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United States Department of the Interior
FISH AND WILDLIFE SERVICE
Ecological Services
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October 16, 1995

Mr. Robert Davis
Superfund Branch (HW41)
U.S. Environmental Protection Agency
841 Chestnut Street
Philadelphia, PA 19107

Re. Naval Weapons Station Yorktown, Virginia

Dear Mr. Davis:

The Draft Round Two Remedial Investigation and Baseline Risk Assessment and the Draft Feasibility Study Report, dated September, 1995, for Site 12 at the Yorktown Naval Weapons Station Superfund Site, Yorktown, Virginia have been reviewed. The U.S. Fish and Wildlife Service offers the following comments for consideration by the Biological Technical Assistance Group (BTAG).

Remedial Investigation

Lead should have been retained as an ecological contaminant of concern in sediment. The reason for its exclusion, as indicated in Table 7-4, was that levels of lead did not exceed background screening levels. As the Service indicated in our May 24, 1995 letter to your office concerning review of the Summary of Background Constituent Concentrations and Characterization of the Biotic Community from the York River Drainage Basin, inorganic and organic chemicals were detected at low concentrations in most of the sampling locations chosen as background surface water and sediment conditions. However, several samples exceeded Effects Range-Low sediment Guidelines developed by Long et al. (1 993). In particular, elevated levels of lead were detected in Yorktown Creek in both surface water and sediment sample numbers BGCPSWO 1 and BGCPSDO 1, respectively. Due to the elevated levels of some organic and inorganic constituents in these samples, the Service reiterates exercising caution when using these numbers as background conditions for comparisons to other locations.

Two aquatic assessment endpoints were chosen to address potential ecological risk at Site 12 (page 7-41). The first aquatic assessment endpoint was a change in the structure of benthic macroinvertebrate communities attributable to contaminants from the site. The measurement endpoints for this assessment endpoint included lower species diversity and richness in the benthic macroinvertebrate community relative to background, and the dominance of contaminant tolerant species over contaminant intolerant species, as

calculated by the Macroinvertebrate Biotic Index (MBI). The second aquatic assessment endpoint was the reduction of an aquatic receptor population or subpopulation that is attributable to contaminants from the site. Measurement endpoints for the second aquatic assessment endpoint included exceedances of contaminant-specific surface water and sediment effect concentrations and an increase of gross external fish pathologies, as compared to background locations.

Results from the benthic macroinvertebrate species richness and diversity analysis were inconclusive. Although species richness was higher overall than values calculated for background, the total number of taxa, was lower at Site 12 than at background sampling locations. Lower densities (relative to background sampling stations) were noted at some of the Site 12 sampling locations, yet other Site 12 sampling stations had comparable or greater densities than background stations.

As indicated above, results from the MBI were used to assess the benthic macroinvertebrate populations at the site. Tolerance Values (TVS) were assigned to each taxa observed in the sampling locations of Ballard Creek and its tributaries. The TVS ranged from 0 to 10, with 0 assigned to taxa found in "unaltered streams of high water quality," and 10 assigned to taxa that occur in streams with "intermediate degrees of pollution or disturbance." Results indicated that the benthic macroinvertebrate community at Site 12 is being adversely impacted, potentially by contaminants at the site. It was, however, noted that other ecological stressors present at Site 12 may also be adversely impacting the benthic macroinvertebrate community.

As indicated on page 7-42, cadmium, cyanide, iron, and manganese in the surface water may potentially be adversely impacting "the aquatic environment" based on exceedances of acute or chronic screening levels. It was also noted that polychlorinated biphenyls, semi-volatile organic compounds, DDE, DDD, chlordane, endrin aldehyde, antimony, cobalt, cadmium, iron, manganese, selenium, silver, copper, lead, arsenic, mercury, nickel, and zinc were detected at levels that exceed BTAG ecological screening values, and therefore, may be adversely impacting the benthic macroinvertebrate community. Overall, results from the measurement endpoints; indicated that the surface water and sediment in Ballard Creek and its tributaries may pose a risk to ecological receptors in the aquatic environment.

The assessment endpoint chosen to assess potential risks to terrestrial receptors was the reduction of a receptor population or subpopulation attributable to site contaminants. Exceedances of soil effect concentrations, and exceedances of contaminant-specific effect doses were chosen as the measurement endpoints. It was concluded on page 7-43) that semi-volatile organic compounds, polychlorinated biphenyls, nitramines, antimony, barium, cadmium, iron, lead, selenium, vanadium, and zinc may be adversely impacting the "terrestrial environment" at Site 12. In addition to those inorganics listed, copper, mercury, and nickel were also detected in Area A soils at levels which exceed the Canadian Criteria (Persaud et al., 1992). From the data reviewed, it appears that soils in Area A represent the greatest ecological threat.

Miscellaneous Comments

On page 7-3)2, it was stated that "the fish collected from all of the stations appeared healthy based on the absence of tumors, skeletal abnormalities, and parasites." This statement is misleading in that visual observation cannot be used to determine the presence

or absence of tumors. This statement should be rewritten to read "...absence of gross tumors .....

On page 7-3 K it was stated that (benthic macroinvertebrate) species densities at Station 12BN 1 2, 12BN 1 5, 12BN 1 9, and 12BN20 were above densities calculated for the background stations. The next statement indicated that relatively low densities, as compared to background, were calculated at Stations 12BNO9, 12BN15 and 12BN18. Relative to Station 12BN15, these two statements contradict one another. This discrepancy should be clarified.

Feasibility Study

The Service agrees with the conclusion on page 3-2 that the surface water and sediment be further investigated as a separate operable unit. The Service also agrees with the conclusion on page _3) -2 that the ecological risk assessment identified a potential risk to both the aquatic and terrestrial environments at Site 12. Contaminants which exceeded BTAG ecological screening criteria included: cyanide and cadmium in surface water samples, and polychlorinated biphenyls, semi-volatile organic compounds, cadmium, copper, lead, arsenic, mercury, nickel, and zinc in sediment samples. Because polychlorinated biphenyls and cadmium were potential contaminants of concern, and detection limits for these contaminants were high in the Round Two Remedial Investigation, the Service recommends using lower detection limits for these contaminants in future investigations.

Despite finding that the soils at Site 12 pose a risk to terrestrial receptors, the feasibility study used only results from the human health risk assessment to determine the need for remediation. Although the surface soil at Site 12 presented a risk to human health, remedial action alternatives were not developed (page ES-6). The only remedial action objectives developed for Site 12 pertain to groundwater contamination by volatile organic compounds. The Service recommends that investigations be conducted in Area A to further define the nature and extent of inorganic and semi-volatile organic compound contamination. Additionally, the investigators should then reconsider the need for remediation of Area A based on the levels of contamination and the risk posed to ecological receptors.

Thank you for the opportunity to review this document. Please contact Susan Lingenfelser of this office at (804) 69')-6694 if you have questions or wish to discuss these comments.

Sincerely,

Karen L. May
Supervisor
Virginia Field Office

Literature Cited

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. (1995). Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environmental Management. October 1993.

Persaud, D., Jaagumagi, R., and Hayton, A. (1992). Guidelines for the protection and management of aquatic sediment quality in Ontario. Ontario Ministry of the Environment, Water Resources Branch. Toronto.