ES/ER/TM-153

Guide for Performing Screening Ecological Risk Assessments at DOE Facilities

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PREFACE

This technical memorandum was prepared to present guidance for performing screening ecological risk assessments, which are a major component of the Remedial Investigation process. This work was performed under Work Breakdown Structure 1.4.12.2.3.04.07.02 (Activity Data Sheet 8304). Publication of this document meets an Environmental Restoration Risk Assessment Program milestone for FY 95. Use of this guidance document will standardize the methodology used in preparing screening ecological risk assessments and will narrow the scope of subsequent assessment activities by focusing on those aspects of the hazard that constitute credible potential risks.

CONTENTS

ACRONYMS

BERA	Baseline Ecological Risk Assessment
CLP	Contract Laboratory Program
COPEC	chemical of potential ecological concern
DOE	(United States) Department of Energy
DQOs	Data Quality Objectives
EPA	(United States) Environmental Protection Agency
ERA	Ecological Risk Assessment
ERATL	Ecological Risk Assessment Team Leader
FFA	Federal Facilities Agreement
OU	operable unit
PAHs	polyaromatic hydrocarbons
PCBs	polychlorinated biphenyls
PQLs	Practical Quantification Limits
RI	Remedial Investigation

EXECUTIVE SUMMARY

Screening ecological risk assessments (SERAs) are performed to narrow the scope of subsequent site investigation and assessment activities by focusing on those chemicals and media posing potential risks and those receptors that are potentially at risk. They are performed by beginning with a site description and the full list of chemicals that are suspected to constitute site contaminants and potentially eliminating:

- particular chemicals or classes of chemicals as chemicals of potential ecological concern,
- particular media as sources of contaminant exposure,
- particular ecological receptors as assessment endpoints, or
- ecological risks as a consideration in the Remedial Investigation (RI), when they can be shown to be insignificant.

The primary question to be answered by a SERA is which detected chemicals constitute a potential ecological hazard and which of the undetected chemicals may pose a potential hazard at concentrations below the reported detection limits? This screening is done for each medium by applying one or more of the following criteria:

1. If the concentration is not greater than background concentrations, the chemical may be excluded.
2. If the chemical was not detected and the analytical method is acceptable, the chemical may be excluded.
3. If the wastes deposited at the site are well specified, chemicals that are not constituents of the waste may be excluded.
4. If the presence of chemicals in significant amounts can be excluded based on physical-chemical principles, those chemicals may be excluded.
5. If the chemical concentration is below concentrations that constitute a potential hazard, the chemical may be excluded.

Specific methods for applying these criteria are presented in this guide.

1. INTRODUCTION: PURPOSE OF SCREENING ASSESSMENTS

Screening ecological risk assessments (SERAs) are a critical component of the Remedial Investigation (RI) process, particularly on large sites with diverse wastes like the United States Department of Energy (DOE) reservations. The primary purpose of screening risk assessments is to narrow the scope of subsequent assessment activities by focusing on those aspects of the site that constitute credible potential risks. They are performed by a process of elimination. Beginning with a site description and the full list of chemicals that are suspected to constitute site contaminants one can potentially eliminate:

- particular chemicals or classes of chemicals as chemicals of potential ecological concern (COPECs),

- particular media as sources of contaminant exposure,

- particular ecological receptors as assessment endpoints, or

- ecological risks as a consideration in the RI.

A secondary purpose of screening risk assessments is to identify situations that call for emergency responses. That is, a screening assessment may identify ongoing exposures that are causing severe and clearly unacceptable ecological effects or potential sources of exposure that are likely to cause severe and clearly unacceptable ecological effects in the immediate future. In such cases, the usual RI schedule is bypassed to perform a removal action or other appropriate response. No guidance is provided for such decisions because there is no precedent, and no generally applicable rules are apparent. Ecological emergencies must be identified *ad hoc*.

Finally, screening assessments serve to identify data gaps. Media or classes of chemicals that have not been analyzed, for which analyses are of unacceptably low quality or quantity or for which the spatial or temporal distribution has been inadequately characterized, should be identified during SERAs. This information serves as input to the data quality objectives (DQOs) process for any subsequent phases of the RI or becomes a component of the uncertainty section of the baseline ecological risk assessment (BERA).

Screening assessments are performed at three stages in the RI/Feasibility Study (FS) process. First, when an operable unit (OU) is initially investigated, existing information is collected and a screening assessment is performed to guide the development of the RI work plan. It is used to help focus the work plan on those elements of the OU that require investigation and assessment. Second, in a phased RI, a screening assessment is performed after the preliminary phase to guide the development of the subsequent phase by focusing investigations on remaining uncertainties concerning credible potential risks. Finally, as a preliminary stage to the BERA for the RI, a screening assessment is performed to narrow the focus of the assessment on those contaminants, media, and receptors that require detailed assessment.

The reader should note that screening assessments are final assessments only when they indicate that there are no potential hazards to ecological receptors. Otherwise, they should prompt the Federal Facilities Agreement (FFA) parties to consider the need for additional data. Whether or not additional data are collected, a screening assessment which indicates that a site is potentially hazardous must be followed by a more definitive BERA which provides estimates of the risks and suggests whether remedial actions are needed.

Note that assessment of radionuclides is not specifically discussed in this guide. Although radionuclides have not been found to pose a significant ecological risk in ecological risk assessments (ERAs) performed to date for sites in Oak Ridge, Tennessee; Portsmouth, Ohio; or Paducah, Kentucky, they are not screened out because of the particular concern for radionuclide risks by the regulators. Therefore, the BERA should address ecological risks of all radionuclides included in the baseline human health risk assessment.

This guidance is meant to be as clear and complete as possible. However, the particular circumstances of a site, changes in DOE or regulator policies, or oversights by the author may make this guidance inadequate for a particular assessment. Therefore, before proceeding with an SERA, ecological risk assessors should consult with the Ecological Risk Assessment Team Leader (ERATL) for their OU.

2. METHODS FOR SCREENING ASSESSMENTS

Screening assessments, like all other ERAs must begin with a problem formulation phase that defines the scope of the assessment in terms of a site description, assessment endpoints, and a conceptual model. This step determines what chemicals, media, routes of exposure, and receptors need to be considered. Assessors should begin with the generic conceptual model and endpoints provided in the ERA strategy document for the type of OU under consideration (Suter et al. 1994). The list of chemicals to be screened is assumed to include the United States Environmental Protection Agency’s (EPA's) Target Compound List and Target Analyte List (EPA 1985, 1991). Chemicals known to be associated with the site but not on those lists, particularly radionuclides, should be included as well.

2.1 SCREENING CHEMICALS

At many OUs, concentrations will be reported for more than 100 chemicals, most of which will be reported as undetected at some defined limit of detection. The assessor must decide which of these constitute COPECs. That is, which detected chemicals constitute a potential ecological hazard and which of the undetected chemicals may pose a hazard at concentrations below the reported detection limits. The concern about undetected chemicals results from the possibility that the detection limit may be higher than concentrations that cause toxic effects. This screening is done for each medium by applying one or more of the following criteria:

1. If the chemical was not detected and the analytical method is acceptable, the chemical may be excluded.

2. If the wastes deposited at the site are well specified, chemicals that are not constituents of the waste may be excluded.

3. If the concentration is not greater than background concentrations, the chemical may be excluded.

4. If the presence of chemicals in significant amounts can be excluded based on physical-chemical principles, those chemicals may be excluded.

5. If the chemical concentration is below concentrations that constitute a potential toxicological hazard, the chemical may be excluded.

Specific methods for applying these criteria are presented in the following subsections. The order of presentation is logically arbitrary. That is, the screening methods can be applied in any order, and the order used in any particular assessment can be based on convenience. In addition, it is not necessary to use all of the five screening criteria in the SERA. Some criteria may be inappropriate to a particular medium or OU, and others may not be applicable because of lack of information.

2.1.1 Screening Against Background

Waste sites are not remediated to achieve concentrations below background; therefore, baseline risk assessments do not estimate risks from chemicals that occur at background concentrations. Chemicals that occur at background concentrations may be naturally occurring, may be the result of regional contamination (e.g., atmospheric deposition of ^{137}Cs from weapons testing or mercury from incinerators), or may be local contaminants that have been added in such small amounts that their concentrations have not been raised above the range of background concentrations. Screening against background requires that two issues be addressed. First, what locations constitute background? Second, given a set of measurements of chemical concentrations at background locations, what parameter of that distribution constitutes the upper limit of background concentrations?

2.1.1.1 Selection of background data

Background sites should be devoid of local contamination from DOE wastes or any other local source. For example, water from a location upstream of an OU cannot be considered background if there are outfalls or waste sites upstream of that location. To ensure that there is no local contamination, a careful survey of watersheds for potential background water or sediment sites should be performed, and for terrestrial sites, the history of land use must be determined. For example, although Norris Reservoir is quite clean relative to Watts Bar Reservoir, the occurrence of a chloralkali plant in the Norris Reservoir watershed has eliminated it as a background site for mercury. In theory, if a local source releases a small and well characterized set of contaminants, a location that is contaminated by it could be used as a background site for other chemicals. However, this will nearly always be impractical in practice. Background can be defined at multiple scales. Each scale has its advantages and disadvantages.

National or regional background concentrations may be available from existing sources such as U.S. Geological Survey publications (e.g., Shacklette and Boerngen 1984). National or regional background concentrations are advantageous in that they provide a broader perspective. It is not sensible to remove or treat soils at a site for a metal concentration that is higher than local background but well within the range of concentrations of that metal at uncontaminated sites across the region or nation (LaGoy and Schulz 1993). However, one must be careful when using national or regional background values to ensure that the concentrations were measured in a manner that is comparable to the measurements at the waste site. For example, dissolved-phase aqueous concentrations should not be compared to total concentrations of metals. The EPA has suggested that nationwide background concentrations of metals could be used for comparison to site levels (EPA 1986). However, because use of national or regional background concentrations is less conservative than use of local or OU-specific concentrations, it has not been favored by regulators. It should be used as supporting evidence only.

Local background measurements are generally the most useful. Local backgrounds are those that are applicable to an entire DOE reservation or to a geologically homogeneous portion thereof.

Examples include the background soils data for the Oak Ridge Reservation (ORR) (Watkins et al. 1993) and the background soil and groundwater data for the Portsmouth Gaseous Diffusion Plant in Piketon, Ohio (Geraghty & Miller 1994). (Studies of background chemical concentrations are ongoing at Paducah Gaseous Diffusion Plant in Paducah, Kentucky.) These sources provide high quality data that are agreed to represent background and provide an estimate of the natural variance in background concentrations.

OU-specific background values are those that are collected for an individual OU. Examples include water collected upstream of an OU or soil collected beyond the perimeter of an OU. Water and soil samples are seldom available for the initial screening assessment. Because samples are typically collected in the vicinity of the OU, there may be some danger of undetected contamination. In addition, because OU-specific background measurements are often poorly replicated in space or time, their variance is often poorly specified. However, because the natural variance in background concentrations is lower in the vicinity of an individual OU than across a reservation or region, use of OU-specific background values is more likely to suggest (as compared to background estimates on a larger scale, which are less conservative) that concentrations on the OU are above background.

No regulatory guidance is available for selection of background data for ERAs. The human health portion of *Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual* (EPA 1989) provides guidance for use of site-specific background data which would be applicable to either local or OU-specific background. The background soil studies on the ORR and at Portsmouth are based on this guidance. Therefore, local background values should be used when they are available. Lacking those values, OU-specific background should be used, with care taken to ensure that background variance is specified and that samples from background and contaminated locations are comparable. For example, because aqueous concentrations of naturally occurring chemicals are sensitive to hydrologic conditions, background samples should be taken in conjunction with contaminated samples. Regional and national background values can be used to check the reasonableness of local and OU-specific background values.

2.1.1.2 Quantitative methods for comparison to background

Various methods might be used for comparison of site concentrations to background concentrations. The most recent instruction from EPA Region IV for screening against background is that chemicals should be retained unless the maximum concentration of the chemical on the OU is less than twice the mean background concentration (Akin 1991).

2.1.1.3 Treatment of background in multimedia exposures

Wildlife are exposed to contaminants in food, water, and soil (Sample and Suter 1994). If concentrations of a chemical in all media are at background levels, the chemical can be screened out. However, if concentrations in one or more of the media are above background, the chemical cannot be eliminated from consideration in any of the media with respect to that wildlife endpoint because all sources of the chemical contribute to the total exposure.

2.1.1.4 Chemicals that can be screened against background

Screening concentrations of inorganic chemicals and naturally-occurring radionuclides against background is generally acceptable. However, anthropogenic radionuclides and organic chemicals cannot be eliminated as COPECs by screening against background, even when they are detected at background sites that receive no input other than regional atmospheric deposition. It should be noted that some polycyclic aromatic hydrocarbons (PAHs) were detected in the ORR background soils, and there is no reason to believe that these were due to local contamination (Watkins et al. 1993). PAHs have also been detected in Poplar Creek sediments both upstream of and within the ORR and are believed to be extracted from coal, which is abundant in those sediments because of the extensive coal mining and processing in the watershed. Similarly, ^{137}Cs from nuclear weapons testing is ubiquitous and polychlorinated biphenyls (PCBs) are found in all rivers with any urban or industrial development. Although these observations cannot be used in the screening assessments, they can be used in the RI/FS to qualify conclusions concerning risk and remediation.

2.1.1.5 Instances when a concentration is not comparable to background

If there is reason to believe that a chemical occurs in a form that is more toxic or more bioavailable than at background sites, it may be a COPEC even at concentrations that are within the range of background values. An example from the ORR is the highly acidic and metal-laden leachate from the S-3 ponds which entered Bear Creek. Because metals are more bioavailable in acidic waters, metal concentrations in upper Bear Creek that are within the range of background waters should not be screened out on that basis. Considerations include the major physical/chemical properties of the waste such as pH, hardness, concentrations of chelating agents relative to properties of the ambient media, and the species of the chemical in the waste relative to the common ambient species.

2.1.1.6 Screening biota contamination using background concentrations for abiotic media

It is possible to use background values for abiotic media to screen biota. For example, if all metals in soil are at background concentrations, it can be assumed that plant and earthworm metal concentrations are also at background. Similarly, if concentrations in both water and sediment are at background levels, concentrations in aquatic biota can be assumed to be at background.

2.1.1.7 Screening future exposure concentrations against background

If exposure concentrations may increase in the future, current concentrations should not be used to exclude chemicals from the baseline assessment because future exposure scenarios must also be addressed. If the increased future exposures would result from movement of a contaminated ambient medium such as soil or groundwater, then concentrations measured in those media should be screened against background. For example, if a groundwater plume would intersect the surface in the future, concentrations in the plume should be screened against background. If the increased future exposures would result from changes in a source such as failure of a tank, the contaminant concentrations predicted to occur in ambient media should not be screened against background concentrations. That is because the modeled future concentrations are, by definition, additions to background.

2.1.2 Screening Against Detection Limits

Chemicals that are not detected in any sample of a medium can be screened out if the detection limits are acceptable to the FFA parties. EPA Region IV has indicated that the Contract Laboratory Program's (CLP’s) Practical Quantification Limits (PQLs) can be used for this purpose (EPA Region IV 1994). However, care should be taken when eliminating chemicals that are known to bioaccumulate to concentrations in biota that are higher than in inorganic media. In particular, mercury and persistent lipophilic organic compounds such as PCBs and chlordane may occur in significant amounts in aquatic biota when they cannot be detected in water or even sediment. If there are known sources of these chemicals, they should not be eliminated as COPECs until biota have been analyzed.

2.1.3 Screening Against Waste Constituents

Because of the long history of use on the ORR, at Portsmouth, and at Paducah; the large number of chemicals that have been used and released; the secrecy concerning activities on the sites; and the imperfect record keeping that has characterized waste disposal, it has not been possible to eliminate chemicals as COPECs based solely on the fact that they are not known to have been used or released on the site. Although this is likely to be the case in the future as well, it is conceivable that some well-known source OUs will have well-specified contaminant inventories. In those cases, chemicals that are not waste constituents should be screened out.

2.1.4 Screening Against Physical-Chemical Properties

Chemicals can be excluded as COPECs if their presence in significant amounts in a medium can be excluded by physical-chemical principles. For example, volatile organic compounds (VOCs) were excluded from the RI for Lower Watts Bar Reservoir because any VOCs in ORR emissions would be dissipated by the time the contaminated waters reached the mouth of the Clinch River. Similarly, atmospheric routes of exposure have been eliminated from ERAs at most OUs because significant atmospheric concentrations are implausible given the nature and concentrations of the soil and water contaminants.

2.1.5 Screening Against Ecotoxicological Benchmarks

Chemicals that occur at concentrations that are safe for ecological receptors can be excluded as COPECs. Exposure concentrations that are deemed to be safe are referred to as ecotoxicological screening benchmarks or simply benchmarks. Benchmarks for exposure of aquatic life to chemicals in water are published in Suter and Mabrey (1994); for exposure of benthic organisms to sediments in Hull and Suter (1994); for exposure of plants to soil in Will and Suter (1994a); for exposure of soil invertebrates and microbial communities in Will and Suter (1994b); and for exposure of wildlife to food, water, and soil in Opresko et al. (1994). These benchmark values are updated regularly due to addition of new chemicals, discovery of new data, and receipt of new direction from the regulators. Therefore, before using these benchmarks, ecological risk assessors should check with the ERATL for their OU.

The exposure concentration that is compared to the benchmarks depends on the characteristics of the receptor. In general, a concentration should be used that represents a reasonable maximum exposure given the characteristics of the medium and receptor. The fundamental distinction that must be made is between receptors that average their exposure over space or time and those that have essentially constant exposure.

- Terrestrial wildlife are like humans in that they move across a site potentially consuming soil, vegetation, or animal foods from locations that vary in their degree of contamination. Therefore, mean concentrations are necessary to provide reasonable estimates of exposure levels. For the conservative estimate to be used in the screening assessment, the 95% upper confidence limit (UCL) on the mean is appropriate as in human health assessments (EPA 1989).

- Fish and other aquatic organisms in flowing waters average their exposures over time. Similarly, wildlife average drinking water concentrations over time. Therefore, the 95% UCL is a reasonably conservative estimate of aqueous exposure concentrations. If aqueous concentrations are known to be highly variable in time and if periods of high concentration can be identified that persist for extended periods, the averaging period should correspond to those periods.

- Wildlife that feed on aquatic biota average their exposure across those prey organisms. Therefore, they average concentration over space and time (i.e., over their feeding range and over time as their prey respond to variance in water quality), and the 95% UCL is a reasonably conservative estimate of exposure concentrations.

- Soil and sediment concentrations are relatively constant over time, and plants, invertebrates, and microbes are immobile or nearly immobile. Therefore, there is no averaging of concentrations over space or time. The reasonable maximum exposure for those media and receptors is the maximum observed concentration. That is, some organisms occupy that maximally contaminated soil or sediment or would occupy it if it were not toxic. Therefore, exceedence of ecotoxicological benchmarks at any location implies a potential risk to some receptors.

Screening against wildlife benchmarks requires specification of individual wildlife species. If endpoint species have not been selected for the OU through a DQO process, they should be selected from the potential endpoint species for the ORR listed in ES/ER/TM-33/R1 (Suter et al. 1994) or, for Portsmouth and Paducah, from species lists for those sites. The chosen species should include potentially sensitive representatives of trophic groups and vertebrate classes that are potentially exposed to contaminants on the site.

If no appropriate benchmark exists for a chemical that cannot be screened out by comparison to background, then an effort should be made to find or develop a benchmark for that chemical. The ERATL for the site or the authors of the applicable benchmark document should be consulted in such cases. However, in some cases, no appropriate toxicity data are available for a chemical/receptor combination. In such cases, the chemical cannot be eliminated, and its toxicity cannot be addressed. Such chemicals should be retained in a separate category for purposes of determining the need for media toxicity testing and to prevent the elimination of further consideration for the media in which it occurs.

2.1.6 Exposure Concentrations

The screening methods described here presume that measured chemical concentrations are available to define exposure. This is appropriate for most OUs on the ORR, at Portsmouth, and at Paducah because of the amount of environmental measurement and monitoring that has been performed. Use of measured concentrations implies that concentrations are unlikely to increase in the future. Where concentrations may increase in the future due to movement of a contaminated groundwater plume, failure of waste containment, or other processes, future concentrations must be estimated and used in place of measured concentrations for the future scenarios. For screening assessments, simple models and assumptions such as exposure of aquatic biota to undiluted groundwater are appropriate.

For large OUs, it is appropriate to screen contaminants within areas or stream reaches rather than for the entire OU to avoid diluting out a significant contaminant exposure. The division of an OU into areas or reaches should be done during the development of the conceptual model and should take into consideration differences in contaminant sources and differences in habitat. The maxima and 95% UCLs should then be determined for each reach and area.

Soil and sediment concentrations are typically reported for various depths. Current ecological exposures are to surface materials because most of the mass of roots is in surface soil (although tree roots may extend several meters, most roots are in the A and B horizons), most soil heterotrophic activity is in the surface organic layer, and benthic invertebrates occur on the surface of the sediment or in the thin oxidized surface layer. Screening assessments seldom provide the luxury of choosing an appropriate averaging depth for surface soil or sediment. That is, one must simply use the definition of surface layer implied by the available data. However, when ecological risk assessors have an opportunity for input to sampling and analysis plans, they should help to define the surface sample to coincide with the biologically active layer at the site.

Exposures that involve multiple routes must be modeled. Models and generic parameters for wildlife exposures to contaminants in water, food, and soil are presented in Sample and Suter (1994). If concentrations in food items are not available, they must be estimated using uptake factors from the literature. Models and generic parameters for exposure of aquatic biota and wildlife to radionuclides are provided in Blaylock et al. (1993) and Baker and Soldat (1992).

Some benchmarks are defined in terms of specific forms or species of chemicals. When forms are not specified in the data available for the screening assessment, the most toxic form should be assumed unless there are compelling reasons to believe that other forms predominate. In particular, it has been generally recognized and confirmed on the ORR that the hexavalent form of chromium is converted to trivalent chromium in soils, sediments, and waters; therefore, EPA Region IV has recommended against assuming that chromium 6+ is present in significant amounts on the ORR.

Measurements of chemicals in ambient media often include a mixture of detected concentrations and nondetects with associated detection limits. For screening of soil and sediment, the maximum value can still be derived in such cases. However, 95% UCLs on the mean cannot be derived directly. If time and resources permit, the 95% UCL should be estimated using a maximum likelihood estimator or a product limit estimator. Otherwise, the 95% UCL can be calculated using the detection limits as if they were observed values. If the chemical was not detected in any sample and the analytical techniques did not achieve detection limits that have been agreed to be adequate by the FFA parties (Subsect. 2.1.2), then the reported limit of detection should be screened in place of the maximum or 95% UCL value.

2.2 SCREENING MEDIA

If the screening of chemicals does not reveal any COPECs in a particular medium and if the data set is considered adequate, that medium may be eliminated from further consideration. However, if toxicity has been found in appropriate tests of the medium or if biological surveys suggest that the biotic community inhabiting or using that medium appears to be altered, then the assessors and FFA parties must consider what inadequacies in the existing data are likely to account for the discrepancy and perform appropriate investigations or reanalysis of the data to resolve the discrepancy.

2.3 SCREENING RECEPTORS

If all media to which an endpoint receptor is exposed are eliminated from consideration, then that receptor is eliminated as well. For wildlife that are exposed to contaminants in water, food, and soil, this means that all three media must be eliminated. Aquatic biota can be eliminated if both water and sediment have been eliminated. Plants and soil heterotrophs can be eliminated if soil has been eliminated. Any evidence of significant exposure to contaminants or injury of the receptor would prevent its elimination from the assessment.

2.4 SCREENING SITES

An OU can be eliminated from an ERA if all endpoint receptors for that type of OU have been eliminated. However, it must be noted that even when there are no significant risks due to contaminant exposures on the OU, the ERA must address fluxes of contaminants that may cause ecological risks in other OUs or incidental use of the site by wildlife which may cause risks to wide-ranging wildlife populations (Suter et al. 1994).

2.5 DATA COLLECTION AND EVALUATION

SERAs for the BERA or for preliminary phases of an RI should have data that are appropriately documented and delivered for performing a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) data evaluation.

SERAs for initial site screening typically use all available data. In many cases, it is necessary to use data that are not adequately quality assured or documented to perform a full CERCLA data evaluation. In such cases, the data should be evaluated as far as possible to eliminate multiple reports of the same measurement, unit conversion errors, and other spurious data. Such screening assessments also need to consider the relevance of historical data to current conditions. Issues to consider in deciding whether data are too old to be useful include the following:

- if contamination is due to a persistent and stable source that has been operating since before the date of the historic data, the data are likely to be relevant;

- if the source is not persistent and stable and the chemical is not persistent (e.g., it degrades or volatilizes), then the data are unlikely to be relevant;

- if the ambient medium is unstable or highly variable, then historic data are less likely to be relevant (examples include highly variable aqueous dilution volumes and scouring of sediments); and

- human actions, particularly those taken to stabilize the wastes or partially remediate the site, may make historic data irrelevant.

2.6 DATA ADEQUACY AND UNCERTAINTIES

SERAs performed at the intermediate stages of a phased RI or as the initial step in the BERA for an RI should have adequate data quality and quantity because the data set used should be the result of a proper DQO process. However, the initial SERA performed for the RI work plan is likely to have few data for some media, and the data quality may be questionable. The proper response to questionable data adequacy is to perform the screening assessment with the available data and describe the inadequacies of the data and the resulting uncertainties concerning the results. Highly uncertain screening results for a medium could then constitute evidence for making analyses of some or all of the Target Analyte List and Target Compound List chemicals a part of the DQOs for the next phase of the RI.

3. CONCLUSIONS

This guidance provides a means of narrowing the scope of ERAs to those chemicals, media, receptors, and sites that potentially contribute to a significant risk. This report is consistent with guidance available at the time it was written from the EPA Office of Emergency and Remedial Response, EPA Region IV, and the Tennessee Department of Environment and Conservation. However, regulatory personnel may change their policies without notice, so adherence to this guidance does not guarantee an acceptable SERA. Finally, the reader should bear in mind that all generic guidance should be superseded by good scientific judgment when provisions of the guidance are not applicable to a given situation.

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