Frequently Asked Questions

These FAQs were prepared by the EPA Region 3 BTAG to answer questions and address situations commonly encountered during the ecological risk assessment process for CERCLA sites in Region 3. They were developed to provide key information and approaches that can be applied consistently at a multitude of sites and to help to ensure that all ecological risk assessors working on sites in Region 3 have access to regional BTAG guidance. In most cases the information provided is merely a reiteration or clarification of existing EPA guidance or policy. The methodologies or approaches described should be viewed as default approaches to be implemented in EPA Region 3.

Ecological Risk Assessment

Frequently Asked Questions

Screening Level Ecological Risk Assessments

1. Does a site visit need to be conducted for a screening level ecological risk assessment?

It is strongly recommended that a site visit be conducted during the problem formulation phase of the screening level assessment (Step 1) by the primary ecological risk assessor. The use of *The Checklist for Ecological Assessment / Sampling* (Appendix A of ERAGS Appendix B) or similar checklists (such as the RBP checklists) is strongly encouraged to ensure that adequate information is collected and reported to properly develop the problem formulation.

If the site visit and ecological characterization is not conducted by the primary ecological risk assessor, it is strongly recommended that the checklists be completed by appropriately trained personnel (i.e., biologists, ecologists, etc.) and be reviewed by the primary ecological risk assessor. This should be completed as early as possible in the risk assessment process to ensure the ecological

characterization of the site has been properly completed and can be used during the subsequent problem formulation to accurately identify site conditions. While the completed checklists do not need to be included in the risk assessment report(s), care must be take to ensure that the checklists are properly completed (unbiased and accurately report site conditions).

2. What type of information should be presented in the environmental setting section of ecological risk assessments?

The environmental setting sections of both Screening Level Ecological Risk Assessments (SLERA) and Baseline Ecological Risk Assessments (BERA) should focus on providing detailed habitat descriptions which include:

- identification of dominant vegetation;
- identification of potential receptors based on field observations (time, date, conditions should be noted) and literature identifications based on locale and habitat type (the inclusion of checklists are appropriate);
- topography;
- descriptions of habitats adjacent to the site along contaminant migration pathways (especially important when evaluating aquatic systems); and,
- apparent function of observed habitats
  - on-site
  - adjacent
  - along migration pathways.

While not required, BTAG encourages the inclusion of photographs of habitats and key topographic features as part of the ecological risk assessment report.

3. What should be presented in the Site Conceptual Model (SCM)?

The information that should be presented in the SCM is detailed in ERAGS. It is critical to note that the SCM must not be limited to an exposure pathway / fate-and-transport diagram. Detailed supporting discussion should be included in the risk assessment.

4. When should the ecological risk assessor start the process of trying to establish whether or not endangered species may be present at a site?

Letters to the cognizant natural resource agencies requesting the identification of endangered and threatened species should be prepared and submitted at key phases of a remedial project. These include the initiation of the ecological risk assessment, during the work plan development phase, prior to the submission of the risk assessment reports (SLERA and BERA), and during the preparation of the proposed plan. The resultant responses from the natural resource agencies should be included as appendix to SERA and / or BERA. In the event that the potential occurrence of an endangered or threatened species has been identified, both the BTAG and the RPM should be notified immediately.

5. Does a wetland delineation need to be conducted as part of the ecological characterization of the site?

No. However, if wetlands are suspected to be present onsite Section 404 of the Clean Water Act may be an ARAR and delineation of the wetland is likely to be necessary to properly complete a Feasibility Study and any subsequent Remedial Design and Remedial Action activities. A delineation should be performed at the RI/FS stage whenever the response action may adversely impact the wetlands.

6. Does a functional assessment of any identified wetlands need to be performed as part of the ecological characterization of the site?

No, however a wetland functional assessment may be necessary prior to proposing and evaluating mitigation measures for wetlands impacts. The wetland functional assessment can provide important data to evaluate the potential ecological effects of a response action on potentially impacted wetlands. This data may be factored into the ecological risk assessment.

7. Can a Screening Ecological Risk Assessment be completed utilizing pre-remedial data?

Yes. Depending on the available data set (quality, locations of sample stations, analytical parameters, etc.) it is recommended that the SERA be completed utilizing this data in order that the Baseline Ecological Risk Assessment Work Plan can be incorporated into the RI/FS Work Plan. At a minimum, the SERA must be completed as expeditiously as possible in order that the findings of the subsequent BERA, if required, can be incorporated into the RI Report.

8. When discussing contaminants known or suspected to exist at a site, should the discussion be limited to available analytical data?

No, discussions of contaminants known or suspected to exist at a site should also include a description of the site history and the activities that are known or suspected to have occurred. This information is often useful in identifying contamination that may be attributable to the site or provide data key to assessing fate and transport mechanisms.

9. Should the Screening-Level Ecological Risk Assessment be incorporated into the Remedial Investigation Report?

The SERA should be completed well in advance of the RI Report. The Baseline ERA should be incorporated into, or submitted concurrently with the RI Report. The results of the complete ERA process are necessary to ensure that the FS presents alternatives that are protective of the environment.

10. During a SERA problem formulation, what type of fate and transport information should be considered and ultimately presented in the SERA report?

At a minimum, all contaminant migration pathways should be identified. Where the contaminants are physically located and where they are suspected or likely to be transported or move to should be evaluated. For the SERA the highest contaminant concentrations measured on site should be documented for each medium. Probable degradation mechanisms (eg., UV degradation) should be identified and discussed.

11. Why should the fate and transport information be considered so early in the screening process?

While there are many uses of the fate and transport information throughout both the ERA and RI process, some of the primary reasons for the evaluation of this data at the screening level are to assess the effectiveness of the sampling locations utilized up to that point, to identify daughter or breakdown products that might not normally be considered, and to identify data gaps that need to be addressed to evaluate potential exposure pathways. It should be noted that fate and transport data should be considered even before the onset of the screening process during the work plan development phase.

12. Must a fate and transport analysis be performed for each potential contaminant of concern?

No. For the SERA report, it may be appropriate to limit the information presented to the chemical family or class level (e.g., inorganics, volatile organics, etc.). Utilizing data available that characterizes historical disposal practices and waste sources, key site specific chemicals can and should also be discussed.

13. How should groundwater be evaluated in the SLERA?

If there is a known or suspected groundwater to surface water interface, the maximum groundwater contaminant concentrations should be compared to ecological freshwater screening values. Dilution factors or mixing zones should not be applied.

14. Is food chain analysis required for bioaccumulative compounds in the SLERA?

Yes, food chain analysis should be conducted for any detected bioaccumulative compound. Analytes with Eco-SSL values for higher order ecological receptors are exceptions.

15. Can frequency of detection and or spatial extent of contamination be used to eliminate Contaminates of Concern in the SLERA?

No, it is inappropriate to delete COCs in the SLERA based on frequency of detection, magnitude of exceedance, spatial extent, only one sample detected above screening levels, average concentrations less than screening values, and sample concentrations less than background. All of these data observations can be taken into consideration during the risk management decision making process.

16. When is ecological quality considered in the ERA process?

The goal of the SLERA is determine whether or not there is risk to ecological receptors. The site description should describe the environment, the observed plants and wildlife and the potential ecological receptors. It is appropriate to identify whether the area is protected or considered critical habitat. It is not appropriate to compare a site to a protected or critical area such as a wildlife refuge and conclude that the area does not have significant ecological quality. After the risk determination has been made, observations concerning the quality of the environment may be considered in the risk management decision.

Screening Benchmarks

1. Is there a "standard set" of screening values used in Region 3?

Yes. The "Region 3 BTAG Screening Benchmark" tables provide media-specific sets of ecotoxicological benchmarks that should be used in developing a screening level assessment. These guidelines are to be used to screen exposure through routes other than food chain exposure. The 1995 Region 3 BTAG table is currently being updated and revised benchmarks for freshwater and freshwater sediments are now available. Additional media-specific tables will be posted on this website as they become available. Until the updated tables are available, the values found in the 1995 Region 3 BTAG Table should be utilized. Where appropriate, updated values that may be available in subsequent releases of the EPA Ecological Soil Screening Levels, and the NOAA SQuiRT values should be used in place of the values cited in the 1995 Region 3 BTAG table.

2. The "Region 3 BTAG Screening Benchmarks" tables do not provide a value for a compound at my site. Can I develop an alternate value?

In general, when a BTAG value is not available, we recommend carrying a compound through the screening level assessment and providing justification for dropping or retaining the compound for further evaluation in the ecotoxicological and fate and transport discussions that will be provided in the baseline problem formulation.

As approved by BTAG, alternate values may be considered if they are from one of the following sources and the source of the value is clearly cited:

1. EPA's Ecological Soil Screening Levels
2. EPA EcoTox Thresholds;
3. NOAA SQuiRT values (current values may also be used to update the historical ER-L values previously used as a BTAG value);
4. CCME (Canadian Council of Ministers of the Environment) Canadian Environmental Quality Guidelines; and,
5. Oak Ridge National Laboratory Screening Benchmarks (appropriate safety factors must be applied to values not based on "no effects" data).

The revised Region 3 BTAG Screening Benchmarks for Freshwater and Freshwater Sediment were based on the most recent ecotoxicological data available at the time of their compilation. These values will be routinely reviewed and revised. The absence of a value in the tables indicates that toxicity data were lacking or existing values were not suitable. Therefore, alternate screening values will not be considered for chemicals detected in these media when a BTAG value is not provided. These compounds should be appropriately identified and addressed in the baseline problem formulation.

Alternate values from other sources will be considered when the following criteria have been met:

1. a written justification supporting the use of the value is provided and approved by BTAG prior to the development and submission of the Screening Level Ecological Risk Assessment;
2. the value is based on a NOAEL;
3. citations for the studies that were evaluated during the development process are provided; and,
4. copies of the key references (e.g., journal article, unpublished research, etc.) supporting the use of the value are provided.

3. What values do I use to screen / evaluate exposure via food chain exposure? Does Region 3 have screening values that address this route of exposure?

The Region 3 BTAG has not developed food chain exposure screening values. NOAEL-based values must be obtained from the literature for the receptor species (or its surrogate) selected for evaluation in the screening level assessment. When applicable and available, EPA's Ecological Soil Screening Levels for food chain exposure should be utilized. Adequate documentation for the use and applicability of each value must be provided. The risk assessor should consult with BTAG prior to initiating the development of these values and discuss the format for the presentation of the data that is to be evaluated and considered.

4. Which compounds should be considered in the food chain exposure evaluation?

All bioaccumulative compounds need to be assessed in the food chain exposure evaluation. The list of compounds that the Region III BTAG considers to be bioaccumulative is on Table 4-2 in *Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs*, EPA-823-R-00-001, February 2000. If a compound found on your site is on this list, it must be considered in the food chain evaluation.

The need to include other compounds should be evaluated using the site conceptual model to identify complete exposure pathways to higher trophic level receptors. For compounds expected to be present in prey, toxicity data should be reviewed to determine if higher trophic level species are sensitive to these compounds.

Analytical Considerations

1. For the ecological risk assessment, how do I determine what chemical contaminants must be included in the analyses of site samples?

In general, during the planning for the initial problem phase (i.e., data collection) the full suite of TAL/TCL compounds should be strongly considered. The analytical suite may be tailored to site-specific conditions (i.e., historical data and/or knowledge), however the revised suite must include, at a minimum, all site-specific COPCs and their daughter products. If less than a full scan is proposed and warranted, field screening techniques should be utilized to verify that there are no "surprises."

2. Can the ecological risk assessment focus on only the contaminants known to be handled onsite?

The screening steps of the risk assessment (Steps 1 and 2) must evaluate all of the available analytical data (i.e., the entire suite of compounds for which analyses were performed).

3. How do I evaluate duplicate samples with different results?

The greater or more conservative result should be used. If you have duplicate samples with one sample yielding a "detect" but the second sample yielding a "non-detect" and the detected value is lower than the non-detect, the detected value will be used in the screening ERA.

4. How do I evaluate "Non-Detects"?

In cases where the detection limits were higher than the screening values, ½ of the detection limit should be used in determining the number of samples exceeding the screening values and completing the comparison with the benchmarks. If the detection limits were lower than the benchmark, it can be assumed that chemical was not present in the sample at levels which are of concern.

5. How do I determine what analytical detection limits should be used for data that is going to be used for an SERA?

In general, the detection limits should be lower than the screening level benchmarks. However, the selection of analytical methods and the resultant detection limits is site specific and is usually negotiated during the work plan development phase of a project. Regardless of the method and limits selected, or the detection limits actually achieved, chemicals of potential concern whose detection limit is greater than the corresponding screening value must be carried through into Step 3 of the ERA process

6. What parameters are required for surface water and sediment investigations?

The following field parameters are required for surface water investigations – temperature, dissolved oxygen, Eh, pH, specific conductance, and, for estuarine and marine systems, salinity. The following laboratory parameters are required for surface water investigations – total suspended solids, alkalinity, and hardness. Biological oxygen demand, chemical oxygen demand, total dissolved solids, and total organic carbon are optional. The following field parameters are required for sediment investigations – temperature, Eh, pH, specific conductance and color. Total organic carbon, grain size analysis, % moisture, and % solids are required laboratory parameters.

Background Considerations

1. Can I screen out potential contaminants of concern at the screening level based on background concentrations?

EPA Region 3 BTAG regards comparison with background as a risk management function and not part of the risk assessment process. During the screening ecological risk assessment background data are not be used to eliminate areas from further risk assessment. Screening is a risk-based process and should not consider background or other policy-laden issues at this point.

2. Can I evaluate background concentrations as part of the uncertainty analysis?

In general, only evaluations of site specific background concentrations are appropriate. The comparison of a benchmark or site concentration with U.S. background soil concentrations as a potential uncertainty is not appropriate. Regional background data may be appropriate for consideration if it is geographically limited to an area with similar soil, geology, and atmospheric deposition patterns as the site. Data from the eastern half of the country does not constitute regional data, nor does data from the northeastern US or state-specific data. For example, statewide background values for Pennsylvania encompass samples from glaciated and non-glaciated zones, as well as different meteorological conditions that would affect atmospheric fallout of contaminants.

It should be noted that naturally occurring and anthropogenic background sources are not to be differentiated; they are to be treated equally. When reliable site and contaminant-specific data are available, chemicals that are clearly not site related, but due to natural or anthropogenic background sources, may be identified in the uncertainty section of the baseline risk assessment (BERA) and identified for possible elimination as chemicals of concern (COC) during the risk management process.

3. How do I handle contaminants that are present at background concentrations?

Where there are elevated concentrations of chemicals of potential concern due to background that may present an unacceptable risk to the environment, the risk from these chemicals should be quantified, if possible, in the risk assessment. Although these chemicals may not be called "COCs" in the risk assessment or the ROD, they none the less, should be evaluated. Even though EPA or the

responsible party will not address these risks in the remedy selection process, Superfund believes that it has a responsibility to share this information with local and state authorities in the hope that they can take some action to reduce the risk from high background concentrations. EPA acknowledges that this approach can present issues in community involvement and encourages early community involvement and increased emphasis on risk communication.

Composite Sampling within Ecological Assessments

1. What is composite sampling?

Composite sampling is a technique whereby multiple temporally or spatially discrete, media or tissue samples are combined, thoroughly homogenized, and treated as a single sample.

2. Where, When, and Why is composite sampling used?

Composite sampling can improve spatial or temporal coverage of an area without increasing sample number. As the resulting information on contaminant extremes and variability is substantially reduced compared to discrete sampling, the appropriateness of composite sampling is dependent upon the sampling objectives and the site characteristics. Project managers and risk assessors should consult with the BTAG, a statistician, and possibly other technical specialists when developing a sampling plan that includes composite sampling for the following purposes:

- to obtain data for ecological risk assessments,
- to determine the extent of receptor exposure,
- to develop ecological PRGs,
- to determine the areal extent to which an ecological PRG will be applied, or
- to demonstrate compliance with ecological remedial objectives.

Composites are appropriate for inorganic contaminants and persistent, nonvolatile organic compounds such as PCBs (EPA 1991) in all media and biota under the following conditions (Carson 2001, Correll 2001):

- the distribution of contaminants is expected or known to be random,
- the variability is expected or known to be low, and
- laboratory costs are substantially greater than field sampling costs.

The need for subsequent sampling (i.e., composite exceeding adjusted benchmark - see #5 below) is minimized if:

- the frequency of exceeding a benchmark value is expected or known to be low, and
- the background level is substantially lower than the benchmark.

Specific circumstances and objectives may also warrant composite sampling:

- if composite samples are representative of expected exposure of receptors in a defined area or time period, or
- if individual organisms or target tissues are small and compositing is necessary to achieve analytical mass for one or more contaminants or to satisfy QA/QC objectives.

3. How is composite sampling applied spatially? How is it applied temporally?

Compositing can be performed on spatially distinct component samples if they have equivalent exposure potential. Thus, horizontal compositing should be limited to a particular medium or habitat type over which exposure is expected to be uniform. For example, sediment samples should not be composited across an entire bay if the receptor spends most of its time in shallow areas along the periphery. Likewise, vertical compositing is limited to layers in which exposure potential is uniform. For example, sediment dwelling receptors spend disproportionate amounts of time in the surface sediment layers. Thus, composite sampling should combine discrete samples from within, but not between 0-6, 6-12, and 12-24 inch sediment layers.

Temporal composite sampling can be valuable in assessing average exposure in media if contaminant discharges are expected or known to be randomly distributed (i.e., surface water in a tidal river, air downwind from a discharge point). For example, when substantial time or flow related concentration changes are expected, compositing would likely not be acceptable.

The sampling program must be designed to appropriately account for both spatial and temporal variation in contaminant concentrations and receptor habitat use. Weighted averaging of the composite sample concentrations can then be used to account for known differential spatial or temporal habitat use in deriving an overall exposure point concentration.

4. What is an acceptable composite sample?

Composite sampling must be designed to ensure that it fulfills the specific sampling objective, site characteristics, and statistical assumptions. For example, the design to derive exposure point concentrations for an ecological receptor may be substantially different from that to determine the success of a soil removal action in the same area. The number of discrete samples forming the composite must consider the expected ability to detect exceedances of the benchmark (see Carson 2001), while minimizing the error rates (see Correll 2001). The composite must be limited to discrete samples from areas where contaminants are expected to be randomly distributed and variability is

expected to be low. Areas with known or expected biased distribution of contaminants (e.g., waste trenches, discharge pipes) must be sampled separately with either discrete samples or composite sampling restricted to within the biased area. Habitat type and receptor home range would still dictate whether and how data from unbiased and biased area should be combined to estimate exposure concentrations.

5. What are adjusted benchmarks, how are they derived, and how are they applied?

With discrete sampling, data are compared to the benchmark appropriate for the particular objective (e.g., soil samples are compared to earthworm toxicity reference value). When discrete samples are composited, concentrations of chemicals within individual samples that exceed the benchmark may be masked within the composite. Therefore, the benchmark is adjusted to indicate if chemical concentrations within any of the individual samples are likely to exceed the benchmark. To perform effectively, the adjusted benchmark must balance both the false positive and false negative error rates to fulfill the specific objective. Statisticians have derived different approaches of varying degrees of statistical complexity for adjusting the benchmark (Boswell et al. 1996, Carson 2001, Correll 2001, US EPA 1991, 1992) and for selecting discrete samples for separate analysis when composites exceed adjusted benchmarks (Patil and Taillie 2001). Each approach has assumptions that markedly influence the adjustment parameters and should be considered in light of the objective. To ensure that the assumptions and methodology are compatible with the sampling objective, consultation with a statistician is advised.

6. What are the benefits of composite sampling?

Composite sampling can improve spatial or temporal coverage of an area without increasing sample number.

Depending on the scale of sampling and objectives, composite sampling can provide more information about average contaminant concentration over space or time.

With an appropriately adjusted contaminant benchmark, composite sampling can increase the ability to detect hot spots by increasing the number of locations sampled.

Composite sampling can provide more representative estimates of mean concentrations than could be achieved by the same number of discrete samples.

Composite sampling may provide more accurate exposure point concentrations for certain receptors in certain habitats.

For the same size area, composite sampling can reduce sampling cost.

7. What are the limitations of composite sampling?

Preliminary discrete samples and/or site history details are necessary to demonstrate that the media meets the requirements and to derive adjusted benchmarks.

The resulting information on contaminant extremes and variability in the media or biota is reduced upon compositing.

Composites may mask hot spots if benchmarks are not adjusted to account for the number of component samples per composite and the known/expected variability. For example, to achieve 91% detection probability of hot spots of 3 ppb with a discrete sample criterion of 1 ppb, the adjusted benchmark for 4 discrete samples per composite is 1.05 ppb, while for 8 discrete samples it is 0.8 ppb. Using an adjusted benchmark of 1.05 ppb with 8 discrete samples per composite would lower the detection probability to 64%.

Some of the statistical approaches to deriving the appropriate number of components and adjusted benchmarks are complex and time consuming.

Valid methods for adjusting the benchmarks are limited to single contaminant evaluations. Therefore, addressing mixtures will require multiple adjustments and selection of the most appropriate surrogate contaminant.

Composite sampling can reduce the utility of the data for multiple purposes. Physical averaging of the media to form composites prevents the recombination that is possible with mathematical averaging of different sets of discrete data. For example, composite sampling designed to derive exposure point concentrations for a receptor may not provide sufficient detail for delineating the extent of unacceptable contamination within that receptor's habitat that is necessary to determine the volume of material to be remediated.

8. How can we define ecological exposure points (using composite samplings)?

Composite samples must be designed to be representative of an area. Once a sample is taken that meets the sampling design requirements it can be treated the same, with respect to exposure point concentration, as the mean of discrete samples from an area. It is possible that a series of composite samples over a small area or in a short time frame would yield a more defined exposure point concentration than fewer discrete samples over a larger area or greater time frame. The resulting ecological exposure point could be compared to a benchmark for chronic exposure. Composite samples provide less information on maximum exposure concentrations, and therefore, they are not appropriate for situations where maximum exposure is used (e.g., assessing potential acute exposures, initial screening of COPCs).

9. How does the receptor being protected affect the use of composite sampling?

Provided that the sampling plan has been based upon the sampling site characteristics and the potentially exposed receptors, analysis of composite samples can result in better estimates of receptor exposure. Consideration must be given to the relationship between compositing and the receptor's spatial or temporal use of the habitat. If the receptor has equal exposure over an area, then broad composites that cover the area in a representative way might be an appropriate and low cost approach to estimate exposure. Compositing that is suitable for one receptor may be totally inappropriate for another. If receptors with widely different home ranges are being assessed in the same area, then the compositing scheme must be designed to accommodate the receptor with the smallest home range. For example, compositing of sediment samples throughout a marsh would be appropriate to estimate exposure for mobile benthic fish, while compositing for frog tadpoles should be limited to sediment in shallow areas along the margins of the marsh.

Bibliography

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- Carson, J.H. Jr. 2001. Analysis of composite sampling data using the principle of maximum entropy. Environmental and Ecological Statistics. 8:201-211.
- Correll, R.L. 2001. The use of composite sampling in contaminated sites - a case study. Environmental and Ecological Statistics. 8:185-200.
- Patil, G.P. and C. Tailie. 2001. Use of best linear unbiased prediction for hot spot identification in two-way compositing. Environmental and Ecological Statistics. 8:163-169.
- US EPA. 1991. Removal Program Representative Sampling Guidance, Volume 1: Soil. OSWER Directive 9360.4-10.
- US EPA. 1992. Preparation of Soil Sampling Protocols: Sampling Techniques and Strategies. ORD, EPA 600/R-92/128.

Ecological Considerations in Removal Actions

1. Do ecological considerations need to be made when planning removal actions?

Yes. Any action taken at a site that is to be protective of human health and the environment must consider the reduction of risk to ecological receptors and the impact of the removal action itself on ecological receptors.

2. Do the residual contaminant levels present after the removal action need to be at concentrations that are not expected to pose an unacceptable risk to ecological receptors?

No. However, the presence of residual contamination at levels that may pose a risk to ecological receptors will necessitate further evaluation. Typically this evaluation will be conducted as part of either a site inspection or a remedial investigation.

3. Why should ecological considerations be made during removal actions?

There are several practical reasons why ecological considerations must be made during removal actions:

- Consideration of removal levels that are protective of ecological receptors may significantly reduce or eliminate the need for further actions or significantly limit the scope of required ecological risk assessments;
- Will help to ensure that any negative impacts caused by the removal action (both the short-term and long-term impacts) do not

outweigh the ecological risks / impacts mitigated by the proposed action;
- May enable the interim action to be considered final;
- Will help to ensure that site stabilization activities are designed to mitigate the ecological impact of the action itself to the greatest degree possible; and,
- Will help to ensure that ecologically-related statutory requirements are met.

4. When might it be appropriate to consider a removal action to address ecological risk?

Removal actions to address ecological risk should be considered when there is an imminent and substantial threat posed to ecological receptors. It may also be appropriate to consider removal actions when:

- the extent of contamination is limited and has been adequately established, contaminant levels can be reasonably expected to pose a risk, and additional studies (remedial investigation, risk assessments, etc.) are highly unlikely to change the findings of the initial removal assessment;
- The costs of ecologically-protective removal actions are less than further site-specific assessments and can be completed in a significantly shorter timeframe.

5. Does an action adequately reduce ecological risk if all visible waste is removed?

Not necessarily. Even in cases where all contamination is believed to be visually evident, such as in the case of lead shot or blast grit sites, contaminants may have migrated or leached from the source in concentrations sufficient to pose an ecological risk.

6. How are ecologically-based clean-up levels established for removal actions?

Ideally, the results of site-specific toxicity testing or bioaccumulation studies should be used to develop appropriate clean-up levels. If an ecological risk assessment has been performed for the site, the results of that assessment should be used in developing the clean-up levels. In lieu of appropriate site-specific levels, literature-based ecotoxicological values protective of the most sensitive species that can be reasonably expected to occur on site can be used. Values no greater than a lowest observed adverse effects level (LOAEL) should be considered when establishing an appropriate clean-up range. In certain situations the use of background concentrations may be appropriate.

7. Can background concentrations be used as target clean-up levels?

In cases where it has been documented that contaminants are present at levels that are posing a risk to ecological receptors, site-specific background concentrations may be used as target clean-up levels.

8. How do I know that a proposed removal action is protective of ecological receptors?

A proposed removal action can be expected to be protective of ecological receptors when the action decreases contaminant concentrations to levels that are expected to reduce risk to acceptable levels for the most sensitive ecological receptors anticipated to occur at the site and / or all exposure pathways have been broken.

9. Is reducing the bioavailability of the contaminants sufficient to be protective?

Reducing the bioavailability of contaminants can be considered protective, as long as it can be demonstrated that the residual contaminant levels do not pose a risk. In cases where actions are planned to achieve their effectiveness through reduction of contaminant bioavailability, a monitoring program must be established to demonstrate the effectiveness of the action.

10. Are post-removal investigations necessary to determine if the removal was protective?

If the action(s) were planned integrating ecologically-based clean-up levels and it can be demonstrated that the action achieved those levels, post-removal investigations are not likely to be necessary. If waste is left in place, a monitoring program is typically necessary. In cases where the action(s) have been performed to stabilize a site, but the resultant conditions were not planned to address all risk issues, a site investigation may be necessary to recharacterize the site.

Ecological Receptors

1. Do I need to assess the potential impact that a site may have on amphibians?

Amphibians can and should be included as receptors in the screening level risk assessment as appropriate (based on the potential presence of habitat necessary to support these receptors). The assessment should consider AWQCs and any appropriate contaminant specific benchmark available in the literature. Even if risk is indicated during the screening level assessment, evaluation of potential impacts to amphibians will only be carried through to the baseline assessment if "appropriate" amphibian habitat is present or threatened or endangered species (T&E species) are expected. "Appropriate" habitat can be described as habitat that provides essential components (i.e., water regime, soil type, structure, etc.) necessary for the survival of the endpoint species with no comparable habitats in the immediate area; access to the habitat should also be considered. In many cases, temporary pools, puddles, ephemeral ponds are all that is needed for amphibian reproduction and should be considered as high quality. Amphibian habitat completely surrounded by impervious materials or industrial facilities are generally not to be considered further.

2. Do I need to assess the potential impact that a site may have on reptiles?

As a general rule in Region 3, impacts to reptiles do not have to be considered as an assessment endpoint in the screening level ERA. However, the screening ERA would need to state that impacts to reptiles are being assessed qualitatively through the use of surrogate receptors. An exception to this rule is when a T&E reptile has been identified as a potential receptor on the site. In this situation, it may be appropriate to consider impact on reptiles when identifying assessment endpoints.

Endangered & Threatened Species

1. What documentation is required for endangered and threatened species?

The potential for endangered or threatened species to be present within a project area must be established by the U.S. Fish & Wildlife Service or the appropriate state agency in the form of a letter. A letter should be requested from the appropriate contact(s) listed below and this documentation should be included with the Screening Level Ecological Risk Assessment.

Delaware

Karen Bennett
Delaware Natural Heritage Program
Nongame and Endangered Species Program
Delaware Division of Fish & Wildlife
Department of Natural Resources and Environmental Control
4876 Hay Point Landing Rd
Smyrna, DE 19977
302-653-2883 X101

Maryland

Lori Byrne, Wildlife Biologist
Maryland Wildlife and Heritage Service
Department of Natural Resources
Tawes State Office Building, E-1
580 Taylor Ave
Annapolis, MD 21401
410-260-8573

The federal contact for Delaware and Maryland is:

Mary Ratnaswamy
U.S. Fish and Wildlife Service
177 Admiral Cochrane Drive
Annapolis, MD 21401
410-573-4541

Pennsylvania

Fish, Amphibians, and Reptiles:

Chris Urban
PA Fish and Boat Commission
459 Robinson Lane
Bellefonte, PA 16823

Birds and Mammals:

James R. Leigey
PA Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9797

Plants:

Justin Newell
PA Department of Conservation and Natural Resources
Bureau of Forestry
6th Floor Rachel Carson State Office Building
PO Box 8552
Harrisburg, PA 17105-8552

The federal contact for Pennsylvania is:

David Densmore
USFWS - PAFO
312 South Allen Street
Suite 322
State College, PA 16801

Virginia

Non-insect Animals:

Mr. Andy Zadnick
Virginia Department of Game and Inland Fisheries
Environmental Services Section
P.O. Box 11104

Richmond, VA 23230
Phone: (804) 367-2733

Plants and Insects:

Ms. René Hypes
Virginia Department of Conservation and Recreation
Division of Natural Heritage
217 Governor St. 2nd Floor
Richmond, VA 23219
Phone: (804) 371-2708

The federal contact for Virginia is:

Eric Davis
U.S. Fish and Wildlife Service
6669 Short Lane
Gloucester, VA 23061
(804) 693-6694 X104

West Virginia

Barbara Sargent
WVDNR - Wildlife Diversity Program
PO Box 67
Ward Road
Elkins, WV 26241
Phone: 304/637-0545
FAX: 304/637-0250
http://www.wvdnr.gov EXIT Disclaimer

The federal contact for West Virginia is:

Tom Chapman
USFWS - WVFO
694 Beverly Pike
Elkins, WV 26241

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2. Does the information documenting the absence of endangered or threatened species have to be updated?

The potential for endangered or threatened species to be present within a project area should be established or confirmed at key phases of the project. At a minimum, it is recommended that this occur when the RI/FS work plan is prepared, prior to completion of the FS or preparation of the proposed plan (if more than two years has elapsed), during remedial design, and at each Five Year Review.

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Media Considerations

1. How should I evaluate subsurface soils?

Subsurface soils should be evaluated in the risk assessment unless it can be demonstrated that there is no contamination, no prey, or no receptors at this depth. In any event, the subsurface soil media should be discussed in the uncertainty section of the ecological risk assessment. For sites where the sampling has already been completed there may be no need to collect additional data. The available subsurface soil data, if any, can be handled either quantitatively or qualitatively as appropriate (e.g., two to six foot composite samples may only need to be evaluated qualitatively). A Region 3 BTAG representative should be consulted on a site specific basis in these situations.

2. Do I need to evaluate subsurface sediments in the ecological risk assessment?

The depth interval of sediment that must be evaluated in the ecological risk assessment is dependent on the site-specific conceptual model. However, during the initial phases of sampling and risk assessment, depths of sediment samples can generally be restricted to the 0 - 6" interval. Deeper sediments will be assessed in the nature and extent of contamination phase as either excavation or storm events could expose sediments with concentrations of contaminants that would adversely effect ecological receptors. The evaluation of potential impacts of contaminated groundwater discharge to sediment / surface water should be addressed on a site-specific basis.

3. When do I consider my receiving waters freshwater and when do I consider them saltwater?

Salinity must be determined at the time of sampling. Receiving waters with salinity values less than 1 part per thousand (ppt) should be considered freshwater and evaluated using freshwater criteria or benchmarks. Those with salinity values between 1 ppt and 10 ppt should be considered brackish and evaluated using the more conservative of the freshwater and marine benchmarks. Receiving waters with salinity values equal to or greater than 10 ppt are considered marine and should be evaluated using marine criteria.

Miscellaneous

1. At what point is a waterbody considered too saline to be used as a drinking water source for wildlife?

As a rule of thumb, any waterbody with a salinity of less than 1.5% should be considered as a potential drinking water source. Wildlife tend to utilize water with lower salinity levels and experience no adverse effects with salinity levels of 0 to 0.5%. Wildlife will tolerate salinity levels of 0.5 to 1.5% if no other sources are available; while dependent on a number of variables, adverse effects can be expected at salinity levels over 1.5%.

2. When is ecological quality considered in the ERA process?

The goal of the SLERA is determine whether or not there is risk to ecological receptors. The site description should describe the environment, the observed plants and wildlife and the potential ecological receptors. It is appropriate to identify whether the area is protected or considered critical habitat. It is not appropriate to compare a site to a protected or critical area such as a wildlife refuge and conclude that the area does not have significant ecological quality. After the risk determination has been made, observations concerning the quality of the environment may be considered in the risk management decision.

3. What is the role of NEBA in the ecological risk assessment process?

If a NEBA is to take place at a site, resources can be leveraged to collect pertinent data for the ERA and NEBA at the same time. The NEBA can proceed on a course parallel to the RI/FS process.

4. Are PRGs dervied from LOAEL toxicity values acceptable?

No, PRGs derived from LOAELs are not protective enough of their target ecological receptors because they are derived using toxicity values at which effects can be expected. PRGs derived from NOAELs are acceptable. PRGs derived from the Maximum Acceptable Toxicant Concentration (the geometric mean of the NOAEL and LOAEL) are also acceptable.