



**DEPARTMENT OF THE NAVY**

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5090  
Ser 64/ 5246

30 NOV '93

From: Commanding Officer, Navy Environmental Health Center  
To: Commanding Officer, Atlantic Division, Naval Facilities  
Engineering Command, Code 18222, Norfolk, VA 23511-6287

Subj: MEDICAL REVIEW OF INSTALLATION RESTORATION PROGRAM  
DOCUMENTS FOR NAVAL WEAPONS STATION, YORKTOWN, VA

Ref: (a) LANTNAVFACENCOM ltr 5090 Ser 1822:BRN:srw of 9 Nov 93

Encl: (1) Medical Review of Preliminary Draft Work Plan for  
Sites 6, 7, 12, 16 and Background, Naval Weapons  
Station, Yorktown, VA

1. Per reference (a), we have completed a medical review of the Preliminary Draft Work Plan for Sites 6, 7, 12, 16 and Background, at Naval Weapons Station (NAVWPNSTA), Yorktown, Virginia. Our review comments and recommendations are provided in enclosure (1).

2. The technical point of contact for medical reviews is noted in the enclosure. Health Risk Assessment Department personnel are available to discuss the enclosed information by telephone with you and to review future documents associated with the NAVWPNSTA, Yorktown sites.

3. If you require additional assistance, please call Ms. Sheila A. Berglund, P.E., Head, Installation Restoration Program Support Department at (804) 444-7575 or DSN 564-7575, extension 430.

  
W. P. THOMAS  
By direction

**MEDICAL REVIEW OF PRELIMINARY DRAFT WORK PLAN  
FOR SITES 6, 7, 12, 16, AND BACKGROUND  
NAVAL WEAPONS STATION, YORKTOWN, VIRGINIA**

**Reference:** (a) *Assessing Human Health Risks from Chemically Contaminated Fish and Shellfish* (September 1989), U.S. EPA (EPA 503/8-89-002)

**General Comments:**

1. The draft document entitled "Preliminary Draft Work Plan, Sites 6, 7, 12, 16 and Background, Naval Weapons Station, Yorktown, Virginia" dated November 5, 1993 was provided to the Navy Environmental Health Center (NAVENVIRHLTHCEN) for review on 10 November 1993. The report was prepared for Atlantic Division, Naval Facilities Engineering Command by Baker Environmental, Inc.

2. The information presented in this work plan is generally in accordance with guidance provided in pertinent Environmental Protection Agency (EPA) documents such as *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final (October 1988)* and the EPA document *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part A, December 1989 (RAGS Manual)*. Our review comments and recommendations are provided below.

3. The Introduction states that the site specific work plans provide a "detailed description of site conditions, the findings of previous investigative work at the sites, the number and types of samples to be collected, the analytical methods to be used on those samples, specific sample locations, and the rationale for selecting these environmental media, locations and analyses." This information is presented in the Work Plan (WP); however, we feel that the WP needs a detailed site-specific risk assessment section to define sampling needs and locations. Our review comments and recommendations address the need for more specific risk assessment information to be included in this WP.

4. The technical point of contact for this review of the preliminary draft work plan is Ms. Andrea Lunsford, Head, Health Risk Assessment Department, Environmental Programs Directorate, NAVENVIRHLTHCEN, who may be contacted at 444-7575, extension 402.

**Review Comments and Recommendations:**

1. Page 1-1, section 1.0 (Introduction) and page 3-1, section 3.0 (Conceptual Site Models)

Comment: The introduction states that the site specific work plans "provide a detailed description of site conditions, the findings of previous investigative work at the sites, the

Enclosure (1)

number and types of samples to be collected, the analytical methods to be used on those samples, specific sample locations, and the rationale for selecting these environmental media, locations and analyses." This report lacks much of the site-specific information needed to determine sampling needs and exposure pathways:

a. Sections 2.2 through 2.5 provide information concerning the nature of each of the sites under investigation; however, the text does not address current land use at or near each of the sites.

(1) Site-specific information to characterize potentially exposed populations with regard to size and characteristics is not provided.

(2) Sensitive populations (e.g., infants and children, elderly people, hospitals, etc.) and their locations in reference to the specific sites are not addressed (e.g., nursing homes and child care facilities).

b. Section 3.0 states that "station employees and residents could potentially engage in fishing, crabbing or hunting activities" and contact chemicals of potential concern. It is not known whether this is being stated generically (e.g., anywhere on station) or if it specifically refers to Sites 6, 7, 12 and 16. If it is site-specific, then it is not clear why none of the conceptual site models includes a crab or wildlife (i.e., deer, squirrel or groundhog) consumption pathway. If it is stated generically, then this site-specific work plan should address activities at each of the sites under investigation.

Recommendations:

a. Provide site-specific information to characterize exposed populations with respect to location relative to the sites, activity patterns, and the presence of sensitive populations. Also identify any distant exposed populations, such as public water supply consumers and consumers of fish, shellfish or agricultural products impacted by the site.

b. Characterize the activities and activity patterns of the potentially exposed population associated with each land use.

c. Discuss fishing, hunting and crabbing activities in and around each of the sites under investigation.

2. Pages 3-1 to 3-6, section 3.0 (Conceptual Site Models) and page 2-7, section 2.5 (Site 16-West Road Landfill)

Comments:

a. The conceptual site models (i.e., Figures 3-1 through 3-4) present a future residential exposure pathway. Generally a residential land use is selected when deciding the type of alternate land use that may occur in the future, as it is the most conservative choice. However, the RAGS manual states "an assumption of future residential land use may not be justifiable if the probability that the site will support residential use in the future is exceedingly small."

b. Section 2.5 states that a waste layer containing glass containers, cans and newspapers was identified under one of the Site 16 Landfill drum piles. This finding indicates that this landfill may also have been used for municipal wastes. It is highly likely that such landfills will not be developed for residential or industrial use.

Recommendation: Further investigate the materials buried at Site 16 to determine whether or not it could have been a municipal landfill. If determined to be a municipal landfill, consider future residential or industrial land use to be unlikely.

3. Page 4-6, section 4.1 (Site 6-Explosives-Contaminated Wastewater Impoundment), subsection 4.1.4 (Aquatic Ecological Sampling)

Comments:

a. This section states that aquatic ecological investigations will be conducted at the same seven locations that sediment and surface water sampling is conducted. Additionally, aquatic sampling is also planned for Site 7. The text does not specifically state whether these locations are known harvest areas. Reference (a) states "Sampling stations should generally be located in known harvest areas." If planned sampling locations are known harvest areas, it should be specifically stated. If they are not, other locations should be considered.

b. Subsection 4.1.4 continues to provide a cursive summary of benthic macroinvertebrate sampling and refers to Section 3.17 of the Master Field Sampling Plan (FSP) for additional sampling details. Neither Subsection 4.1.4 nor Section 3.17.2 of the Master FSP addresses the type of tissue to be collected for the different species of fish to be caught. For example, will whole fish or fish fillet be sampled. If whole fish is sampled, the fish parts that will be used to assess "whole body" analysis (i.e., whether only the edible portions of the fish will be used

or whether whole fish, including viscera, will be used) should be stated.

c. The work plan does not provide a characterization of the potentially exposed population with respect to general method(s) of food preparation and parts of fish eaten. The majority of Naval Weapons Station, Yorktown local fish consumers likely consume only the fish fillet. However, this should be determined. There are populations that consume all edible portions of the fish, or prepare fish in such a way that contaminants in other portions of the fish are of concern (e.g., some populations remove the viscera and boil the rest of the fish). Another issue that should be determined is whether or not the skin is taken off, or left on, the fillets.

d. The Agency for Toxic Substances and Disease Registry (ATSDR) *Public Health Assessment Guidance Manual* (1992) states that public health assessments (PHAs) should be based on measurements of the contamination in the "edible portions" of the relevant aquatic species. However, the manual also states that the assessor should consider the specific dietary habits of the potentially affected population and notes that "if that information is not available, the assessor should state that an acceptable evaluation of this exposure pathway cannot be made without the information." Although the term "edible" is not specifically defined, the general discussion in the manual indicates that this is eviscerated fish, as opposed to fish fillets.

e. The optimal situation is to determine the concentrations of contaminants in all edible portions of the fish, as well as the concentrations in the fillets.

Recommendations:

a. Further define the fish parts that will be included in the "whole body" samples.

b. Characterize the potentially exposed populations with respect to method of food preparation and parts of fish eaten.

4. Page 4-2, section 4.1 (Site 6-Explosive-Contaminated Wastewater Impoundment), subsection 4.1.2 (Surface Soil Sampling)

Comments:

a. The text states that surface soils will be collected from 0 to 6 inches below ground surface. The collection of surface soil samples at depths of 0 to 6 inches is consistent with EPA guidance as presented in documents such as the RAGS manual. However, it is inconsistent with the ATSDR *Public Health Assessment Guidance Manual* (1992) which defines surface soil

samples as soil samples taken from depths of 0 to 3 inches.

b. The guidance reflects ATSDR's position that depths greater than three inches do not accurately reflect surface soil conditions. Under the Comprehensive Environmental Response, Compensation and Liability Act, ATSDR is mandated to perform a public health assessment (PHA) of any site which is placed on the National Priorities List. In developing PHAs at Department of Defense facilities, ATSDR uses environmental data collected during installation restoration investigations. ATSDR summaries may reflect "no samples" taken for surface soil based on the fact that samples were taken at depth intervals greater than three inches.

c. To facilitate correlation between PHAs and health risk assessments, and in order to minimize costs associated with redundant sample collection and analysis, we encourage the adoption of "0 to 3 inches" as the norm for surface soil sample collection for future site investigations. Adoption of this sampling protocol will not be in controversy with current EPA guidance, since the RAGS manual does direct that surface soil samples be collected at the "shallowest depth practical" in order to accurately reflect the potential surface soil exposure pathway.

Recommendation: Collect surface soil samples at 0 to 3 inch depths wherever this is achievable.

5. Page 4-44, section 4.10 (Baseline Risk Assessment)

Comments:

a. This section consists of three sentences that refers the reader to Section 4.5 of the NWS, Yorktown Master Work Plans for procedures to be followed, methods of data analysis and criteria for risk characterization. It further states that the baseline risk assessment (BRA) will be a separate document. Neither the master work plans nor this site-specific document include a detailed, site-specific risk assessment section. It is not clear whether a separate work plan will be developed for the BRA.

b. Work plans should contain a separate human health risk assessment section which specifically describes the type of information that will be included in the risk assessment. Some of the types of information that should be included are:

(1) Identification of all potentially exposed populations, site-specific descriptions of tasks related to exposure pathways, present and potential future land use, media that are or may be contaminated, locations of actual and

potential exposure and present concentrations at appropriate

exposure points.

(2) The equations, calculations, and default assumptions used to determine exposures for all exposure scenarios (e.g., off-base, on-base, children, adults, current land use, future land use, etc.) to estimate exposure point concentrations (e.g., arithmetic mean, geometric mean, 95th percentile, etc.); to determine risk estimates (e.g., hazard quotients, and carcinogenic risk estimates).

(3) The reference doses (RFDs) and cancer slope factors (CSFs) used to determine exposures.

(4) A discussion concerning the selection of data to be used for the risk assessment (e.g., the use and nonuse of "U", "J", and "UJ" qualified data.

(5) The selection criteria used to determine "compounds of concern" (e.g., comparison to background and frequency of detection statistics).

(6) A discussion concerning the use of unfiltered ground water data to determine the exposure point concentration per guidance set forth by reference (a).

(7) An "uncertainty" section that addresses significant differences between actual site conditions and required default assumptions to determine risk (for example, to discuss the risk associated with a potential shallow ground water ingestion scenario; or the risk associated with proxy values being used for non-detection data).

(8) A discussion concerning the toxicity factors to be used to calculate risks for polycyclic aromatic hydrocarbons (PAHs). Some of the Regional EPA offices have adopted a toxicity equivalency factor (TEF) methodology for carcinogenic PAHs based on each compounds relative potency to the potency of benzo(a)pyrene.

(9) A discussion concerning the use of absorption factors to be used in determining risks associated with dermal exposure to contaminated soils and the soil to skin adherence factors used for assessing risks associated with dermal exposure.

Recommendation: Discuss and/or present the information addressed above.

6. Pages 5-41 to 5-59, section 5.7.1 (Human Health Evaluation Process)

Comment: The text does not address the proxy value that will be used for non-detects. The RAGS Manual provides guidance

on the use/non-use of negative detection data. Generally, a value equal to one-half the sample quantitation limit (SQL) of the analytical method must be substituted as a proxy value for a negative detection. Frequency of detection statistics may be subsequently used to demonstrate that the arithmetic or geometric means derived are significantly influenced by the non-detect proxy values.

Recommendation: Discuss the use of proxy concentrations for non-detects in determining mean exposure point concentrations.

7. Pages 5-41 to 5-59, section 5.7.1 (Human Health Evaluation Process)

Comment: In addition to the information discussed above, the risk assessment section of the work plan should provide specific information on the presentation of results. Section 5.7.1.3 (Data Summary) states that tables will be developed for each medium sampled and data will be grouped according to organic and inorganic species within each table. The following data table types should also be addressed.

(a) The format of the data summary tables should be specified in advance (e.g., the summary tables should list sampling numbers on the horizontal axis and provide the analytical result of all detections on the vertical axis); this section could reference an appendix which provides the specific format of the tables.

(1) Exhibit 9-1 ("Suggested Outline for a Baseline Risk Assessment Report") of the RAGS manual (pages 9-4 to 9-8) should be used as a guide for the health risk assessment (HRA) report format. Exhibit 9-1 is fairly extensive and indicates the need to incorporate a considerable amount of specific information in the report.

(2) Exhibit 8-2 (Example of Table Format for Cancer Risk Estimates") and Table 8-3 ("Example of Table Format for Chronic Hazard Index Estimates") of the RAGS manual, illustrate sample tables which present information in a specific format. The use of these formats enable reviewers to easily compare the variables in risk assessment equations. (Data presentation in some of the documents that we have reviewed, effectively precludes analytical review.)

(b) Tables should contain the frequency of detection, range of detects, average concentration, upper 95th percent confidence limits and background concentration (when appropriate), for each chemical, as detected in each medium.

(c) The method by which proxy values will be annotated on the data summary tables should be described (e.g., the use of 1/2

the SQL is generally adopted as the proxy value for non-detects). These data should be specifically annotated. Parenthesis may be used to indicate substitute values, i.e., in addition to a "U" validation qualifier.

(d) The methodology and the specific sampling results used to "group" data (e.g., to derive average and upper-limit concentration values) should be clearly identified and/or shown on individual tables in the RI report; this section should state that this information will be provided.

(e) The text should specify that all equations used to derive intermediate parameters of the risk equations will be provided; and that all default assumptions used in the individual risk equations will be provided/listed.

(f) The text should state that the risk summary tables will be presented in the format recommended in the RAGS manual (e.g., see exhibits 8-3 and 8-4 on pages 8-8 and 8-9 of the RAGS manual).

Recommendation: Expand this section to include the specific information suggested in (a) through (f), above.