

3745-300-07 “Phase II Property Assessments.”

(A) Applicability.

- (1) A “Phase II Property Assessment” must 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, underlying or is emanating from the property. This rule does not apply when a release within an identified area is demonstrated to be de minimis in accordance with the requirements of paragraph (G) of rule 3745-300-06 of the Administrative Code.
- (2) Factors affecting eligibility of a property. The volunteer must utilize information from “Phase I Property Assessments” or “Phase II Property Assessments” to determine that a property is eligible for the “Voluntary Action Program” in accordance with the requirements of rule 3745-300-02 of the Administrative Code. At a minimum, if any of the following are discovered on the property, further analysis must be conducted to determine if all or a portion of a property may be ineligible:
 - (a) Hazardous substance underground storage tanks (hereinafter “UST”) subject to the Resource Conservation and Recovery Act (hereinafter “RCRA”) or petroleum tanks subject to the bureau of underground storage tank regulations (hereinafter “BUSTR”);
 - (b) Underground Injection Control (hereinafter "UIC") wells, except class V UIC wells;
 - (c) Oil and gas wells;
 - (d) Polychlorinated biphenyls (hereinafter "PCBS");
 - (e) Any hazardous wastes which were treated, stored or disposed of at the property on or after November 19, 1980; and
 - (f) Solid waste facilities as described in paragraph (c)(7) of rule 3745-300-02 of the Administrative Code.

(B) Definitions for purposes of this rule:

- (1) "Composite sample" means a combination of discrete samples, or equal portions of discrete samples, taken from different locations or at different times.
- (2) "Discrete sample" means a single representative part of a medium collected at a specific location and time.

- (3) "Engineered fill" means soil or aggregate materials derived from on-property or off-property locations which have been placed on the property to meet specific engineering requirements for the construction of buildings, utility lines, roadway sub-grade, or other structures. Engineered fill includes structural fill.
- (4) "Industrial fill" means non-soil materials that are derived from industrial or manufacturing operations and that have been placed on a property for the purpose of disposal, grading or construction.
- (5) "Native fill" means soil material derived from the property and transferred from one area of the property and placed in another area in such a manner that the original soil structure and physical properties may be altered from the initial pre-excavation conditions, but the chemical and physical properties remain consistent with other undisturbed native soils at the property.

(C) Purpose of a "Phase II Property Assessment."

The purpose of a "Phase II Property Assessment" is to conduct an investigation sufficient to determine whether applicable standards are met in all identified areas and affected media or to determine that remedial activities conducted in accordance with rule 3745-300-15 of the Administrative Code at the property have or will achieve applicable standards.

[Comment: a volunteer may conduct remedial activities at any point during a "Phase II Property Assessment", provided that these remedial activities comply with rule 3745-300-15 of the Administrative Code, the remediation rule, and provided that the volunteer completes the activities contained in paragraph (D) of this rule.]

(D) "Phase II Property Assessment" activities. the initial "Phase II Property Assessment" activities may be limited to performing data collection activities. however, it may be necessary to later conduct additional "Phase II Property Assessment" activities in order to complete the "Phase II Property Assessment." the volunteer may also have to conduct additional "Phase II Property Assessment" activities based on information obtained throughout the "Phase II Property Assessment." data collection and data evaluation may be conducted iteratively.

[Comment: the requirements for an initial statement of work for a "Phase II Property Assessment" are described in paragraph (e) of this rule. at a minimum, an initial statement of work for a "Phase II Property Assessment" must be completed by volunteers who wish to make a demonstration that the requirements of the sufficient evidence provisions of the eligibility rule have been met. The requirements of the sufficient evidence provisions are described in paragraph (D) of rule 3745-300-02 of the Administrative Code.]

in order to achieve the purpose contained in paragraph (C) of this rule, the volunteer must, at a minimum, perform the following:

(1) Data collection. The volunteer must collect sufficient data in accordance with the requirements contained in this paragraph to make the determinations contained in paragraphs (D)(2) to (D)(9) of this rule. Any sampling activities conducted under this paragraph must be performed in accordance with the sampling procedures contained in paragraph (F) of this rule.

(a) Use of existing information.

(i) “Phase I Property Assessment” and other existing information. The person conducting a “Phase II Property Assessment” must 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 properly characterizing environmental conditions on, underlying, or emanating from the property.

(ii) Amending “Phase I Property Assessments”. if more than one hundred and eighty days has elapsed since the completion of a “Phase I Property Assessment” performed in accordance with either rule 3745-300-06 of the Administrative Code or with the interim standards contained in section 3746.07 of the Revised Code, the volunteer must conduct additional investigations regarding potential changes in the environmental conditions at the property or areas surrounding the property, as provided in paragraph (J)(3) of rule 3745-300-06 of the administrative code. Amendments to the “Phase I Property Assessment” must be included in the “Phase II Property Assessment” report.

(iii) Using data from prior “Phase I Property Assessments.” prior “Phase I Property 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:

(a) The prior “Phase I Property Assessment” was conducted prior to the effective date of this rule;

(b) The information gathered and the method used to collect and evaluate data are consistent with the purposes described in paragraph (B) of rule 3745-300-06 of the Administrative Code;

- (C) The prior “Phase I Property Assessment” is amended in such a way as to comply with the requirements of rule 3745-300-06 of the Administrative Code; and
 - (d) The prior “Phase I Property Assessment” is amended in accordance with paragraph (D)(1)(a)(ii) of this rule if more than one hundred and eighty days has elapsed since its completion.
- (iv) Use of data from prior “Phase II Property Assessments.” prior “Phase II Property Assessments” and studies not conducted in accordance with this rule may be used to partially meet the requirements of this rule, provided that all of the following are met:
- (a) The prior “Phase II Property Assessments” was conducted prior to the effective date of this rule;
 - (b) The information gathered and the method used to collect and evaluate data are consistent with the purposes of this rule;
 - (c) The data is evaluated to ensure quality and consistency with the requirements for data collected in A “Phase II Property Assessment” conducted in accordance with this rule; and
 - (d) The data is confirmed by samples analyzed using a certified laboratory whose certification was current at the time that the confirmatory samples were analyzed. confirmatory samples must be collected as follows:
 - (i) For ground water, surface water, and air, a minimum of ten per cent of the sample population of each data set in the previous study must be confirmed, provided that the samples are collected from the same sampling points that were used in the previous study; and
 - (ii) For all media not addressed in paragraph (D)(1)(a)(iv)(d)(i) of this rule, or if the sampling points used in the previous study cannot be used, or are not used, for collecting confirmatory samples, the volunteer must confirm that the representative concentrations of chemical(s) of concern within each identified area are within the statistical range derived from the original data set of the previous study by collecting a minimum of ten

per cent of the sample population, or at least three samples, whichever is greater, for each data set in the previous study.

(b) A review and evaluation of existing regional geologic, hydrogeologic, and physical characteristics. The volunteer must review reasonably available information pertaining to the regional geologic, hydrogeologic and physical characteristics, and geologic, hydrogeologic, and physical data from previous on-property investigations. Based on this review, the evaluation must address and include, as necessary, the following:

- (i) The lithology and depth to bedrock;
- (ii) The characteristics of major stratigraphic units and depositional environments;
- (iii) Identification of regional aquifers, including those underlying the property;
- (iv) Identification and characterization of ground water recharge and discharge areas, and the amount of recharge and discharge;
- (v) A description, and the potential orientation, of regional geomorphology including topographical features that may influence the ground water FLOW SYSTEM;
- (vi) A description of structural geological features, such as joints, faults or fractures;
- (vii) The presence of legally-enforceable restrictions on the use of ground water including, without limitation, local rules or ordinances;
- (viii) The absence or presence of regional commingled chemical(s) of concern from multiple sources or source areas;
- (ix) The natural quality of ground water and surface water;
- (x) The regional availability of surface water and ground water and reasonable alternative sources of drinking water;
- (xi) The productivity of the saturated zones; and
- (xii) Well-head protection areas or sole source aquifer designations.

(c) The volunteer must identify the chemical(s) of concern in identified areas by evaluating the following:

- (i) Hazardous substances or petroleum identified in A “PHASE I PROPERTY Assessment” in accordance with rule 3745-300-06 of the Administrative Code or this rule;
- (ii) Hazardous substances or petroleum that are or have been commonly used in industrial or commercial activities similar to the activities conducted at the property; and
- (iii) 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 (D)(1)(c)(i) and (D)(1)(c)(ii) of this rule.

(d) The volunteer must evaluate all identified areas and identify, within each identified area:

- (i) Any sources that are present;
- (ii) Any source areas that are present; and
- (iii) All affected media that are present.

[Comment: if the volunteer finds that either the source, source area, or affected media extend beyond the current boundaries of the identified area, the volunteer must either extend the boundaries of the identified area, or declare a new identified area.]

(e) Sampling environmental media.

- (i) The volunteer must collect samples from the following environmental media, in accordance with sampling procedures developed under paragraph (F) of this rule that are proven to be reliable for the environmental media being sampled, as necessary to make the determinations contained in paragraphs (D)(2) to (D)(9) of this rule:

(A) Soil;

(B) Sediments;

(C) Surface water;

(D) Ground water;

(e) Bedrock;

(f) Soil gas; and

(g) Air.

(ii) When determining how to conduct sampling under paragraph (D)(1)(e)(i) of this rule, the volunteer must ensure that the data collected will be sufficient for making the determinations in paragraphs (D)(2) TO (D)(9) of this rule and must ensure that the data is representative considering:

(A) The spatial distribution of sampling locations; and

(B) Temporal variations in the media or in the concentrations of chemical(s) of concern contained in the media.

(f) An evaluation of the property-specific geologic, hydrogeologic, and physical characteristics of the identified areas by evaluating characteristics contained in paragraphs (D)(1)(f)(i) to (D)(1)(f)(xi) of this rule, as necessary. The methods used must be consistent with the requirements contained in paragraph (F) of this rule.

(i) A description of the continuous profile of the stratigraphic units beneath the property including, the thickness and lateral extent of each unit;

(ii) The vertical and horizontal hydraulic conductivity;

(iii) The soil characteristics including but not limited to: porosity, effective porosity, bulk density, moisture content, grain size analysis, and soil pH;

(iv) The contaminant attenuation capacity and mechanisms of attenuation of the natural earth material and/or fill; such as: ion exchange capacity, organic carbon content, mineral content, and soil sorptive capacity;

(v) The effect of stratification on saturated and unsaturated flow;

(vi) Infiltration;

(vii) Evapotranspiration;

(viii) The local occurrence, flow direction and gradient of surface water or ground water;

(ix) Any anthropogenic influences that may affect the geology and hydrogeology of the property;

- (x) The structural geology of the property; any physical properties affecting the transport of chemical(s) of concern; and
 - (xi) Any other characteristics that may be useful for potential fate and transport analysis or remedial activities.
- (g) Identification of receptor populations.

The volunteer must identify the current and anticipated land uses of the property and must identify all receptor populations that are reasonably anticipated to be exposed to chemical(s) of concern on the property. In addition, the volunteer must identify off-property receptors where and when chemical(s) of concern emanate from the property. Receptor populations that must be identified for the purpose of making the determinations contained in paragraph (d)(2) 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; and
- (iv) Populations on or off the property that are reasonably anticipated to be exposed to chemical(s) of concern emanating from the property through ground water migration, surface water migration, dust emissions, volatilization and other mechanisms which transport chemical(s) of concern off the property; and
- (v) Important ecological resources that, considering the land use and the quality and extent of habitat on the property and adjoining properties, would have reasonably been associated with the property or adjacent properties were it not for the presence of chemical(s) of concern on or emanating from the property.

[Comment: “populations” may be humans or important ecological resources.]

- (h) The volunteer may need to conduct data collection activities necessary to determine background levels in accordance with paragraph (I) of this rule.
- (2) Pathway completeness determination.

- (a) The volunteer must evaluate the existing and potential exposure pathways and must identify the following:
 - (i) Any source, source area, or affected media contributing to the pathway;
 - (ii) The receptors identified under paragraph (D)(1)(g) of this rule and any applicable point of compliance; and
 - (iii) The transport mechanism for the pathway;

[Comment: the points of compliance for a pathway may be a receptor, or may be determined under other rules contained in this chapter. For example, the point of compliance for direct-contact soils, when generic numerical standards are used, is either two feet from the surface, or ten feet from the surface, depending upon the land use.]

- (b) The volunteer must determine which existing and potential pathways are complete. Exposure pathways must be based on property-specific data collected in accordance with the procedures described in rules 3745-300-06 and 3745-300-07 of the Administrative Code, and must be evaluated in accordance with rules 3745-300-08, 3745-300-09, and 3745-300-10 of the Administrative Code. a pathway is considered to be complete if all three of the pathway components contained in paragraphs (D)(2)(a)(i) to (D)(2)(a)(iii) of this rule are present. All exposure pathways determined to be complete under this paragraph must be identified in the “Phase II Property Assessment” report.

- (c) If it is determined that any of the exposure pathways on or adjoining the property are not reasonably expected to be complete for the chemical(s) of concern, the “Phase II Property Assessment” report must include a written justification for the elimination of those exposure pathways from further consideration.

[Comment: the volunteer must consider all exposure pathways related to humans and important ecological resources. Table 1 is a non-comprehensive list of potential human exposure pathways. Table 2 is a non-comprehensive list of potential exposure pathways that may impact important ecological resources. Exposure pathways that are not listed in table 1 or table 2 but which may impact receptors on or off the property must also be considered.]

[Comment: Table 1: Potential Human Exposure Pathways]

Exposure/ Contact Medium	Transporting/ Source Medium	Route of Exposure	Pathway
--------------------------	-----------------------------	-------------------	---------

[Comment: Table 1: Potential Human Exposure Pathways]

Exposure/ Contact Medium	Transporting/ Source Medium	Route of Exposure	Pathway
Ground water	Direct contact	Ingestion	Ground water containing dissolved or suspended chemicals of concern is ingested by on-property/off-property receptor using ground water
Ground water	Direct contact	Dermal contact	Ground water containing dissolved or suspended chemicals of concern is used for bathing/showering or is contacted incidentally during other potable or process use by on-property/off-property receptor
Ground water	Soil to ground water	Ingestion	Ground water containing chemicals of concern which have leached from soil is ingested by on-property/off-property receptor using ground water as drinking water
Ground water	Soil to ground water	Dermal contact	Ground water containing chemicals of concern which have leached from soil is used for bathing/showering or is contacted incidentally during other potable or process use by on-property/off-property receptor
Air	Ground water to air	Inhalation	Volatiles released from ground water containing chemicals of concern are inhaled during bath/shower or inhaled incidentally during other potable or process use by on-property/off-property receptor
Air	Soil to air	Inhalation	Volatiles released from ground water containing chemicals of concern enter buildings through basement or foundation and are inhaled by on-property/off-property receptors occupying buildings
Air	Soil to air	Inhalation	Volatiles released to outdoor air from soil containing chemicals of concern are inhaled by on-property/off-property receptors
Air	Soil to air	Inhalation	Particulates released to outdoor air from soil containing chemicals of concern are inhaled by on-property/off-property receptors

[Comment: Table 1: Potential Human Exposure Pathways]

Exposure/ Contact Medium	Transporting/ Source Medium	Route of Exposure	Pathway
Air	Surface water to air	Inhalation	Volatiles released from surface water containing dissolved or suspended chemicals of concern are inhaled by on-property/off-property receptor
Soil	Air particulates to soil	Ingestion	Airborne particulates containing chemicals of concern are deposited on soil for ingestion by on-property/off-property receptors
Soil	Direct contact	Ingestion	Soil containing chemicals of concern is ingested by on-site receptor
Soil	Direct contact	Dermal contact	Soil containing chemicals of concern is contacted by on-site receptor
Surface water	Direct contact	Ingestion	Surface water containing dissolved or suspended chemicals of concern is ingested by on-property/off-property receptor from ingestion as drinking water or from other incidental ingestion
Surface water	Direct contact	Dermal contact	Surface water containing dissolved or suspended chemicals of concern is contacted by on-property/off-property receptor while bathing/showering, swimming or through other incidental contact related to potable, process or recreational use
Surface water	Soil to surface water	Ingestion	Surface water containing dissolved or suspended chemicals of concern from overland flow is ingested by on-property/off-property receptor from ingestion as drinking water or from other incidental ingestion
Surface water	Soil to surface water	Dermal contact	Surface water containing dissolved or suspended chemicals from overland flow is contacted by on-property/off-property receptor while bathing/showering, swimming or through other incidental contact related to potable, process or recreational use
Surface WATER	Ground water to	Ingestion	Surface water containing dissolved or suspended chemicals of concern from Ground

[Comment: Table 1: Potential Human Exposure Pathways]

Exposure/ Contact Medium	Transporting/ Source Medium	Route of Exposure	Pathway
	Surface water		water discharges is ingested by an on-property/off-property receptor from ingestion as drinking water or through other incidental ingestion
Surface water	Groundwater to surface water	Dermal contact	Surface water containing dissolved and suspended chemicals of concern from ground water discharges is contacted by an on-property/off-property receptor while bathing/showering, swimming or through other incidental contact related to potable, process or recreational use
Sediments	Direct contact	Ingestion	Sediments containing chemicals of concern are incidentally ingested during work or recreational activities by a human receptor
Sediments	Direct contact	Dermal contact	Sediments containing chemicals of concern are contacted incidentally during work or recreational activities by a human receptor
Vegetables and fruits from plants	Soil to crop plant (bio-concentration)	Ingestion	Plants which have incorporated chemicals of concern from soil are ingested as food by a human receptor
Fish and shellfish	Surface water to fish/shellfish tissue (bio-concentration)	Ingestion	Fish and shellfish which have incorporated chemicals of concern from surface water are ingested as food by a human receptor
Fish and shellfish	Food source organisms to fish/shellfish tissue (bio-magnification)	Ingestion	Fish and shellfish which have incorporated chemicals of concern from food source organisms are ingested as food by a human receptor
Fish and shellfish	Sediment to fish/shellfish tissue (bio-concentration)	Ingestion	Fish and shellfish which have incorporated chemicals of concern from sediment are ingested as food by a human receptor
Meat, milk and eggs from livestock	Plants to livestock tissue (bio-magnification)	Ingestion	Livestock animals which have incorporated chemicals of concern from plants are ingested as food (milk, meat or eggs) by a human receptor

[Comment: Table 1: Potential Human Exposure Pathways]

Exposure/ Contact Medium	Transporting/ Source Medium	Route of Exposure	Pathway
Meat, milk and eggs from livestock	Surface water to livestock tissue (bio-concentration)	Ingestion	Livestock animals which have incorporated chemicals of concern from surface water are ingested as food (meat, milk or eggs) by a human receptor

[Comment: Table 2: Potential Ecological Exposure Pathways]

Exposure/ Contact Medium	Transporting/ Source Medium	Route of Exposure	Pathway
Soil	Direct contact	Ingestion	Ingestion of soils containing chemicals of concern by mammals, birds, or soil fauna on-property
Soil	Direct contact	Dermal	Dermal contact with soil containing chemicals of concern by mammals, birds or soil fauna on-property
Surface water	Direct contact	Ingestion	Ingestion of surface water containing chemicals of concern by on/off site mammals, birds, fish, or macro-invertebrates
Surface water	Direct contact	Dermal	Dermal contact with surface water containing chemicals of concern by on/off site mammals, birds, fish, or macro-invertebrates
Surface water	Soil to surface water	ingestion	Ingestion of surface water containing chemicals of concern by on/off site mammals, birds, fish, or macro-invertebrates
Surface water	Soil to surface water	Dermal	Dermal contact with surface water containing chemicals of concern by on/off site mammals, birds, fish, or macro-invertebrates
Surface water	Sediments to surface water	Ingestion	Ingestion of surface water containing chemicals of concern from sediments by on/off site mammals, birds, fish, or macro-invertebrates
Surface water	Sediments to surface water	Dermal	Dermal contact with surface water containing chemicals of concern from sediments by on/off site mammals, birds, fish, or macro-invertebrates
Air	Soil to air	Inhalation	Volatile emissions emanating from soil containing chemicals of concern are inhaled by mammals or birds on/off site
Air	Soil to air	Inhalation	Airborne particulate emissions from soil containing chemicals of concern are inhaled by mammals or birds on/off site
Air	Surface water to air	Inhalation	Volatile emissions from surface water containing chemicals of concern are inhaled by

[Comment: Table 2: Potential Ecological Exposure Pathways]

Exposure/ Contact Medium	Transporting/ Source Medium	Route of Exposure	Pathway
			mammals or birds on/off site
Sediments	Direct contact	INGESTION	Coincidental ingestion of sediments containing chemicals of concern by on-property mammals, birds, fish or macro-invertebrates
Sediments	Direct contact	Dermal	Dermal contact with sediments containing chemicals of concern by on-property mammals, birds, fish or macro-invertebrates
Plants	Soil to plants (bio-concentration)	Ingestion	Plants which have incorporated chemicals of concern from soil are ingested by mammals, birds or soil fauna on-property
Plants	Surface water to plants (bio-concentration)	Ingestion	Plants which have incorporated chemicals of concern from surface water are ingested by mammals, birds or macro-invertebrates on-property
Soil fauna	Soil to soil fauna (bio-concentration)	Ingestion	Soil fauna (e.g. insects, earthworms) which have incorporated chemicals of concern from soil are consumed by mammals and birds off/on-property
Sediment fauna	Sediment to sediment fauna (bio-concentration)	Ingestion	Sediment fauna which have incorporated chemicals of concern from sediment are consumed by mammals, birds and fish off/on-property
Sediment flora	Sediment to sediment flora (bio-concentration)	Ingestion	Sediment flora which have incorporated chemicals of concern from sediment are consumed by mammals, birds, fish and macro-invertebrates off/on-property
Prey animals	Plants to prey animals (bio-magnification)	Ingestion	Prey animals which have ingested chemicals of concern from land and aquatic plants are consumed by on-property/off-property predators
Prey animals	Soil to prey animals (bio-concentration)	Ingestion	Prey animals which have incorporated chemicals of concern from soil are consumed by on-property/off-property predators

[Comment: Table 2: Potential Ecological Exposure Pathways]

Exposure/ Contact Medium	Transporting/ Source Medium	Route of Exposure	Pathway
Prey animals	Soil fauna to prey animals (bio-magnification)	Ingestion	Prey animals which have ingested soil fauna containing chemicals of concern are consumed by on-property/off-property predators
Prey animals	Surface water to prey animals (bio-concentration)	Ingestion	Prey animals which have incorporated chemicals of concern from surface water are consumed by on-property/off-property predators
Prey animals	Sediment to prey animals (bio-concentration)	Ingestion	Prey animals which have incorporated chemicals of concern from sediments are consumed by on-property/off-property predators
Prey animals	Sediment fauna to prey animals (bio-magnification)	Ingestion	Prey animals which have ingested sediment fauna containing chemicals of concern are consumed by on-property/off-property predators
Prey animals	Sediment flora to prey animals (bio-magnification)	Ingestion	Prey animals which have ingested sediment flora containing chemicals of concern are consumed by on-property/off-property predators

(3) Provisions for protecting ground water meeting potable use standards.

- (a) In order to determine whether the provisions for protecting ground water meeting potable use standards contained in paragraph (E) of rule 3745-300-10 of the Administrative Code apply, the volunteer must do one of the following:
- (i) Assume that the ground water underlying a property does not contain concentrations of chemical(s) of concern above the generic or risk-derived unrestricted potable use standards, and therefore apply the provisions for protecting ground water meeting potable use standards contained in paragraphs (D)(3)(b) and (D)(3)(c) of this rule, paragraph (E) of rule 3745-300-10 of the Administrative Code, and paragraph (I) of rule 3745-300-15 of the Administrative Code;
 - (ii) Install one or more ground water monitoring wells immediately down-gradient of the source area, or down-gradient and as close to the

source area as possible, and take one or more ground water samples to determine the concentration of chemical(s) of concern in the ground water. if two consecutive samples, taken from the same well within fifteen to thirty days of each other and analyzed by a certified laboratory, contain concentrations of chemical(s) of concern above the generic or risk-derived unrestricted potable use standards, then the provisions for protecting ground water meeting potable use standards contained in paragraphs (D)(3)(b) and (D)(3)(c) of this rule, paragraph (E) of rule 3745-300-10 of the Administrative Code, and paragraph (I) of rule 3745-300-15 of the Administrative Code do not apply to the property. if the volunteer is unable to show that two consecutive samples, taken from the same well within fifteen to thirty days of each other and analyzed by a certified laboratory, contain concentrations of chemical(s) of concern above the generic or risk-derived unrestricted potable use standards, the volunteer must either apply the provisions for protecting ground water meeting potable use standards contained in paragraphs (D)(3)(b) and (D)(3)(c) of this rule, paragraph (E) of rule 3745-300-10 of the Administrative Code, and paragraph (I) of rule 3745-300-15 of the Administrative Code, or determine the concentrations of chemical(s) of concern in accordance with paragraph (D)(3)(a)(iii) of this rule; or

- (iii) Determine the ninety-five per cent UCL of the arithmetic mean of the concentrations of chemical(s) of concern in the ground water underlying the source area. the ninety-five per cent UCL of the arithmetic mean may be derived by sampling the ground water underlying the source area or conducting modeling in accordance with paragraph (G) of this rule to determine the representative concentrations of chemical(s) of concern in the ground water, based upon the concentrations of chemical(s) of concern in the source area. if the ninety-five per cent UCL of the arithmetic mean of the concentrations of chemical(s) of concern in the ground water underlying the source area is determined to be above the generic or risk-derived unrestricted potable use standards, then the provisions for protecting ground water meeting potable use standards contained in paragraphs (D)(3)(b) and (D)(3)(c) of this rule, paragraph (E) of rule 3745-300-10 of the Administrative Code, and paragraph (I) of rule 3745-300-15 of the Administrative Code do not apply to the property. if the ninety-five per cent UCL of the arithmetic mean of the concentrations of chemical(s) of concern in the ground water underlying the source area is determined to be below the generic or risk-derived unrestricted potable use standards, then the volunteer must apply the provisions for protecting ground

water meeting potable use standards contained in paragraphs (D)(3)(b) and (D)(3)(c) of this rule, paragraph (E) of rule 3745-300-10 of the Administrative Code, and paragraph (I) of rule 3745-300-15 of the Administrative Code.

- (b) If it is determined under paragraph (D)(3)(a) of this rule that the provisions for protecting ground water meeting potable use standards contained in paragraphs (D)(3)(b) and (D)(3)(c) of this rule, paragraph (E) of rule 3745-300-10 of the Administrative Code, and paragraph (I) of rule 3745-300-15 of the Administrative Code apply to the property, and if it is determined that chemical(s) of concern are leaching or will leach into ground water, then the volunteer must develop a remedy in accordance with rule 3745-300-15 of the Administrative Code that will prevent the ground water underlying the property from exceeding generic unrestricted potable use standards, in accordance with paragraph (D)(3)(b)(iii)(b) of rule 3745-300-09 of the Administrative Code.

[Comment: if the volunteer is required to determine an applicable standard for the leaching to ground water pathway under paragraph (D)(3)(b) of this rule, the volunteer must either use the leach-based standards contained in the support document for generic standards, develop property-specific leach-based numbers in accordance with this rule and rule 3745-300-09 of the Administrative Code, or develop and implement an engineering control in accordance with rules 3745-300-09 and 3745-300-15 of the Administrative Code.]

- (c) If the provisions for protecting ground water meeting potable use standards contained in paragraphs (D)(3)(b) and (d)(3)(c) of this rule, paragraph (e) of rule 3745-300-10 of the Administrative Code, and paragraph (I) of rule 3745-300-15 of the Administrative Code apply to a property, the volunteer must demonstrate that the property complies with the provisions for protecting ground water meeting potable use standards. in order to demonstrate compliance with the provisions for protecting ground water meeting potable use standards contained in paragraphs (D)(3)(b) and (D)(3)(c) of this rule, paragraph (E) of rule 3745-300-10 of the Administrative Code, and paragraph (I) of rule 3745-300-15 of the Administrative Code, the volunteer may either:

- (i) Install one or more ground water monitoring wells biased towards the point of highest concentration and located immediately down-gradient of the source area, or down-gradient and as close to the source area as possible, and take one or more ground water samples to determine the concentration of chemical(s) of concern in the ground water. to demonstrate that the volunteer is maintaining

compliance with the provisions for protecting ground water meeting potable use standards contained in paragraphs (D)(3)(b) and (D)(3)(c) of this rule, paragraph (E) of rule 3745-300-10 of the Administrative Code, and paragraph (I) of rule 3745-300-15 of the administrative Code, the volunteer must show that two consecutive samples, taken from the same well within fifteen to thirty days of each other and analyzed by a certified laboratory, contain concentrations of chemical(s) of concern below the generic or risk-derived unrestricted potable use standards, and must:

- (A) Monitor the concentrations of chemical(s) of concern in ground water samples obtained from the monitoring well. the volunteer must monitor the concentrations of chemical(s) of concern in ground water samples obtained from the monitoring well at a frequency that is sufficient to represent the concentrations of chemical(s) of concern in the ground water, considering the hydrogeologic characteristics of the property and considering temporal variations, and for a time period that is equivalent to the length of time that it is determined that it will take concentrations of chemical(s) of concern to leach from the source area into the ground water and travel to the well; or
 - (B) Conduct modeling activities to determine the ninety-five per cent UCL of the arithmetic mean of the concentrations of chemical(s) of concern in the ground water underlying the source area. the ninety-five per cent UCL of the arithmetic mean may be derived by conducting modeling in accordance with paragraph (g) of this rule to determine the representative concentrations of chemical(s) of concern in the ground water, based upon the concentrations of chemical(s) of concern which remain in the source area; or
- (ii) Otherwise demonstrate that, based upon the geological, hydrogeological, and physical characteristics of the property and in consideration of the chemical(s) of concern present and the nature and time of their release, the provisions for protecting ground water meeting potable use standards contained in paragraphs (D)(3)(b) and (D)(3)(c) of this rule, paragraph (E) of rule 3745-300-10 of the Administrative Code, and paragraph (I) of rule 3745-300-15 of the Administrative Code will not be violated.

- (d) If it is necessary to take a ground water sample directly beneath a source area, the volunteer must use methods which will not cause chemical(s) of concern to be drawn into the ground water via the monitoring well.
- (4) Determination of applicable standards. The volunteer must determine the applicable standards for the property in accordance with this rule and rules 3745-300-08, 3745-300-09, 3745-300-10, and 3745-300-15 of the Administrative Code. applicable standards must be determined for all chemical(s) of concern with respect to every pathway that is either determined to be complete under paragraph (D)(2) of this rule or that is only considered to be incomplete as a result of an engineering or institutional control employed at the property in accordance with rules 3745-300-09 and 3745-300-15 of the Administrative Code.
- (a) The volunteer must determine the applicability of generic numerical standards at the property in accordance with paragraph (B)(1)(a) of rule 3745-300-08 of the Administrative Code.
- (b) When a property-specific risk assessment is performed at the property, the volunteer must determine the applicability of standards derived through a risk assessment conducted in accordance with paragraph (B) of rule 3745-300-09 of the Administrative Code.
- (c) If it is determined that a combination of generic direct contact soil standards and applicable standards, determined under rule 3745-300-09 of the Administrative Code, are used, the volunteer must adjust the concentrations of the applicable standards, using the procedures contained in paragraphs (B)(2)(b)(i) and (B)(2)(b)(ii) of rule 3745-300-08 of the Administrative Code to meet the human health risk based levels described in those paragraphs.
 - (d) The volunteer must determine the applicability of any other standards contained in this rule or in rule 3745-300-08, 3745-300-09, 3745-300-10, or 3745-300-15 of the Administrative Code.
- (5) Determination of the concentrations of chemical(s) of concern in identified areas. the volunteer must determine concentrations of chemical(s) of concern in accordance with paragraphs (D)(5)(a) to (D)(5)(e) of this rule as necessary to make the determinations contained in paragraphs (D)(2) to (D)(4) and (D)(6) to (D)(9) of this rule.
- (a) To determine concentrations of chemical(s) of concern in surface water, the volunteer must follow the sampling and analysis criteria contained in paragraph (F)(4) of this rule.

- (b) To determine concentrations of chemical(s) of concern in sediments for purposes of comparing the concentrations to the ecotoxicologically-based benchmarks pursuant to paragraph (F)(2)(d) of rule 3745-300-09 of the Administrative Code, the data collected must be analyzed by a certified laboratory to determine its representative concentration or maximum concentration in the identified area. for purposes of determining representative or maximum concentrations in identified areas, the volunteer must derive the concentrations in accordance with paragraph (D)(5)(c)(i) of this rule. for purposes of determining the maximum concentrations of chemical(s) of concern in identified areas, the volunteer must determine the concentrations in accordance with paragraph (D)(5)(c)(ii) of this rule.
- (c) To determine concentrations of chemical(s) of concern in soil, the data collected must be analyzed by a certified laboratory to determine the representative concentrations or maximum concentrations of chemical(s) of concern in the identified area. for purposes of determining representative or maximum concentrations of chemical(s) of concern in identified areas, the volunteer must either:
- (i) Derive the representative concentration by calculating the ninety-five per cent UCL of the arithmetic mean. The ninety-five per cent UCL must be calculated for each data set. Data sets must 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 meeting the requirements of paragraph (F) of this rule, the volunteer must use techniques for sampling normal or log-normal distributions based on appropriate equations contained in U.S. EPA'S supplemental guidance to risk assessment guidance for superfund: "Calculating The Concentration Term" (May 1992), or by other peer-reviewed statistical methodology for normal or log-normal distributions ; or
 - (ii) Derive the maximum concentration within the identified area. when information exists which allows the volunteer to reliably bias sampling activities within the identified area to the point of highest concentration, the volunteer may use the maximum concentration in the data set to represent the identified area concentration, provided that a minimum of three or more samples are collected and analyzed by a certified laboratory, unless data collection, field testing, field screening and sampling techniques which meet the requirements of paragraph (F)(1)(d) of this rule allow the volunteer to reliably establish the maximum concentration based upon a lesser number of certified laboratory samples.

- (d) To determine the concentrations of chemical(s) of concern in ground water, the data collected must be analyzed by a certified laboratory, and the data must represent the arithmetic mean of the data collected from each well for each quarter over a one year period or must otherwise demonstrate that temporal variations will not result in an exceedance of applicable standards.

To represent the concentrations of chemical(s) of concern at the point of compliance or receptor, or up-gradient of the point of compliance or receptor, the volunteer must perform sampling activities in compliance with the following criteria:

- (i) One or more samples must be biased towards the location that is, or would be anticipated to be, the point of highest concentration based upon:
 - (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; and
 - (E) Ground water modeling conducted in accordance with paragraph (G) of this rule;
 - (ii) If sample locations cannot be reliably biased towards the point of highest concentration, the volunteer must take samples from a number of additional sample locations sufficient to determine the point of highest concentration; and
 - (iii) For purposes of determining compliance with applicable standards, the volunteer must evaluate the data from each well separately.
- (e) Non-intrusive or indirect field testing may be used to assist in selecting sampling locations, but these techniques must not be used to demonstrate that concentrations of chemical(s) of concern are below applicable standards.
- (6) Determination of ground water yield. Whenever testing is conducted for purposes of determining the yield of a saturated zone underlying a property, the volunteer must conduct sufficient testing to determine the yield that is representative of the amount of ground water that is available from that saturated zone for potable purposes in accordance with the following criteria:

- (a) Temporal considerations. the volunteer must demonstrate either:
 - (i) The statistical average yield for the aquifer over a twelve month period;
or
 - (ii) The maximum yield for the aquifer, provided that ground water samples were biased towards the period of the highest yield;
- (b) Spatial considerations. the volunteer must bias the ground water sampling locations to the area of highest yield.
- (c) For the purpose of determining that the yield of a saturated zone falls below the minimum yield criteria for actionable ground water as defined in paragraph (A)(1) of rule 3745-300-01 of the Administrative Code:
 - (i) The ground water yield must be determined 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; or
 - (ii) Appropriate field test methods must be used to determine the in situ hydraulic conductivity of the saturated zone.
- (d) For the purpose of determining that the yield of a saturated zone falls below the criterion for critical resource ground water as described in paragraph (C)(1) of rule 3745-300-10 of the Administrative Code, the yield of the saturated zone being classified must be based on one or more of the following sources of information or methods:
 - (i) The ground water resources maps published by the Ohio Department of Natural Resources or other published and verified data for the saturated zone being classified; or
 - (ii) A determination of ground water yield to a sufficient number of properly developed wells constructed to the minimum standards of an eight inch diameter manufactured screen extending through at least eighty per cent of the thickness of the saturated zone in a twelve inch diameter borehole.
- (e) For the purpose of determining that the yield of a saturated zone falls below the criteria for "Class A" ground water in paragraph (C)(2) or (C)(2) of rule 3745-300-10 of the Administrative Code, the yield of the saturated zone being classified must be based on one or more of the following sources of information or methods:

- (i) For an unconsolidated saturated zone, a determination of yield to 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 extending through at least eighty per cent of the thickness of the water-bearing portions of the saturated zone being classified or a two inch diameter manufactured screen in a six inch diameter borehole extending through at least eighty per cent of the thickness of the water-bearing portions of the saturated zone being classified. when wells with dimensions of a two inch diameter manufactured screen in a six inch diameter borehole are used to determine yield, the yield must be multiplied by a factor of 1.15 for purposes of this paragraph; or
 - (ii) For a consolidated saturated zone that is monitored using wells with screens, a determination of yield to 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 extending through at least eighty per cent of the thickness of the water-bearing portions of the saturated zone being classified or a two inch diameter manufactured screen in a six inch diameter borehole extending through at least eighty per cent of the thickness of the water-bearing portions of the saturated zone being classified. when wells with dimensions of a two inch diameter manufactured screen in a six inch diameter borehole are used to determine yield, the yield must be multiplied by a factor of 1.15 for purposes of this paragraph; or
 - (iii) For a consolidated saturated zone that is monitored using wells with open hole intakes, a determination of yield to a sufficient number of wells that are properly constructed and developed to appropriate minimum standards of an eight inch diameter borehole extending through at least eighty per cent of the thickness of the water-bearing portions of the saturated zone being classified or a six inch diameter borehole extending through at least eighty per cent of the thickness of the water-bearing portions of the saturated zone being classified. When wells with a six inch diameter borehole are used to determine yield, the yield must be multiplied by a factor of 1.15 for purposes of this paragraph.
- (f) For the purpose of comparing the yield of a saturated zone being classified to another saturated zone present below the property in accordance with the criterion of paragraph (C)(2)(b) of rule 3745-300-10 of the Admistrative Code, the yield of the other saturated zone, which is the likely source of

water used for potable purposes within one mile of the property, must be determined based on the lowest yield of any wells within one mile of the property. if there are no wells within one mile of the property used for potable purposes, the ground water resources maps published by the Ohio Department of Natural Resources may be used to determine the yield of another saturated zone present under the property, which would likely be source of water used for potable purposes within one mile of the property should a well be developed.

(7) Classification of ground water. The volunteer must classify the ground water underlying the property in with accordance paragraphs (B) and (C) of rule 3745-300-10 of the Administrative Code. in addition to the information regarding ground water yield determined under paragraph (D)(6) of this rule, the volunteer must also assess current ground water use in order to classify the ground water underlying the property. In order to determine if the ground water underlying the property or emanating from the property is being used, the volunteer must, at a minimum:

(a) Identify any visual evidence of ground water use in areas where ground water has or is reasonably anticipated to have concentrations of chemical(s) of concern in excess of generic or risk-derived unrestricted potable use standards; and

(b) Review Ohio Department of Natural Resources water well log information for the properties on which ground water has or is reasonably anticipated to have concentrations of chemical(s) of concern in excess of generic or risk-derived unrestricted potable use standards.

[Comment: when classifying ground water in accordance with paragraphs (B) and (C) of rule 3745300-10 of the Administrative Code, the volunteer may be required to determine the total dissolved solids value for the ground water underlying the property. When determining the total dissolved solids value, the volunteer must comply with the requirements of paragraph (F) of this rule.]

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

(a) The sources or source areas located on the property that contribute or contributed to ground water contamination;

(b) The extent to which on-property sources or source areas have affected the ground water underlying the property;

- (c) If off-property sources or source areas of contamination may have affected the ground water underlying the property;
 - (d) The extent to which off-property sources or source areas have affected the ground water underlying the property; and
 - (e) Compliance with rule 3745-300-10 of the Administrative Code.
 - (9) If concentrations of chemical(s) of concern are determined under paragraph (D)(5) of this rule to exceed the applicable standards, as determined under paragraph (D)(4) of this rule, the volunteer must implement a remedy in accordance with rule 3745-300-15 of the Administrative Code.
- (E) Initial statement of work for completing a “Phase II Property Assessment”. A “Phase II Property Assessment” initial statement of work for completing a “Phase II Property Assessment” is not required of a volunteer unless the sufficient evidence provisions of paragraph (D) of rule 3745-300-02 of the Administrative Code apply. If a volunteer elects to make demonstrations for the purpose of satisfying the requirements of paragraph (D)(2)(b) of rule 3745-300-02 of the Administrative Code, a volunteer must have prepared an initial statement of work for completing a “Phase II Property Assessment” and may need to provide additional information to fully demonstrate that the volunteer had entered the voluntary action program prior to receipt of the enforcement letter and that the volunteer was proceeding and is continuing to proceed expeditiously to address the threats at the property. The initial statement of work for completing a “Phase II Property Assessment” must include the following:
- (1) A summary of the findings of the “Phase I Property Assessment” conducted at the property;
 - (2) A summary of the existing “Phase II Property Assessment” information as determined under paragraph (D)(1)(a) of this rule;
 - (3) A detailed description of the data collection activities initially planned to be conducted pursuant to paragraph (D)(1) of this rule;
 - (4) A detailed description of how data collected under paragraph (E)(3) of this rule will be evaluated for the purpose of making of determinations in (D)(2) to (D)(9) of this rule;
 - (5) A detailed schedule for implementing the activities described under paragraph (E)(3) of this rule;
 - (6) A general description of planned “Phase II Property Assessment” activities or other voluntary activities necessary to address the threat named in the enforcement letter; and

- (7) A general estimation of the time frame for completing the activities described under paragraph (E)(6) of this rule.

[Comment: an initial statement of work for completing a “Phase II Property Assessment” is not a mandatory element of the “Phase II Property Assessment” and is only required when the sufficient evidence provisions of rule 3745-300-02 of the Administrative Code, the eligibility rule, apply. The sufficient evidence provisions apply when the agency issues an enforcement letter to a person who had already entered the voluntary action program and who desires to continue under the voluntary action program. When the sufficient evidence provisions apply, an initial statement of work for completing a “Phase II Property Assessment” must have been prepared prior to receipt of the enforcement letter. The initial statement of work for completing a “Phase II Property Assessment” is one of several required demonstrations that must be made to satisfy the sufficient evidence provisions when they apply. The director will also evaluate other progress that has occurred on the property to determine whether or not the property is eligible for the "Voluntary Action Program." Other progress may include, but is not limited to, property assessment, remediation, securing financing or obtaining access to or possession of the property.]

(F) Sampling procedures.

- (1) The volunteer must establish and employ sampling procedures which satisfy the following:

(a) The volunteer must establish and employ data quality objectives which are consistent with U.S. EPA interim final guidance, “Data Quality Objectives Process for Superfund” (September 1993) according to its limitations and intended uses, and the data quality objectives must, at a minimum:

(i) Be consistent with the sampling objectives;

(ii) Define the most appropriate types of samples to collect;

(iii) Determine the most appropriate conditions from which to collect the samples; and

(iv) Define the quality and quantity of samples to be collected and must specify tolerable limits on decision errors which will be used as the basis for establishing the quantity and quality of data needed to support the decision.

(b) The volunteer must identify the samples and analytes for which the certified laboratory must analyze and the volunteer must ensure that:

(i) The sampling procedures employed at the property are consistent with the sample quality requirements of the certified laboratory; and

- (ii) The certified laboratory is certified for and capable of performing the analyses that are required for the property, including those necessary for forming the basis of the no further action letter.

[Comment: the volunteer should contact the certified laboratory that is conducting analyses in support of the voluntary action to determine if the applicable standards for the property are within the laboratory's reporting limits. properties with multiple chemicals of concern must perform a cumulative adjustment following the procedure contained in paragraph (B)(2)(b) of rule 3745-300-08 of the Administrative Code. the cleanup levels calculated by performing this cumulative adjustment may result in chemical concentrations that are below the certified laboratory's reporting limits. the volunteer is responsible for determining that the certified laboratory which performs analyses in support of the no further action letter, is capable of detecting the chemical(s) of concern on the property at or below the applicable standards.]

- (c) The volunteer must establish and employ acceptable QA/QC procedures when collecting field data during the "Phase II Property Assessment". The field QA/QC must serve to minimize sources of error, minimize the potential for cross contamination, and maximize the representativeness of the data collected, and must, at a minimum, include the following:
 - (i) A review of laboratory QA/QC and standard operating procedures for consistency with field QA/QC;
 - (ii) Developed field QA/QC, at a minimum, for such items as:
 - (A) Equipment decontamination;
 - (B) Trip blanks, equipment blanks, field blanks, and duplicates;
 - (C) Calibration of field instruments, which includes procedures for instrument correction and re-calibration when necessary;
 - (D) Documentation and record maintenance;
 - (E) Sample handling, preservation and holding times; and
 - (F) Chain-of-custody.
- (d) The volunteer must establish and employ data collection, field testing, field screening and sampling techniques. data collection, field testing, field screening and

sampling techniques must be used in a manner that is consistent with achieving the purpose of the “Phase II Property Assessment”. The volunteer must use the data collection, field testing, field screening and sampling techniques, according to their limitations and intended uses, contained in the following documents:

(i) Documents containing data collection, field testing, field screening and sampling techniques which are demonstrated to:

(A) Be field-validated;

(B) Be documented and peer-reviewed;

(C) Ensure the representativeness of samples taken following the technique; and

(D) Be proven capable of achieving the data quality needs; or

(ii) “subsurface Characterization and Monitoring Techniques, A Desk Reference Guide. Volume 1: Solids And Ground Water Appendices A and B; Volume II: The Vadose Zone, Field Screening And Analytical Methods Appendices C and D.” U.S. EPA, office of research and development Washington D.C. 20460 (May 1993).

[Comment: the following guidance may be helpful in selecting data collection techniques:

“Guidance For Data Usability In Risk Assessment”, OSWER Directive 9285. 7-05, EPA/540/G-90/008, October 1990, interim final.

“Guidelines And Specifications For Preparing Quality Assurance Project Plans”, Ohio EPA, Division of Emergency and Remedial Response, policy No. DERR-00-RR-008, March 1990;

“quality Assurance/ Quality Control Guidance for Removal Activities: Sampling QA/QC Plan And Data Validation Procedures”, interim final, EPA/540/G-90/004, April 1989.]

(2) Sediments. The volunteer must assess sediments in accordance with the requirements contained in paragraph (F) of rule 3745-300-09 of the Administrative Code.

(3) Ground water. The volunteer must follow the methods and procedures according to their limitations and intended uses, contained in the following documents:

- (a) Documents containing data collection, field testing and sampling techniques which are demonstrated to:
- (i) Be field-validated;
 - (ii) Be documented and peer-reviewed;
 - (iii) Ensure the representativeness of samples taken following the technique; and
 - (iv) Be proven capable of achieving the data quality needs identified in paragraph (F) of this rule; or
 - (b) “Technical Guidance Manual For Hydrogeologic Investigations And Ground Water Monitoring,” (Ohio EPA February 1995), except when the application 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.
- (4) Surface water. When identified areas include or affect surface water, surface water samples must be collected and analyzed in accordance with:
- (I) Ohio EPA, “Biological Criteria For The Protection Of Aquatic Life: Volume II: User’s Manual for Biological Field Assessment Of Ohio Surface Waters”, October 30, 1987, updated January 1, 1988, amended September 30, 1989; and
 - (ii) Section 3.3 of the “Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices”, October 1, 1988, revised December, 1991.
- (G) Use of modeling. The volunteer must identify any models used to describe the saturated and unsaturated zones or the concentration of chemical(s) of concern in or emanating to ground water. If modeling is used to describe the saturated and unsaturated zones or the concentration of chemical(s) of concern in or emanating to ground water, the models must be:
- (1) Peer-reviewed.
 - (2) Model-verified. To be model-verified, the computer code for the model must be shown to produce reliable and mathematically accurate results for all functions of the model;
 - (3) Field-validated to determine if there exist favorable comparisons between the modeled, or predicted, conditions and observed field conditions for the area being modeled;

- (4) Consistent with conditions throughout the modeled area. The assumptions and limitations of the computer code, mathematical solution, technology utilized and computer code structure must be consistent with the conditions throughout the modeled area and the application of the model;
- (5) Used consistent with the model's documentation; and
- (6) Calibrated to geologic, hydrogeologic, and physical conditions throughout the modeled area.

[Comment: the volunteer should use input data collected from the modeled area to calibrate the model to conditions throughout the modeled area. Whenever the volunteer does not rely upon input parameters collected from within the modeled area, the volunteer must provide justification for why input parameters were not collected from within the modeled area, and the volunteer must demonstrate that the model is being calibrated or used properly. The volunteer should validate the model predictions with empirical data collected from the locations of the model output, and should validate within as close proximity as possible to the point of compliance or point of exposure.]

[Comment: the following models are considered by Ohio EPA to be acceptable for modeling in the saturated zone, so long as they are calibrated to property conditions and are used according to their limitations and intended uses: MT3D in conjunction with "Modflow" from U.S. EPA Kerr laboratory (1990).]

[Comment: the following model is considered by Ohio EPA to be acceptable for modeling in the vadose zone, so long as it is calibrated to property conditions and is used according to its limitations and intended uses: "VLEACH" from U.S. EPA Kerr laboratory center.]

[Comment: contaminated plumes. the volunteer may use ground water modeling, conducted in accordance with paragraph (G) of this rule to determine whether a source of contamination on the property will cause applicable standards to be exceeded either at the property boundary, or at an off-property well.]

(H) Data analysis.

- (1) The volunteer must verify compliance with applicable standards by comparing the values determined to be representative of chemical(s) of concern in identified areas as provided in paragraph (D)(5) of this rule to the applicable standards identified in paragraph (D)(4) of this rule.
- (2) The volunteer must verify the assumptions of any models and statistical methods used.

[Comment: the following guidance may be helpful in determining compliance with applicable standards. both of these documents are summarized in "An Overview of Methods for Evaluating the Attainment of Cleanup Standards for Soils, Solid Media, and Groundwater, EPS", R.O. Gilbert, T.LE Gore, R.F. O'Brien, (January 1996). The first document is "Methods for Evaluating the Attainment of Cleanup Standards, Volume 1 Soils And Solid Media." EPA 230/02-89-042, Office of Policy, Planning, and Evaluation, Washington, D.C.; U.S. Environmental Protection Agency (USEPA) 1989. the second document is "Methods For Evaluating The Attainment OF Cleanup Standards, Volume 2: Ground Water." EPA 230-R-92-014, Office of Policy, Planning, and Evaluation, Washington, D.C.; U.S. Environmental Protection Agency (USEPA) 1992.]

(I) Determination of background levels

(1) Background levels in soil. If the background levels, as determined in accordance with rule, for a chemical of concern do not meet the applicable standard derived for the property in accordance with rule 745-300-08 or 3745-300-09 of the Administrative Code, the volunteer can select, as the applicable standard, a comparison demonstrating that the concentration of any such chemical of concern on the property is at or below background levels. However, if soil background levels are not determined for the property consistent with this paragraph then background levels may not constitute the applicable standards for soils.

(a) Background level samples may be taken in areas not identified in paragraph (I)(1)(b) of this rule. When determining background levels in soils, the samples must be taken in soil media native to the property. Native fill may be used for determining background levels when the native fill was not moved from or is not currently in an area described in paragraph (I)(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 must collect samples from a nearby, representative off-property location which would meet the requirements of this paragraph.

(b) The following areas are inappropriate to sample when determining 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, or

(D) Material handling areas;

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

[Comment: for example, a volunteer may not sample within three feet of a roadway when the volunteer is trying to determine a background level for lead.]

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

(v) Railroad tracks or railway areas or other areas affected by their runoff. This restriction only applies when the chemical(s) of concern is one that would normally be associated with the activities conducted on or around the railroad tracks;

(vi) Areas of concentrated air pollutant depositions or areas affected by their runoff;

(vii) Storm drains or ditches presently or historically receiving industrial or urban runoff; or

(viii) Spill areas.

(c) Background levels must be representative of the zones or depth intervals to which the background levels may be applied, and

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

(i) Collecting background level samples. At a minimum, eight soil sampling points must be taken to represent a background level within each zone, or soil horizon which will be compared to samples taken to determine the concentrations of chemical(s) of concern in identified areas.

(ii) Determining the numerical value for background concentrations for chemical(s) of concern at the property. The statistical method that must be applied to establish background concentrations is as follows:

(A) The background mean, referred to as: \bar{X}_b Must 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, referred to as: S_b must 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 ($n_b - 1$):

$$S_b = \sqrt{\frac{(X_1 - \bar{X}_b)^2 + (X_2 - \bar{X}_b)^2 + (X_n - \bar{X}_b)^2}{n_b - 1}}$$

(C) The coefficient of variation, referred to as “ C_v ” must be recalculated by dividing the background standard deviation by the background mean:

$$C_v = \frac{S_b}{\bar{X}_b}$$

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 maximum allowable time limit may be calculated for the transformed data in accordance with paragraph (I)(1)(d)(ii)(D) of this rule. If “ C_v ” exceeds 1.0 the the volunteer must conduct a thorough evaluation to account for this variability. If the “ C_v ” exceeds 1 and the volunteer determines that a data

point does not accurately represent background conditions or if a QA/QC problem exists which has invalidated the data point, the invalidated and inaccurate data points may be dropped, or additional samples must 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 “ $2 * S_b$ ” represents two times the standard deviation and “ \overline{X}_b ” represents the background mean.

Compare each sample point to the calculated maximum allowable limit or upper limit analyzed from background data.

If a value is found to be an outlier which is not representative of background conditions, it may be replaced by another sample that is not an outlier to maintain at least eight samples for the background determination for soils.

If data are not normally distributed or cannot be normalized by an appropriate technique, alternative statistical comparisons between sample background data may be applied with consultation with an Ohio EPA Division of Emergency and Remedial Response representative.

(2) Ground water background levels.

(a) Property specific determination of bound water background levels. If background levels, as determined in accordance with this rule, for a chemical of concern 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 demonstrating that the concentration of such chemical of concern on the property is at or below background levels in ground water , samples must be taken up-gradient at appropriate locations and depths which are unaffected by anthropogenic sources of contamination. Background sampling points may include points not hydraulically up-gradient of the area of concern where:

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

- (ii) Sampling at other points will provide 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 must be:
 - (i) Appropriate for the method used for determining whether concentrations of chemical(s) of concern exceed background in accordance with paragraph (D)(4)(a) of this rule, 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 will be detected.
- (c) The method chosen must be applied separately for each chemical of concern and must comply with the following performance standards:
 - (i) Capable of accounting for data below the limit of detection using the lowest practical quantitation limit (referred to as "PQL") that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the volunteer. The PQL must be below the potable ground water standard;
 - (ii) Obtain procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data;
 - (iii) Should a statistical method be chosen, the method must 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 should be transformed or a distribution-free theory test should be used. if the distributions for the chemicals of concern differ, more than one statistical method may be needed; and
 - (iv) Complies with the performance standards set in: "U.S. EPA Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities," Interim Final Guidance, April or " U.S. EPA Addendum to the Interim Final Guidance for Statistical Analysis of Ground Water Monitoring at RCRA Facilities," April 1992.
- (3) Determination of ground water background levels from off-property investigations. Use of prior studies of Ohio's ground water. If it is not possible to find an appropriate location to determine background levels for ground water on or underlying the property, the Ohio ambient ground water quality monitoring network database may be used to aid the volunteer in determining the background concentrations of chemical(s) of concern at a property. If the Ohio ambient ground water quality

monitoring network database information is not representative of conditions at the property, the volunteer cannot use this method to demonstrate background levels of chemical(s) of concern in ground water.

[Comment: the volunteer cannot use background values for chemical(s) of concern from the Ohio ambient ground water quality monitoring network database which are for anthropogenic chemical(s) of concern.]

- (4) If background levels in ground water cannot be determined using either paragraph (I)(2) or (I)(3) of this rule then background levels cannot be used as the applicable standards for ground water.
- (J) A volunteer must complete a “Phase II Property Assessment” written report which at a minimum, includes:
- (1) An introduction identifying: 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 conducting the “Phase II Property Assessment”;
 - (2) A summary of any amendment to the “Phase I Property Assessment” required by paragraph (D)(1)(a) of this rule;
 - (3) A Statement of any limitations or qualifications which impact the “Phase II Property Assessment”;
 - (4) A summary of the data collection activities conducted under paragraph (D)(1) of this rule and the data derived as a result of these activities;
 - (5) A summary of the rationale for the sampling and testing activities conducted in accordance with the requirements of this rule;
 - (6) A summary of the determinations made under paragraphs (D)(2) to (D)(9) of this rule and a summary of the rationale for the determinations made under paragraphs (D)(2) to (D)(9) of this rule;
 - (7) A summary of the sampling procedures employed in accordance with paragraph (F) of this rule;
 - (8) A summary of any background determination activities conducted under paragraph (I) of this rule;

- (9) A summary of any models used in accordance with paragraph (G) of this rule and a description of how the models were calibrated and field-validated;
- (10) An indication of whether the property met applicable standards or whether remedial activities were required to meet applicable standards;
- (11) A bibliography of references which identifies, to the extent available, the description, date, source, and location of any document 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”;
- (12) Appendices for appropriate supporting documentation.
- (13) If a risk assessment was conducted to determine applicable standards, a copy of the written risk assessment report must be attached to the “Phase II Property Assessment” report; and
- (14) A property map indicating the locations of the identified areas on or underlying the property, and the concentration and physical distribution of the chemical(s) of concern identified on the property.

3745-300-07

39

Effective: _____

Certification: _____

Date: _____

Promulgated Under: RC Chapter 119.

Rule Amplified: RC Chapter 3746.

Rule Authorized by: RC Chapter 3746.

Prior Effective DateS: None