Passaic River RARC Reference and Background Proposal

1. EPA suggests the following language be incorporated into Appendix B of the RARC:

Reference

Reference is defined by the Webster dictionary as "a source of information to which a consulter is referred". Using this basic definition, EPA Region 2 considers all sources of information that are used for comparison purposes in the ecological risk assessment as a reference value. By extension of this, any area or location that is used to derive the reference values would be identified as a reference location.

For the purposes of the Baseline Ecological Risk Assessment, reference value or reference location will be defined as a value or area that is used to compare a measured parameter.

Background

Background is a specific type of reference value. Background is defined in EPA's "Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites" as: "Substances or locations that are not influenced by the release from a site and are usually described as naturally occurring or anthropogenic: (1) Naturally occurring substances are present in the environment in forms that have not been influenced by human activity, (2) Anthropogenic substances are natural and human-made substances present in the environment as a result of human activities (not specifically related to the CERCLA site in questions)." Further, the document describes a background reference area as: "The area where background samples are collected for comparison with samples collected on site. The reference area should have the same physical, chemical, geological, and biological characteristics as the site being investigated, but has not been affected by the activities on the site." Both of these definitions identify background as a concentration of a substance. Therefore, for the purposes of the Baseline Ecological Risk Assessment, background will refer to the concentration of a chemical that is found at a reference location. These concentrations will also be called "background reference concentrations".

Descriptive Terms

Additional adjectives may be used to describe the characteristics of the area from which the data was collected for both reference values/areas or background reference concentrations. These adjectives can include, but are not limited to, freshwater, estuarine, marine, urban, industrial, non-industrial, and rural.

Usage

The preferred use of reference values/areas and background reference concentrations is to compile data from representative locations (i.e., same physical, chemical, geological, and biological characteristics, but not affected by the activities on the site) to develop a range of values that can be used for comparison to the data collected from within the LPRSA. The primary use of the reference values/areas and background reference concentrations will be to aid the risk managers in determining

the appropriate remedial action; they serve as points of comparison to inform the decision making process.

The reference areas selected should be as similar as possible to the site, minus the site-related contamination. For each measured parameter that requires a reference or background value/area, a range of estimates (i.e., low, medium and high) will be developed. The low values will be based upon reference areas that reflect a low-degree of contamination, which may require the use of a reference location that is less similar to the Passaic River, such as a river in southern New Jersey (e.g., Mullica River) or on eastern Long Island (e.g., Mill River, Nissequogue River), while the medium and high values will be based on closer areas (i.e., regional) that have similar characteristics to the Passaic River. Utilizing a range of reference and background values for each measured parameter will provide a robust evaluation for the use in risk management decisions.

The use of reference values/areas and background reference concentrations will be used qualitatively in the Baseline Ecological Risk Assessment for comparison purposes to explain observations in the collected data. The use of reference values/areas and background reference concentrations will not be used to negate the calculated quantitative risk estimates. The following table (Table 2-1 from RARC Appendix B) presents the use of reference values/areas and background reference locations as they pertain to the identified the measurement endpoints.

2. Supporting Text from EPA Guidance which was used to develop the language above.

EPA's Ecological Risk Assessment Guidance (ERAGS) contains the following guidelines for selecting a reference site:

"Reference data are baseline values or characteristics that should represent the site in the absence of contaminants released from the site. Reference data might be data collected from the site before contamination occurred or new data collected from a reference site. The reference site can be the least impacted (or unimpacted) area of the Superfund site or a nearby site that is ecologically similar, but not affected by the site's contaminants."

"The reference areas should be chosen to be as similar as possible to the site in all aspects except contamination. Parameters to be evaluated for similarity include, but are not limited to: slope, habitat, species potentially present, soil and sediment characteristics, and for surface waters, flow rates, substrate type, water depth, temperature, turbidity, oxygen levels, water hardness, pH, and other standard water quality parameters. If several on-site habitats or habitat variables are being investigated, then several reference areas could be required. Reference areas should be as free of site-related contaminants above background levels as practical."

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From Appendix B in ERAGS

2.2.3.1 Reference Area Selection

A reference area is defined in this document as an area that is outside the chemical influence of the site but possesses similar characteristics (e.g., habitat, substrate type) that allows for the comparison of data between the impacted area (i.e., the site) and the unimpacted area (i.e., the reference area). Reference areas can provide information regarding naturally occurring compounds and the existence of any regional contamination independent of the site. They can help determine if contaminants are ubiquitous in the area and can separate site-related issues from non-site related issues.

The reference area must be of similar habitat type and support a species composition similar to the study area. The collection and analysis of samples from a reference area can support site-specific decisions regarding uptake, body burden, and accumulation of chemicals and toxicity. The reference area should be outside the area of influence of the site and if possible, in an area of minimal contamination or disturbance. Location of reference areas in urban or industrial areas is frequently difficult, but an acceptable reference area is usually critical to successful use of ecological assessment methods.

3.2.2.3 Reference Stations

The use of a reference station is essential to determine population/community effects attributable to a site. The use of a reference station within the study area is preferable (upstream or at a nearby location otherwise outside the area of site influence). In some cases this is not possible due to regional impacts, area-wide habitat degradation, or lack of a similar habitat. In these cases the use of population/community studies should be reevaluated within the context of the site investigation. If the choice is made to include the population/community study, regional reference or a literature-based evaluation of the community may be options.

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