

2.9.1 Determination of Surface-Area Weighted Average Concentrations (SWACs)

Integral to the selection of the remedy is the methodology used to select the areas of sediment requiring action in order to meet the RAOs. Through discussions with EPA and RIDEM, the Navy identified the sediment that causes excessive risk as that sediment where the SWACs of the site COCs exceed their respective cleanup levels. Due to the spatially discontinuous distribution of elevated levels of each COC (exceeding respective cleanup levels), and because there is also spatial discontinuity in the manner in which receptor populations could be exposed to the COCs, the project team determined that SWACs should be used to conservatively represent risk in the study area as a whole. By considering only the areas or “cells”, depicted on Figures 2-3A through 2-3C, where cleanup levels are exceeded for each individual COC, an area-average approach was developed that is adequately conservative for the remedial action. Addressing contaminated sediment by reducing the SWACs ensures that cleanup levels are met where exposure can occur.

Before remedial action areas could be identified, a baseline SWAC for each COC-specific decision unit (DU) was calculated. The approach for calculating the baseline SWAC for each COC was as follows:

- Cells where the surface (0- to 1-foot depth) concentration of a COC exceeded its cleanup level were identified. Only those cells were included in the SWAC calculation.
- For each cell with a COC exceeding its cleanup level, the COC concentration was multiplied by the area of that cell. This effectively weighted each cell differently based on COC concentration and area.
- For each COC, the sum of those products (COC concentration multiplied by area) was calculated and then divided by the total area over which that COC concentration exceeded the cleanup level.
- The final result was a baseline SWAC based on only those cells where that COC exceeded its cleanup level.

$$\text{SWAC (for each COC)} = \frac{(\text{conc}_1 * \text{area}_1) + (\text{conc}_2 * \text{area}_2) \dots + (\text{conc}_n * \text{area}_n)}{\text{area}_1 + \text{area}_2 \dots + \text{area}_n}$$

Remedial action areas (target areas) were identified for each COC as described above, and these separate areas were combined by adding the areas together to form a collection of discontinuous action areas to address all four COCs. The SWAC calculation was then used to test each alternative to determine if resulting SWAC concentrations met the cleanup goals. As target areas were selected, the concentrations in the SWAC calculation were revised based on the action specified in that alternative. For example, if a target area was dredged, the new surface concentration after dredging would be the concentration at the newly exposed surface. If that area was covered or capped with clean sand, the COC concentration for that area would be assumed to be “not detected”, and would be given a hypothetical COC concentration of zero. As each target area was hypothetically selected for remedial action, the SWACs were recalculated and they continued to decrease until an adequate area and volume of sediment were addressed such that all SWACs for all COCs were projected to meet cleanup levels, thereby achieving RAOs.

Using this approach, some sediment with COCs exceeding cleanup goals will remain in place, but the resulting SWACs will be less than cleanup levels. Section 2.4 and Appendix D8 of the FS present example calculations for the SWACs.

2.9.2 Sediment Alternatives

To address COCs at OU5, a screening of General Response Actions (GRAs), remedial technologies, and process options was conducted as part of the FS. The technologies and process options retained from the detailed screening were assembled into five remedial alternatives for OU5. Consistent with the NCP, the no action alternative was evaluated as a baseline for comparison with other alternatives during the comparative analysis. Table 2-6 summarizes the major components and provides estimated costs for each of the remedial alternatives developed for OU5.

RECORD OF DECISION

SITE 19 – FORMER DERECKTOR SHIPYARD MARINE SEDIMENT OPERABLE UNIT 5



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