

PROTOCOL

CONSTITUENTS OF CONCERN (COC) REFINEMENT PROCESS

Introduction

The contaminant migration technical analyses, human health assessment, the ecological assessment, the Applicable or Relevant and Appropriate Requirements (ARAR) screening, and the source material screening that are used in the remedial investigative reports are performed using a process agreed upon by the three parties to the Federal Facility Agreement (FFA). This process is performed in accordance with the agreed upon protocol and USEPA guidance. These assessments and analyses are used to identify contaminants which may require remedial action due to risk, regulatory, or source control concerns. In some cases, however, remedial action may not be necessary or appropriate for these identified contaminants. Therefore, a secondary selection process would be beneficial to identify the constituents of concern (COCs) which should be carried forward for remedial alternative screening. This selection process should identify those COCs which have a reasonable likelihood of having been or might be released, are consistent with the conceptual site model, and pose an adverse hazard or risk to human health or the environment. COCs that are carried forward following the secondary screening process are designated as refined COCs (RCOCs). This protocol provides the description of the secondary screening or refinement process.

During the preparation of the RFI/RI/BRA document, uncertainty discussions are provided at the end of the nature and extent, contaminant migration, human health risk assessment, and ecological risk assessment chapters. These uncertainty discussions are specific to each chapter, and are necessary to specify the assumptions and uncertainties inherent to the process. Uncertainty discussions provided at the end of these chapters are not used to remove COCs from further evaluation, but instead, are used to identify the key variables and assumptions that contribute most to the respective uncertainty. The selection of RCOCs as described by this protocol is a cumulative evaluation of the uncertainty factors discussed within each relevant chapter.

The recommendation of whether or not a COC should be carried forward for further remedial evaluations must be based on a thorough analysis of each COC. It is unlikely that any one COC will be eliminated based on a single uncertainty category. Instead, all of the applicable uncertainty factors are compared and the cumulative aspects of the factors are used to determine whether a COC should be eliminated from further consideration. It should be noted that the presence of high uncertainty in a category does not in itself lead to non-selection. In fact, the presence of a high degree of

uncertainty regarding concentration or distribution could lead to inclusion as a RCOC. This protocol provides a listing and discussion of a number of uncertainty factors which may be important for determining whether a constituent should or should not be carried forward for further remedial considerations.

1.0 Refinement Process Criteria

- A. The uncertainty analysis will be performed for the following types of COCs: ARAR COCs, Contaminant Migration COCs (CMCOCs), Primary and Secondary Human Health COCs (HHCOCs), Ecological COCs (ECO COCs), and Source Material COCs (Principle Threat Source Material [PTSM] and Low Level Threat Source Material [LLTSM]).
- B. For each individual COC, prepare an interpretive discussion of the applicable uncertainty factors and provide a recommendation to indicate whether the constituent should or should not be carried forward for further remedial evaluation.
- C. For the RCOCs recommended for further remedial evaluations, Remedial Alternative Objectives (RAOs) and Remedial Goal Options (RGOs) will be developed.

1.1 Major Categories of Uncertainty

The following uncertainty categories of information relating to the selection process have been developed for use at the SRS. For each COC, as applicable, individual uncertainty factors are grouped and discussed under four major uncertainty categories to include unit related, data quality, risk assessment, and contaminant migration uncertainties. These major uncertainty categories will be used to provide a complete summary discussion for each COC. Individual uncertainty factors are briefly discussed below:

Unit Related Uncertainty

- Nature and Extent of Contamination
- Consistency with History of Use
- Presence in Background

Data Quality Uncertainty

- Analytical Data Quality
- Physical Characteristics

Risk Assessment Uncertainty

- Toxicity Data
- Radioactive Decay

Contaminant Migration Uncertainty Presence in Groundwater

2.0 Description of Uncertainty Factors

2.1 Nature and Extent of Contamination

Unit-related contamination should be evaluated based on the nature and extent (distribution) of contamination. This analysis should be primarily based on the relative abundance of “detects” in the total number of samples and the presence or lack of discernible patterns of contamination in the impacted media and source. The evaluation should determine if the distribution of the data indicates the constituent is ubiquitous for the unit or from a discernible source. Planar maps and cross-sections of the distribution of analytes may be used to illustrate the results. Statistical analysis may also be used.

2.2 Consistency with History of Use

SRS has compiled a significant amount of historical information on the usage of the site, including past disposal inventory reports. Based on this information, a determination could be made as to whether the history of use is consistent with the concentration and type of contaminant found at the unit.

2.3 Presence in Background

SRS has extensive information based on USEPA and SRS published documents on the concentration of contaminants in the non-unit related media at the SRS and surrounding region. An evaluation should be made as to whether the contaminant is present at a concentration significantly different from unit background and/or SRS background. Alternate graphical and/or statistical methods of comparison may be used to support this evaluation. The USEPA and SCDHEC will be consulted with regard to the use of alternate methods for comparison of background data sets.

2.4 Analytical Data Quality

The Data Summary Report for the unit provides all of the analytical data and the associated analytical qualifiers. In some cases, constituents may have data quality flags (result and analytical qualifiers) indicating the concentration was estimated and providing the nature of the analytical problem. An evaluation must be made whether the data quality is sufficient to serve as the basis for remedial decisions. If there is uncertainty concerning the concentration of a COC, then additional samples should be collected to confirm the concentration. In addition, if the data set is not of sufficient quality to serve as a basis for a remedial decision, then no COCs should be removed and additional data should be collected. A COC may be removed from further remedial evaluation if the data is of excellent quality and there is supporting information that infrequent detections are not due to a source release. After examining the entire data set, a recommendation can be made as to whether the COC should or should not be considered for further remedial evaluation.

2.5 Physical Characteristics

If an analyte seems out of place within a given media, then evaluate the probability that it actually exists using its' physical characteristics. For example, if a radionuclide COC is naturally occurring in the environment and associated daughter products from the same decay series are detected at similar concentrations (secular equilibrium), then this would increase the uncertainty that the parent constituent is unit related. In addition, a short-lived radionuclide detected in soil long after it should have decayed away would also be viewed with uncertainty indicating that the constituent may be a "false positive" detection. Additional characterization may be needed to determine if the constituent is actually present in the environment. In the absence of unit related activities, the physical characteristics of a COC should be considered to determine if the constituent should be considered for further remedial evaluations, or if additional characterization is needed to better manage the uncertainty.

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2.6 Toxicity Data

COCs which were determined based on the use of surrogate or provisional toxicity, or where toxicity reference values for a given constituent are highly variable, should be closely examined. The specific details of the status of the provisional toxicity information and the chemical/physical relationships between the COC and the surrogate should be closely examined before considering the COC for further remedial evaluation.

2.7 Radioactive Decay

Many of the assessments performed in support of the RI/BRA assume that the present day concentration of contaminants will persist through out the period of interest. This is not an accurate assumption for many radionuclide constituents. As part of the uncertainty analysis, radiological analytes should be mathematically decayed over the time period of interest. For example, if 30 years is the period of interest, then the radionuclide should be decayed over that time and the final activity reported. For contaminant migration, the radionuclide should be decayed for the travel time to the aquifer. Radionuclide decay and the decayed activity for the period of interest should be evaluated and used in the determination of whether a COC should be carried forward for further remedial evaluation.

2.8 Presence in Groundwater (contaminant migration consideration only)

This category is used to evaluate whether groundwater sampling results corroborate the contaminant migration modeling predictions. For example, if the model predicts that a contaminant should be present in groundwater 10 years after it was disposed to the soils and the empirical groundwater data indicates it is not present although disposal took place 40 years ago, retaining the COC for further remedial evaluation is viewed with greater uncertainty. The presence or absence of the contaminant in actual groundwater sampling results should be evaluated and used in the determination of whether a COC should be carried forward for further remedial evaluation.