

ATTACHMENT 2

Checklist to Determine Applicable Remediation Standards Part 1: Ecological Standards

STEP 1: Determine Whether a De Minimis Ecological Screening Evaluation is Appropriate for the Site		
1.1	Are there any undeveloped terrestrial areas on or adjacent to the site (e.g., areas that are not under intensive landscape or agricultural control)?	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.2	Are there any potential wetlands (including vernal pools) on or adjacent to the site?	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.3	Are there any surface water bodies (i.e., lotic or lentic habitat) on or adjacent to the site?	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.4	Are there any terrestrial, wetland, or aquatic habitats off-site, but situated downstream, downwind, or downgradient from the site that may be affected by site-related stressors?	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.5	Are there any projected land uses for the site that would result in undeveloped areas, wetland habitat, lotic habitat, or lentic habitat?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p><i>If "Yes" to any: A complete exposure pathway may exist for potential ecological receptors of concern. Proceed to Step 2.</i> <i>If "No" to all: No further ecological evaluation is required. File this completed form with the Site Assessment Report.</i></p>		

STEP 2: Identify any Readily Apparent Harm or Exceedances of Surface Water Quality Standards		
2.1	Have there been any incidents where harm to wildlife attributable to contaminants originating from the site has been readily apparent?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p><i>If "Yes": Proceed to Question 2.2.</i> <i>If "No": Skip to Question 2.3.</i></p>		
2.2	Has the cause of such harm been eliminated?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p><i>If "Yes": Briefly describe the action taken and complete the rest of the checklist.</i> <i>If "No": Proceed directly to the remedy evaluation or, alternately, proceed with a determination of a Uniform or Site-Specific Ecological Standard, as described in the VRP Guidance Manual, prior to implementation of the remedy. File this form with the Site Assessment Report.</i></p>		
Action Taken:		
2.3	Is the site contributing to exceedances of surface water quality standards established for the protection of aquatic life (see W. Va. Legislative Rule 47CSR2)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
<p><i>If "Yes": Proceed directly to the remedy evaluation or, alternately, proceed with a determination of a Uniform or Site-Specific Ecological Standard, as described in the VRP Guidance Manual, prior to implementation of the remedy.</i> <i>If "No" or "Unknown": Proceed to Step 3.</i></p>		

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STEP 3: Identify Contamination Associated with Ecological Habitats		
3.1	Have the environmental media (e.g., soil, surface water, sediment, biota) associated with the ecological habitat(s) identified in Questions 1.2 through 1.5 been sampled and analyzed with regard to potential site-related contaminants of concern?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<i>If "Yes": Proceed to Question 3.2.</i> <i>If "No": Skip to Step 4.</i>	
	Comments (e.g., some media sampled but others not, limitations of data):	
3.2	Have any site-related contaminants been detected above natural background concentrations in environmental media collected from terrestrial habitat?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> n/a
	Comments (e.g., type of contaminants):	
3.3	Have any site-related contaminants been detected above natural background concentrations in environmental media collected from wetland or aquatic habitats (lotic or lentic habitats)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> n/a
	<i>If "Yes" or "Unknown" to 3.2 and/or 3.3: Proceed to Question 3.4.</i> <i>If "No" or "n/a" to both 3.2 and 3.3: Skip to Question 3.6.</i>	
	Comments (e.g., wetland or aquatic, lotic or lentic, limitations of data):	
3.4	Are site-related contaminants presenting an ecological risk over and above "local" condition?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
	<i>If "Yes": Skip to Step 4.</i> <i>If "No" or "Unknown": Proceed to Question 3.5.</i>	
	Comments (e.g., evidence of local condition and/or ecological risk):	
3.5	Have site-related releases of contaminants been stopped?	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<i>If "Yes": Proceed to Question 3.6.</i> <i>If "No": Skip to Part 4.</i>	
	Comments (e.g., how were releases stopped):	
3.6	Are site-related contaminants currently or likely to be migrating to aquatic habitat (e.g., lotic, lentic, or wetland habitat)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> n/a
	<i>If "Yes" or "Unknown": Proceed to Step 4.</i> <i>If "No" or "n/a": No further ecological evaluation is required. File this completed form with the Site Assessment Report.</i>	

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STEP 4: Characterize the Potential Ecological Habitat

4.1	Describe the general land use in the immediate vicinity of the site.	
	<input type="checkbox"/> Commercial/Industrial <input type="checkbox"/> Residential <input type="checkbox"/> Rural/Agricultural <input type="checkbox"/> Rural/Undeveloped <input type="checkbox"/> Urban <input type="checkbox"/> Other:	
4.2	For all affected areas that fulfill the descriptions in Step 1, answer the following and attach a site map identifying the potential ecological habitat.	
	4.2.1 Outline characteristics for potential terrestrial habitats.	
	Location:	
	Contiguous Area:	
	General Topography:	
	Primary Soil Type:	
	Predominant Vegetation Species:	
	4.2.2 Outline characteristics for potential wetland habitats (e.g., vernal pools, marshes, etc.).	
	Location:	
	Contiguous Area:	
	General Topography:	
	Primary Soil Type:	
	Predominant Vegetation Species:	
	4.2.3 Outline characteristics for potential lotic habitats (flowing water).	
	Location:	
	Typical Width and Depth:	
	Typical Flow Rate:	
	Typical Gradient (m/km):	
	Type of River/Creek Bottom:	
	Types of Aquatic Vegetation Present:	
	Topography of the Riparian Zone:	
	Predominant Riparian Vegetation:	
	Human Utilization of Lotic Habitat:	
	Local Conditions:	
	4.2.4 Outline characteristics for potential lentic habitats (standing water).	
	Location:	
	Is the lentic habitat...?	<input type="checkbox"/> Natural <input type="checkbox"/> Man-made
	Area of Lentic Habitat	
	Typical and Maximum Depth:	
	Description of Sources & Drainage:	
	Predominant Aquatic Vegetation:	
	Topography of Littoral Zone:	
	Predominant Littoral Zone Vegetation:	
	Human Utilization of Lentic Habitat:	
	Local Conditions:	

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4.3	<p>Indicate if the site contains or is adjacent to any of the following types of valued terrestrial habitats:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Climax Community (e.g., old growth forest) <input type="checkbox"/> Federal Wilderness Area (designated or administratively proposed) <input type="checkbox"/> National or State Forest <input type="checkbox"/> National or State Park <input type="checkbox"/> National or State Wildlife Refuge <input type="checkbox"/> National Preserve Area <input type="checkbox"/> State designated natural area <input type="checkbox"/> Federal land designated for protection of natural ecosystems <input type="checkbox"/> Federal or State land designated for wildlife or game management <input type="checkbox"/> Area utilized for breeding by large or dense aggregations of wildlife <input type="checkbox"/> Feeding, breeding, nesting, cover, or wintering habitat for migratory birds <input type="checkbox"/> Area important to the maintenance of unique biotic communities (e.g., high proportion of endemic species) <p><i>Threatened or Endangered Species</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Critical habitat for federally designated threatened or endangered species <input type="checkbox"/> Habitat known to be used or potentially used by Federal or State designated threatened or endangered species, or species in the State Wildlife Action Plan
4.4	<p>Indicate if the site contains or is adjacent to any of the following types of valued wetlands:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Area important to the maintenance of unique biotic communities (e.g., high proportion of endemic species) <input type="checkbox"/> Area utilized for breeding by large or dense aggregations of wildlife <input type="checkbox"/> Spawning or nursery areas critical to the maintenance of fish/shellfish species <input type="checkbox"/> Feeding, breeding, nesting, cover, or wintering habitat for migratory waterfowl or other aquatic birds <input type="checkbox"/> Area important to the maintenance of unique biotic communities (e.g., high proportion of endemic species) <p><i>Threatened or Endangered Species</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Critical habitat for federally designated threatened or endangered species <input type="checkbox"/> Habitat known to be used or potentially used by Federal or State designated threatened or endangered species, or species in the State Wildlife Action Plan
4.5	<p>Indicate if the site is within or adjacent to any of the following valued aquatic habitats:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Federal or State Fish Hatchery <input type="checkbox"/> Federal or State designated Scenic or Wild River <input type="checkbox"/> National River Reach designated as recreational <input type="checkbox"/> Critical areas identified under the Clean Lakes Program <input type="checkbox"/> Trout-stocked streams or wild trout streams with verified trout production <input type="checkbox"/> Spawning or nursery areas critical to the maintenance of fish/shellfish species <input type="checkbox"/> Feeding, breeding, nesting, cover, or wintering habitat for migratory waterfowl or other aquatic birds <input type="checkbox"/> Area important to the maintenance of unique biotic communities (e.g., high proportion of endemic species) <p><i>Threatened or Endangered Species</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Critical habitat for federally designated threatened or endangered species <input type="checkbox"/> Habitat known to be used or potentially used by Federal or State designated threatened or endangered species, or species in the State Wildlife Action Plan
4.6	<p>Have valued terrestrial, wetland, or aquatic habitats been identified within or adjacent to this site? (A list of agencies that can provide information that should assist in determining whether the site is located within or adjacent to the areas listed in 4.3, 4.4, and 4.5 is provided at the end of this checklist.)</p> <p style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</p>

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STEP 5: Identify Any Potential Ecological Receptors of Concern

5.1	<p><u>Threatened and Endangered Species</u> Were any habitats within or adjacent to the site identified as critical habitat for, or areas known to be used by, federally threatened or endangered species listed in 50CFS17.95 or 17.96?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>If “Yes”, indicate which species*:</p> <p><i>Amphibians</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Cheat Mountain salamander (<i>Plethodon nettingi</i>) <p><i>Clams & Mussels</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Clubshell (<i>Pleurobema clava</i>) <input type="checkbox"/> Fanshell (<i>Cyprogenia stegaria</i>) <input type="checkbox"/> James spinymussel (<i>Pleurobema collina</i>) <input type="checkbox"/> Longsolid (<i>Fusconaia subrotunda</i>) <input type="checkbox"/> Northern riffleshell (<i>Epioblasma torulosa rangiana</i>) <input type="checkbox"/> Pink mucket pearlymussel (<i>Lampsilis abrupta</i>) <input type="checkbox"/> Purple cat’s paw pearlymussel (<i>Epioblasma obliquata obliquata</i>) <input type="checkbox"/> Rayed bean (<i>Villosa fabalis</i>) <input type="checkbox"/> Round hickorynut (<i>Obovaria subrotunda</i>) <input type="checkbox"/> Sheepnose (<i>Plethobasus cyphus</i>) <input type="checkbox"/> Snuffbox (<i>Epioblasma triquetra</i>) <input type="checkbox"/> Spectablecase (<i>Cumberlandia monodonta</i>) <input type="checkbox"/> Tubercled blossom pearlymussel (<i>Epioblasma torulosa torulosa</i>) <p><i>Fish</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Candy darter (<i>Etheostoma osburni</i>) <input type="checkbox"/> Diamond darter (<i>Crystallaria cincotta</i>) <p><i>Flowering Plants</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Harperella (<i>Ptilimnium nodosum</i>) <input type="checkbox"/> Northeastern bulrush (<i>Scirpus ancistrochaetus</i>) <input type="checkbox"/> Running buffalo cover (<i>Trifolium stoloniferum</i>) <input type="checkbox"/> Shale barren rock cress (<i>Arabis perstellata</i>) <input type="checkbox"/> Small whorled pogonia (<i>Isotria medeoloides</i>) <input type="checkbox"/> Virginia spiraea (<i>Spiraea virginiana</i>) <p><i>Mammals</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Gray bat (<i>Myotis grisescens</i>) <input type="checkbox"/> Indiana bat (<i>Myotis sodalis</i>) <input type="checkbox"/> Northern long-eared bat (<i>Myotis septentrionalis</i>) <input type="checkbox"/> Tricolored bat (<i>Perimyotis subflavus</i>) – Proposed Species as of 2022 <input type="checkbox"/> Virginia big-eared bat (<i>Corynorhinus towsendii virginianus</i>) <input type="checkbox"/> Virginia northern flying squirrel (<i>Glaucomys sabrinus fuscus</i>) <p><i>Snails & Invertebrates</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Big Sandy crayfish (<i>Cambarus callainus</i>) <input type="checkbox"/> Flat-spired three-toothed land snail (<i>Triodopsis platysayoides</i>) <input type="checkbox"/> Guyandotte River crayfish (<i>Cambarus veteranus</i>) <input type="checkbox"/> Madison cave isopod (<i>Antrolana lira</i>) <input type="checkbox"/> Monarch butterfly (<i>Danaus plexippus</i>) – Candidate Species as of 2020 <input type="checkbox"/> Rusty-patched bumble bee (<i>Bombus affinis</i>) 		

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5.2	<u>Local Populations Providing Important Natural or Economic Resources, Functions, and Values</u> Were any valued terrestrial, wetland, or aquatic habitats listed in 4.3, 4.4, or 4.5 identified within or adjacent to the site?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p><i>If “Yes” to 5.1 and/or 5.2 and/or surface water bodies are not in compliance with applicable water quality standards: The site does not pass the De Minimis ecological risk screening, since a complete exposure pathway may exist for potential ecological receptors of concern. Further evaluation of the site is required using either the Uniform Ecological Standard or the Site-Specific Ecological Standard.</i></p> <p><i>If “No” to 5.1 and 5.2 and surface water bodies are in compliance with applicable water quality standards: No further ecological evaluation is required. File this completed form with the Site Assessment Report.</i></p>		

*The list contains those federally designated threatened and endangered species that are indigenous to WV. WVDNR, Wildlife Resources Section should be consulted to ensure the list is correct. WV has not established a list of state designated threatened or endangered species; however, the WVDNR has developed a [“Species of Greatest Conservation Need” list](#) in the [State Wildlife Action Plan](#). Species listed in the State Wildlife Action Plan should also be considered in any Ecological Risk Assessment.

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Federal and State Agencies for Ecological Review Consultation

U.S. Department of Agricultural – Natural Resources and Conservation Service
1550 Earl L. Core Road, Suite 200
Morgantown, WV 26505
304-284-7540
<https://www.nrcs.usda.gov/wps/portal/nrcs/site/wv/home>

U.S. Fish and Wildlife Service – WV Field Office
Ecological Services
6263 Appalachian Highway
Davis, WV 26260
304-866-3858
<https://www.fws.gov/office/west-virginia-ecological-services>

WV Division of Forestry
7 Players Club Drive
Charleston, WV 25311
304-558-2788
<https://wvforestry.com/>

WV Division of Natural Resources
Building 74
324 Fourth Avenue
South Charleston, WV 25303
304-558-2754
<http://www.wvdnr.gov/>

WV Division of Natural Resources – Wildlife Resources Section
Building 74
324 Fourth Avenue
South Charleston, WV 25303
304-558-2771
<http://www.wvdnr.gov/>

Checklist to Determine Applicable Remediation Standards Part 2: Human Health Standards

STEP 1: Determine Whether the De Minimis Standard is Appropriate for the Site

The De Minimis Standard applies to contaminants for which the primary exposure routes will be ingestion, dermal contact, and/or inhalation of soil or groundwater. For soil, the De Minimis Standard is either the risk-based concentration (RBC) (Table 60-9 of the Rule) or the natural background level of the contaminant, whichever is higher. The potential for vapor intrusion also needs to be screened by comparing site groundwater, soil gas, or indoor air concentrations to the relevant RBC in the USEPA Vapor Intrusion Screening Levels (VISL).

Evaluating a site based on the De Minimis Standard consists of aggregating site data and comparing the exposure point concentration (EPC), which is either maximum concentrations detected or the 95% upper confidence limit (UCL) concentration, to establish RBCs. If site EPCs do not exceed the RBC or site-specific background, then no further evaluation or remediation of the site is required. Similarly, if the site EPCs do exceed the RBC or site-specific background but presumptive remedies can be shown to sever the potential exposure route, then no further evaluation is needed, and the Applicant can proceed to implementing the presumptive remedies. (Completing Worksheet 4-1 at the end of this checklist may aid in this process.)

The De Minimis approach is limited to particular compounds and is appropriate only for residential or industrial exposure scenarios. Note that Recreator risks can be assessed in a De Minimis Risk Assessment using the methods outlined in Appendix C. Below are several questions that will help to determine whether a site may be evaluated under the De Minimis Standard.

1.1	Have media representing all potentially complete pathways in the conceptual site model been sampled?	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.2	Are there fewer than 10 chemicals present at the site?	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.3	If any concentration of chemicals of potential concern exceed the RBC, are there presumptive remedies that can sever the exposure pathways and that are acceptable to the Applicant and impacted off-site property owners?	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.4	Is the future use of the site expected to only be residential and/or industrial?	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.5	Does Part 1 (Ecological Standards) of this checklist indicate that there are no ecological receptors of concern at the site (e.g., wetlands or endangered species)?	<input type="checkbox"/> Yes <input type="checkbox"/> No

If “Yes” to all: The De Minimis Standard is likely appropriate for the site.

If “No” to any: The De Minimis Standard may not be appropriate for the site, and more site-specific characterization may be needed; however, the Applicant may consult with WVDEP to confirm the determination. Note that Recreator risks and Construction Worker risks can be assessed in a De Minimis Risk Assessment using the methods outlined in Appendix C and attaching the RSL Calculator Output, VURAM Output, or ALM spreadsheet, as appropriate.

If “No” to all: The De Minimis Standard is not appropriate for the site. The Uniform Standard or Site-Specific Standard should be considered instead.

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STEP 2: Determine Whether the Uniform Standard is Appropriate for the Site

The Uniform Standard is based on the use of WVDEP-approved methodologies to calculate remediation standards. Advantages to using the Uniform Standard include the fact that this methodology can be used to determine remediation standards for some contaminants and receptors not included under the De Minimis Standards or De Minimis Risk Assessment process (e.g., recreators and construction workers), and that, with adequate documentation, site-specific information can be incorporated into the calculations. The disadvantages of the approach defined under the Uniform Standard are that exposure scenarios and potential exposure pathways included in these calculations are limited to those available in the USEPA Regional Screening Levels methodology.

Note that if site-specific modeling will be used in determining EPCs for media at a site, a site-specific risk assessment should be used.

2.1	Is future use of the site potentially other than residential or industrial use?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.2	Do potentially impacted sediments exist at the site that should not be held to residential or industrial soil cleanup standards?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.3	Do home vegetable gardens potentially exist in the vicinity of the site, and is homegrown produce potentially impacted by site-related chemicals?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.4	Are there any dairy farms or livestock grazing areas within the area of impact of the site?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.5	Is impacted groundwater or surface water used for irrigation or any use other than drinking water?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.6	Are construction/utility workers potentially exposed to contaminated groundwater in a trench? (Note that this scenario can be covered in a De Minimis Risk Assessment using default exposure parameters in VURAM, but the Applicant/LRS may choose to use more site-specific information.)	<input type="checkbox"/> Yes <input type="checkbox"/> No

If "Yes" to any: There are potential pathways for human exposure to site-related chemicals that are not addressed in the methodology provided for determining a Uniform Standard. Therefore, a Site-Specific Standard may be more appropriate for the site.

If "No" to all: The Uniform Standard is likely appropriate for the site.

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Worksheet 4-1

If EPCs for all site contaminants are less than the corresponding RBC values, no remediation is required. If the site EPC values exceed the RBC values, additional assessment or remediation of the site is required.

Worksheet 4-1: Compare Site Data to Chemical Specific De Minimis RBC Values

	Contaminant	Max Concentration	UCL	RBCs	
				Residential	Industrial
Soil (mg/kg)					
	Contaminant	Max Concentration	UCL per well	RBCs	
				Groundwater	Res VISL
Groundwater µg/L					
	Contaminant	Max Concentration	UCL per sample location (if ≤8 samples)	RBCs	
				Residential	Industrial
Soil Vapor µg/m ³					

UCL = 95% Upper Confidence Level
 RBC = Risk Based Concentrations provided in Table 60-9 of the Rule and in the USEPA Vapor Intrusion Screening Levels (VISL)