in U.S EPA's "Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities: Unified Guidance."

(4) Determination of ground water background levels from off-property investigations. Upon a demonstration that it is not possible to find sampling locations in accordance with paragraph (H)(3) of this rule, the volunteer may use information from off-property investigations in accordance with this paragraph to determine the background concentrations of COCs at the property. To evaluate the applicability of the data collected as part of the off-property investigation, the criteria in paragraphs (H)(3)(b) and (H)(3)(c) of this rule shall be satisfied in order to consider the data as potentially applicable to determine background levels in ground water for the purposes of this rule. If the information is not representative of conditions at the property, the volunteer shall not use this method to demonstrate background levels in ground water. Appropriate off-property investigations that may be used for the purposes of this paragraph include investigations that use data demonstrated to be reliable and representative of background levels for the

property. At a minimum, to be reliable and representative, the investigations shall meet the following criteria:

(a) Be conducted on soils and ground waters representative of the soil type, ground water conditions, and ground water zone at the property for which the background level is being determined and are located within or immediately adjacent to the state of Ohio.

(b) Employ data demonstrated to be reliable and representative and at a minimum meet the following criteria:

(i) Employ data quality objectives consistent with paragraph (C) of this rule.

(ii) Employ quality assurance and quality control procedures that serve to minimize sources of error and the potential for cross contamination of field samples, and maximize the representativeness of the data collected.

(iii) Employ data collection and sampling techniques that are consistent with the criteria listed in paragraphs (D)(1) to (D)(3) of this rule.

(c) Employ methods to calculate background levels that are demonstrated to be statistically verifiable.

(5) If background levels in soil or ground water cannot be determined using paragraphs (H)(1) to (H)(4) of this rule, background levels may not be used as the applicable standards for either the soil or ground water.

(I) Demonstration of compliance with applicable standards.

(1) Data collection. The data collected in accordance with this rule shall be sufficient to determine whether applicable standards are met, or to determine that remedial activities conducted in accordance with rule 3745-300-11 of the Administrative Code result in compliance with applicable standards. Data shall be sufficient to assess existing exposure pathways and reasonably anticipated exposure pathways determined to be complete in accordance with paragraph (F)(1) of this rule and all points of compliance for soil, ground water, and other environmental media, including the following:

(a) Points of compliance for soil.

(i) Applicable standards based on direct-contact with soils. A volunteer shall meet and maintain compliance with the direct-contact soil standards to the following minimum soil depths:

(a) For properties that have unrestricted land use or unrestricted residential land use, the point of compliance for applicable standards is from the ground surface to a minimum depth of ten feet. The volunteer shall comply with applicable standards at depths below ten feet when soil may be made available for direct-contact through circumstances other than those specified in paragraph (I)(1)(a)(i)(c) of this rule. In these scenarios, the applicable point of compliance extends from the ground surface to the maximum depth of reasonably anticipated activities.

(b) For properties that have institutional controls that limit a property's land use, and where the institutional controls are implemented in accordance with rule 3745-300-11 of the Administrative Code, the point of compliance for applicable standards is from the ground surface to a minimum depth of two feet. The volunteer shall comply with applicable standards at depths below two feet when soil may be made available for direct-contact through circumstances other than those specified in paragraph (I)(1)(a)(i)(c) of this rule. The volunteer shall comply with applicable standards at depths greater than two feet when soil may be made available for chronic, direct-contact exposure through excavation, grading, utilities maintenance, or other similar circumstances such as when soil below two feet is brought to the surface and left on the surface or otherwise incorporated into the soil that remains within the two-foot point of compliance.

(c) For properties where excavation, grading, or other construction activities may occur on the property, the volunteer shall comply with applicable soil standards for such construction activities. The point of compliance for applicable standards is from the ground surface to a minimum depth equal to the maximum depth of construction activities at the property.

(ii) Applicable soil standards based on leaching of COCs from soils to ground water. The point of compliance for applicable soil

standards based on leaching of chemicals of concern from soils to ground water, when such leaching shall be prevented in accordance with paragraph (D) of rule 3745-300-10 of the Administrative Code, is the depth from the ground surface to the top of the ground water zone that requires protection in accordance with paragraphs (F)(3) and (F)(4) of this rule.

(iii) Applicable soil standards based on other identified complete exposure pathways. The point of compliance for applicable soil standards developed pursuant to rule 3745-300-08 or 3745-300-09 of the Administrative Code for complete exposure pathways identified in paragraph (F)(1) of this rule, other than those identified in paragraphs (I)(1)(a)(i) and (I)(1)(a)(ii) of this rule, shall be determined so that the exposure to receptors is appropriately addressed.

(b) Points of compliance for ground water. The points of compliance for each ground water zone on, underlying, or emanating from a property shall be determined for nonpotable exposure pathways determined in accordance with paragraph (F)(1) of this rule, and in accordance with paragraphs (D) and (E) of rule 3745-300-10 of the Administrative Code.

(c) Points of compliance for other environmental media. The points of compliance for each complete exposure pathway identified in paragraph (F)(1) of this rule for each environmental medium other than those identified in paragraphs (I)(1)(a) and (I)(1)(b) of this rule shall be determined in accordance with rule 3745-300-08 or 3745-300-09 of the Administrative Code.

(2) Data analysis. The volunteer shall verify the assumptions and applicability of models, statistical methods, or any other data analysis methods used to determine compliance with applicable standards, to determine the concentration of COCs, to derive applicable standards, or to demonstrate the effectiveness of a remedial activity. At a minimum, the following shall be demonstrated:

(a) Models were used in accordance with paragraph (G) of this rule.

(b) Statistical methods used are appropriate and valid for the intended use of the statistical methods.

(c) Adjustment of applicable standards for multiple COCs was conducted in accordance with rules 3745-300-08 and 3745-300-09 of the Administrative Code, if applicable. All final cumulative human health carcinogenic risk and non-carcinogenic hazard levels are based on one significant figure.

(d) If non-certified laboratory data or studies not conducted in accordance with this rule are used to partially comply with this rule, the data shall be confirmed in accordance with paragraphs (E)(1)(d)(iii) of this rule. The volunteer shall demonstrate in the phase II property assessment report how the non-certified laboratory data was confirmed using certified data.

(e) If applicable standards were not determined for COCs on the property because the COCs meet the criteria of paragraph (F)(5) of this rule, the volunteer shall demonstrate in the phase II property assessment report how the criteria are met.

(3) Compliance with applicable standards.

(a) The volunteer shall verify compliance with applicable standards for all current exposure pathways and reasonably anticipated exposure pathways determined to be complete in accordance with the procedures described in paragraph (F)(1) of this rule, or the volunteer shall implement a remedy pursuant to paragraph (I)(4)(b) of this rule. The volunteer may make a determination of compliance with applicable standards at any time during the voluntary action including and through assessment and remedial activity implementation.

(b) To verify compliance with applicable standards, the volunteer shall compare the concentration of each COC determined in accordance with paragraph (F)(6) of this rule to the applicable standard identified in paragraph (D)(2)(d) or (F)(5) of this rule. Compliance with an applicable standard is verified if the concentration of each COC does not exceed the applicable standard. All final cumulative human health carcinogenic risk and non-carcinogenic hazard levels are based on one significant figure.

(c) Applicable standards may include but are not limited to standards derived from generic numerical standards, background levels determined in accordance with paragraph (H) of this rule, a property-specific risk assessment, or a combination of these standards. If generic

direct-contact soil standards for a restricted land use are used to meet applicable standards, institutional controls shall be used to limit the property's land use as described in paragraph (I) of this rule and paragraph (C)(2)(c) of rule 3745-300-08 of the Administrative Code. The institutional controls shall be implemented in accordance with rule 3745-300-11 of the Administrative Code.

(4) Implementation of remedial activities.

(a) If concentrations of COCs exceed applicable standards for any existing exposure pathway or reasonably anticipated exposure pathway determined to be complete in accordance with paragraph (F)(1) of this rule, the volunteer shall implement a remedy in accordance with rule 3745-300-11 of the Administrative Code. If the applicable points of compliance for environmental media at the property cannot be met or maintained, the volunteer shall implement a remedy in accordance with rule 3745-300-11 of the Administrative Code.

(b) If compliance with applicable standards cannot be determined or is not determined for an existing exposure pathway or reasonably anticipated exposure pathway determined to be complete in accordance with paragraph (F)(1) of this rule, the volunteer shall implement a remedy in accordance with rule 3745-300-11 of the Administrative Code. The volunteer shall demonstrate that the remedy renders the pathway incomplete as to all potential receptors and that all points of compliance specified in paragraph (I)(1) of this rule are addressed.

(5) In cases where applicable standards were not derived, the applicable standards consist of the standards for each complete exposure pathway identified based on paragraph (F)(1) of this rule and allowable land uses at the points of compliance identified in accordance with paragraph (I)(1) of this rule that met the requirements of rule 3745-300-08 or 3745-300-09 of the Administrative Code at the time of issuance of the no further action letter.

(J) A volunteer shall complete a phase II property assessment written report in a format that is acceptable to Ohio EPA. At a minimum, the report shall include the following:

(1) An introduction that identifies the property, including the legal description of the property, the dates over which the phase I property assessment and the phase II property assessment were conducted and the date that the written report for each was finalized, and the name and job title of each person who

conducted the phase II property assessment.

(2) A summary of any amendment to the phase I property assessment required by paragraph (E)(1) of this rule.

(3) A statement of the limitations or qualifications, if any, which impact the phase II property assessment.

(4) A graphic or written representation of the conceptual site model that describes the relationships between contaminants, transport media, and receptors at the time of the no further action letter issuance, consistent with paragraph (C) of this rule.

(5) A summary of the sampling procedures employed in accordance with paragraph (D) of this rule and the rationale for the sampling and testing activities conducted in accordance with this rule.

(6) A summary of the data collection activities conducted under paragraph (E) of this rule, the data collected as a result of these activities, and a determination of the data usability based on the quality control information. The summary shall include a discussion that notes whether the data meet the data quality objectives required by paragraph (C) of this rule.

(7) A summary of the determinations made under paragraphs (F)(1) to (F)(10) of this rule, and a summary of the rationale for the determinations made under paragraphs (F)(1) to (F)(10) of this rule.

(8) A summary of the background determination activities, if any, conducted under paragraph (H) of this rule.

(9) A summary of any models used in accordance with paragraph (G) of this rule and inclusion of the documentation required by paragraph (G)(6) of this rule.

(10) If an urban setting designation is relied upon in part to address potable use pathways, a summary of the activities conducted in accordance with paragraph (C)(3) of rule 3745-300-10 of the Administrative Code.

(11) If a property-specific risk assessment was conducted to derive applicable standards, a copy of the written risk assessment report shall be attached to or included in a section of the phase II property assessment report.

(12) A summary of any remedial activities implemented prior to the issuance of the no further action letter required by paragraph (I)(4) of this rule.

(13) A discussion of whether the property complies with applicable standards for each exposure pathway, and whether remedial activities were or are implemented to meet or maintain applicable standards in accordance with rule 3745-300-11 of the Administrative Code, and a summary of the applicable standards demonstration conducted in accordance with paragraph (I) of this rule.

(14) The following property maps and cross-sections, as applicable:

(a) Maps that indicate the locations of all borings, monitoring wells, or other sampling locations.

(b) Maps that depict the existing topography with a contour interval of no greater than five feet and delineates on or adjacent to the property any existing streams, swamps, lakes, springs, or other surface water features.

(c) Geologic cross-sections that represent the subsurface geologic and hydrogeologic conditions underlying the property, including all ground water zones evaluated during the phase II property assessment.

(d) Property maps that indicate the locations of the identified areas and exposure units at the property, and the concentration and physical distribution of the COCs identified in environmental media.

(e) Maps that indicate the portions of the property where remedial activities were implemented pursuant to rule 3745-300-11 of the Administrative Code, including the institutional controls, risk mitigation measures, and engineering controls. If a remedial activity does not apply to the entire property, include a plat that shows the boundary survey of the portion of the property to which the remedial activity applies. The survey plat shall be completed (signed and sealed) by a professional surveyor under Ohio law. The survey plat may be included in the operation and maintenance plan, risk mitigation plan, or environmental covenant, as applicable, written pursuant to rule 3745-300-11 of the Administrative Code, instead of in the phase II property assessment report.

(15) A bibliography of references which identifies, to the extent available, the description, date, source, and location of the documents reviewed as part of

the phase II property assessment, and the identification of all laboratories that performed analyses as part of the phase II property assessment.

(16) Appendices for appropriate supporting documentation.

Effective: 10/17/2019

Five Year Review (FYR) Dates: 7/31/2019 and 10/17/2024

CERTIFIED ELECTRONICALLY

Certification

10/07/2019

Date

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