



Environmental
Science &
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March 16, 1995

Mr. David Forsythe
Atlantic Division, Naval Facilities Engineering Command
Environmental Quality Division
Code: 1822
Building N 26, Room 54
1510 Gilbert Street
Norfolk, VA 23511-2699

RE: Norfolk Naval Base, Virginia
Q-Area Drum Storage Yard
Responses to EPA Comments from the Remedial Investigation/Feasibility Study
ESE Project No. 4921150-0900

Dear Mr. Forsythe:

Attached are responses to the US Environmental Protection Agency (EPA) comments dated 25 August 1994 for the project referenced above.

ESE appreciates the opportunity to be of service to the Navy. Please feel free to call me at 703/318-8900 with any questions.

Sincerely,

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

Andrew M. Forrest, PG
Project Manager

AMF/mc/5009

Attachment

General Comments

Comment 1: In many areas the document raises more questions than it answers. The specific comments below will show that this is the case in several parts of the text, but in general surface water and sediment sampling is not of remedial investigation quality in terms of both numbers of samples and location.

Response: The QADSY is located in a heavily industrialized area adjacent to the Elizabeth River to the west, and to Willoughby Bay to the north and east. Surface water drainage flows into stormwater drains that flow north into Willoughby Bay. The sediment sample was collected from the stormwater drainage inlet basin at the QADSY. No drainage ditches, swales, or channels are located near the site from which sediment samples can be collected.

During a conference call on 24 February 1995, the EPA (Robert Thomson), the Virginia Department of Environmental Quality (VDEQ) (Pat McMurry), the Navy, and Environmental Science & Engineering, Inc. (ESE) decided sediment samples would be addressed in the quantitative risk assessment and would not be evaluated due to: 1) the potential for numerous contaminant sources from the drainage conduit flowing through the site; 2) the unknown source of the contamination; and 3) the numerous sources at the effluent to the storm drain pipe at Willoughby Bay. Sediments from the QADSY are not present adjacent to the Elizabeth River due to the bulkhead. Surficial gradient would send surface water/sediments to Willoughby Bay and not to the Elizabeth River.

The background surface water sample was analyzed for metals only to establish baseline surface water quality against which ground water concentrations could be gauged. Only metals were sampled because the likelihood of observing volatile organic compounds (VOCs) at low concentrations in surface water is insignificant due to their volatility. Additionally, VOCs were delineated in ground water during the RI, suggesting that contamination has not affected surface water.

Comment 2: Remedial alternatives are presented in a very confusing way. As it stands, we (EPA/NOAA) cannot determine which remedial alternative is the preferred nor can we ascertain which alternatives would cause the least ecological harm.

Response: ESE prepared the RI/FS in accordance with Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA document EPA/540/G-89/004). The guidance directs the FS to define alternatives, analyzes alternatives against evaluation criteria, and

compares alternatives to one another. The selected remedial alternative will be placed in the remediation action plan (RAP) and record of decision (ROD).

Special Comments

Comment 1: In Section 5.0 and elsewhere, we note that the investigator tied contaminant levels to the Region 3 risk-based concentration (RBC) tables for commercial industrial soils. The comparison of individual chemical concentrations to RBC values on a line by line basis is inappropriate and misleading. It is recommended that, before the baseline risk assessment process begins for the Q-Drum Area Storage Yard, the selection of chemicals of concern be accomplished. The selection of chemicals of concern for soils and ground water should follow the procedures provided in the enclosed Region III guidance document entitled "*Selection of Contaminants of Concern by Risk-based Screening*" (SCCRBS), utilizing the associated SCCRBS tables developed by using a systemic hazard quotient of 0.1 or a lifetime cancer risk 10. Update RfDs can be obtained from newer versions of Regions III *Risk Based Concentration Values* and utilized in the process outlined in the SCCRBS guidance to calculate updated SCCRBS table values for selected chemicals. By utilizing the SCCRBS tables, all chemicals detected which exceed the SCCRBS table values should be retained initially as chemicals of concern and carried forward into the baseline risk assessment process. All chemical concentrations falling below the SCCRBS table values can be eliminated from further concern.

Additionally, the SCCRBS table values listed for soils are generally not protective of ecological resources and should not be used in any determinations of ecological risk, i.e. for the evaluation/screening of sediment chemical concentrations. For the evaluation/screening of sediment, please utilize NOAA *Screening Guidelines*. The table values contained in the NOAA *Screening Guidelines* can be used for the initial identification of chemicals of concern for sediment and surface water much in the same way as the above referenced EPA-Region III SCCRBS tables. For those chemicals not included on the NOAA *Screening Guidelines* tables, default values can be utilized, namely the SCCRBS table values for residential soil.

Response: A quantitative risk assessment will be conducted to address the site. RBSs and SCCRBS will be incorporated in the quantitative risk assessment, accordingly.

Comment 2: We note that the placement of wells appears to be logical in relation to the gradient. However, we question the wells used for reference as they may be too close to the contaminant areas to serve adequately. The

preparer of the draft *Remedial Investigation/Feasibility Study* report (RI/FS) should at least explain why these wells can be regarded as adequate references. Our concern is that the low gradient may allow for upgradient contamination to interfere with the use of these wells as "background." As a result, the use of these wells as controls would be compromised.

Response: Monitor wells DW-2, DW-4, GW-4, and SW-8 are located east of the groundwater divide and are considered background wells because they are not hydrologically connected to the QADSY wells. Although the background well concentrations were compared with downgradient wells at the QADSY, the background well information was not used in determining human health or ecologic risk and remediation criteria.

Comment 3: We note also that the document uses surface water criteria in evaluating the severity of risk. We agree that the use of surface water criteria is acceptable when carrying out Ecological Risk Assessment, but the use here appears to be inappropriate as VA has developed ground water guidelines which are considered ARARs. These guidelines are designed to be protective of ground water resources vis-a-vis TCE and PCE as well as other VOCs and semi-VOCs. The rule of thumb is to use the more stringent numbers in most cases.

Response: VDEQ does not have ground water guidelines for VOCs and semi-VOCs (e.g., TCE). Clean-up levels will be derived from the quantitative risk assessment.

Comment 4: We note that base proposes to use contaminated ground water for irrigation. This contaminated water may represent a risk pathway to ecological receptors and also may contribute to surface water contamination through the pathway of runoff. In addition, if the contaminants contained in the ground water are considered "listed" hazardous wastes, other problems may be encountered if the base uses the ground water for irrigation. NOAA/EPA also believe that metals are a problem with ground water and the runoff poses a risk pathway for these contaminants as noted above.

Response: Ground water is not used for irrigation due to salinity, as discussed in the conference call on 24 February 1995. The quantitative risk assessment will address potential ground water use.

Comment 5: As far as we can tell, only two sediment samples were analyzed and these were from the storm drainage ditches discharging into the Elizabeth River. These sediments are contaminated with Arsenic, Barium, Chromium, Magnesium, Copper, Iron, Lead, and Zinc. Aside from the confusion in the text regarding why the sediments were listed as both moderately and heavily contaminated with barium, we note that the

sediment samples in general show exceedances of the Long & Morgan Guidelines for several trace elements and the pesticides Chlordane and homologues of DDT. As far as we can tell only one surface water sample was analyzed during the entire RI. We believe that a real potential exists for contamination from the site to both the Elizabeth River and Willoughby Bay via both the surface water and ground water pathways. This area is located in the general southern Chesapeake Bay environment which is ecologically rich in aquatic/marine life as well as pelagic, shore, and upland birds. Because of these habitat values that are so dependent upon water quality, we do not believe that one sample at one point in time can be used to determine ecological risk. In addition, that single sample was restricted to priority pollutant metals and did not cover any other site-related contaminants. The receiving waters (Elizabeth River, Willoughby Bay and any others that were identified through reconnaissance of the area) should be sampled for TCL/TAL as well as for specific site-related contaminants. The sampling program should include the attached list of basis water quality parameters. The document mentions such as Mason's Creek and Lafayette Pond but does not mention any other streams and ponds that may be located in the area. These should be sampled systematically along with other aquatic systems. At the same time, the investigation should include sampling of the benthic regimes at the same locations, with emphasis upon selecting depositional areas. Finally, a description of the bank and riparian areas should be included for physical and ecological values.

- Response: See response to General Comment 1. The RI/FS does not mention Mason's Creek and Lafayette Pond, which are several miles southeast and south, respectively, from the site, are not anticipated receptors of QADSY contamination, and should not require investigation.
- Comment 6: Ecological assessment has not received very broad attention and given the levels of metals, TPHs, etc., it is very possible that contamination has moved into the food chain. It is recommended that an effort be made to establish plant and animal tissue/organ levels of contaminants associated with the site. It is noted that several metals that were identified in the document have the ability to bioaccumulate, e.g, cadmium and arsenic. Sampling the ecological receptors should be carefully planned so that organisms most directly exposed to pathways from the site are considered. For example, on page 5-23 DDT homologues are noted as present in sediment samples. It is possible that either sedentary fish or fin fish with small ranges may be available as test organisms. When doing this work it is important to note that different chemical states (e.g., alternate valence states and toxicities for metals) may prevail. We believe the emphasis solely upon human receptors, exposure to the food chain ignores actual impact to ecological receptors.

Response: The quantitative risk assessment will address ecological receptors. See response to General Comment 1.

Comment 7: The inadequate level of ecological characterization, media samples, and risk assessment makes it impossible to agree with the conclusion of no impact. This conclusion is based upon intuition and the speculation that impacts are 'unlikely' is not based upon any factual information. Characterization of the aquatic ecosystem would be required as an initial piece of information towards an effort to determine ecological risk potentials. The discharge of runoff to the Elizabeth River and Willoughby Bay alone is sufficient reason for gathering basic ecological information in pursuit of determining potential impacts through risk assessment. We note that the document presumes that concentrations in ground water are diluted and dispensed but, again, no factual information based on sampling and analysis is provided.

Response: See response to General Comment 1 and Comment 6.

Comment 8: On page 7-11 and -12 as well as on page 8-3 the toxicity assessment concludes that "the disturbed nature of the site makes it unlikely that important terrestrial receptors currently exist." Since neither an ecological characterization nor risk assessment was done, no factual basis exists for this conclusion. In addition, no list of species is provided to determine what the term 'important' means. On page 7-10 they state that no threatened, sensitive, rare, or endangered species are thought to exist on the site. As stated before, the general environmental setting (i.e., lower Chesapeake Bay) argues against this. But aside from this, we could not find where the document states the appropriate state and federal authorities have been contacted regarding status species. For example, the White Marsh office of the Fish & Wildlife Services is one contact that can supply information on endangered species of the locale.

Response: See response to Comment 6.

Comment 9. Cleanup criteria for TPH in soil and ground water is not addressed in the remedial plans because no human health criteria exist for this class of contaminant. TPH, on the other hand, are considered to be serious ecological contaminants and should be addressed as part of an Ecological Risk Assessment Metals levels in sediment also exceed guidelines as do levels of DDT homologues and Chlordane, both of which are greater than NOAA ERM guidelines by several orders of magnitude. The RI failed to clearly establish a source, but implies that an upstream source exists. In light of the topography, this is questioned. Furthermore, the source is likely to be associated with the base, indicating that additional on-base remedial investigation should be carried out to pinpoint the source(s). We suggest that additional investigation should cover such pathways as the storm water system, etc., to locate the source(s).

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- Response: See response to General Comment 1 and Special Comment 6.
- Comment 10: We note that TCLP extraction methods were used in establishing hazardous concentrations of several contaminants. This method is not acceptable for establishing potential availability to ecological receptors.
- Response: TCLP metals were analyzed during the initial investigation because of soil disposal concerns. Total metals were not analyzed during this phase of the RI, although they were analyzed during previous investigations. The results of the total metals will be included in the quantitative risk assessment.
- Comment 11: In the same vein, metals, TPH, and chlorinated hydrocarbons, pesticides, and DDT homologues have been identified in the sediment, therefore, work needs to be done to complete the characterization of sediment and considered in the scope of remedial plans.
- Response: See response to general Comment 1.
- Comment 12: While we usually do not look at the quality assurance plans for RI/FS investigations conducted by the Navy, in this case it would be a good idea for us to have the opportunity to check these plans. It is our concern that the method detection levels and, in fact, the methods themselves might not have been sufficiently sensitive to meet ecological risk criteria.
- Response: A quality assurance plan for RI/FS will be sent to the EPA.
- Comment 13: With regard to the FS, we believe that restricting cleanup to soils and ground water is inadequate. The drainage ditch shows high levels of contamination in sediments and is likely to be of some habitat value as well as a pathway to other areas of ecological value. In addition the contamination in the sediment can act as a long term secondary source of contamination to the ultimate receiving areas, e.g., Elizabeth River.
- Response: A drainage ditch does not exist as the QADSY. The sediments were collected from a storm drain basin as discussed in the response to Comment 1.
- Comment 14: We have many serious concerns with the remediation plans. The alternative ground water and soil remediation are thoroughly discussed, but we cannot see where an actual alternative was selected. One approach involves merely treating the ground water for VOC contamination that could potentially produce a discharge containing other contaminants at concentrations exceeding AWQC (chronic). This water discharged to Willoughby Bay, as in alternative 2, could allow it to both contaminate the bay and contribute to contamination of the sediment.

Response: See Response to general Comment 2.

Comment 15: Further confusion exists in regard to Tables 11-6 and 12-1. In Table 11-6, the precipitation/flocculation alternative was eliminated from consideration but is listed in Table 12-1 as an alternative retained for the site. This is confusing to the reviewer. Alternatives 5a and 5b (in-situ thermal treatment) does not reduce metals concentrations and, in fact, appears to allow them to remain as a continuing source of ground water contamination. The capping alternative may pose a threat if for no other reason than an increase in storm pulse volume and energy of surface water drained to the Elizabeth River and Willoughby Bay.

Response: The precipitation/flocculation alternative will be removed from Table 12-1. Metals are not of concern due to the results of the second groundwater sampling round.

Recommendations

The following recommendations are general in nature because exhaustive details are not possible at this time due to the incomplete nature of the report. The level of effort reported by this document is really only comparable to what we see in a site investigation produced preliminary to listing.

- The Navy should have its contractor complete the characterization of the extent of contamination, including:
 - a) pinpoint sources of contamination, e.g., Chlordane, DDT homologues, etc.; characterize contamination of environmental media, e.g. surface water and sediment; identify and sample all pathways. (Additional guidance is available, if needed.)
- Carry out an ecological characterization by describing the ecosystems and habitats as well as the resident flora and fauna. The sampling and analysis should be designed on a statistical basis.
- Complete an Ecological Risk Assessment using the attached Draft Interim Guidelines.

Response: See response to General and Special Comment 1.

Attachment 1