

April 20, 2000

DW-8J

Mr. Tom Brent  
Naval Surface Warfare Center  
EPD, Code 095 B-3260  
300 Highway 361  
Crane, IN 47522-5001

Re: Draft SWMU 6 & 7 Phase III Soils  
RFI Comments

Dear Mr. Brent:

The United States Environmental Protection Agency (U.S. EPA) has reviewed the Draft SWMU 6 & 7 Phase III Soil RFI Quality Assurance Project Plan (QAPP) Revision 1 dated February 2000.

The QAPP is well constructed and is nearing approval. The U.S. EPA commends the authors on their use of analysis of variance, spatial statistics, discussion of data distribution, and quality assurance/quality control procedures. However, there are certain areas that require attention. Comments on the QAPP are provided as an attachment to this letter. The comments were assembled from several independent reviewers, including Allen Debus, U.S. EPA Quality Assurance Chemist; Dr. Arthur Lubin, U.S. EPA Statistical Expert; Doug Griffin, Indiana Department of Environmental Management Corrective Action Project Manager; and myself. Please revise the QAPP to address these comments.

If you have any questions regarding this matter, please contact me at (312) 886-7890.

Regards,

Peter Ramanauskas  
Environmental Engineer  
WMB, Corrective Action Section

Enclosure

Filename: RFI QAPP Comments SWMU6&7.wpd

cc: Core Team Members: Bill Gates, SOUTHDIV (w/ encls)  
Doug Griffin, IDEM (w/ encls)

Project Team Members: Allen Debus, U.S. EPA (w/ encls)  
Dr. Arthur Lubin, U.S. EPA (w/ encls)

**U.S. EPA/IDEM COMMENTS**  
**Draft Phase III Soils RFI Quality Assurance Project Plan Revision 1 (February 2000)**  
**For Solid Waste Management Units 6 (Demolition Range) & 7 (Old Rifle Range)**  
**Naval Surface Warfare Center - Crane, Indiana**

*Note: Hard copies of two transmittal letters from Mr. Ramanauskas (EPA Region 5) are attached to this document. The first letter dated April 20, 2000 was the transmittal letter accompanying the comments listed below. The second letter dated September 20, 2000 was the transmittal letter sent to NSWC advising the Navy that all actions with regard to SWMU 6 could be deferred until closure of the Demolition Range as described in the Subpart X permit for that unit.*

*Comment 1:*

Referring to the Project Objectives in Section 1.1.1., the objective for the Demolition Range should be modified to state that if groundwater data do not indicate that a hot spot exists at the Demolition Range, the project should move to the next phase of work at the DR (e.g., Corrective Measures Study). For this section and the last sentence of Section 12.4.2., Statistical Ground Water Analyses (SWMU 6 Only), it should be understood that the U.S. EPA together with IDEM will make the final determination to terminate investigation of SWMU 6 under this QAPP based upon a review of the groundwater data. Please revise the language to reflect this.

**Response: Based on USEPA Region 5's decision to defer action on SWMU 6 until closure (see attached letter from Mr. Ramanauskas dated September 20, 2000) the subject comment does not need to be addressed at this time.**

*Comment 2:*

Referring to Section 1.1.2, what is the rationale for setting the subsurface sampling interval at the ORR at 2 to 4 feet?

**Response: There are two reasons why four feet (4') was chosen as the maximum depth. First, risk assessors typically evaluate subsurface soil exposures (construction/residential excavation scenarios) down to ~10' or, if ground water is shallow, to the ground water table. Ground water is typically quite shallow (4 feet or less in the cleared area of the Old Rifle Range), based on several ground water measurements obtained from the 1990 soil borings. The Old Pistol Range (OPR) is topographically lower than the cleared area of the ORR. Although no ground water measurements are available, based on the proximity of a stream to the edge of the OPR area and the elevations involved, it is thought that ground water is no more than 3-4' deep.**

**Secondly, the Base-wide Background Study set the subsurface depths at 2-6' (4, 1-foot intervals randomly selected for analysis). Based on the discussion above, 4' is in the middle of the range for the Background Study.**

**The objective for the first round of sampling is to generate data that can be compared both to the background study (for metals) and to criteria that would be applied for human risk assessment. The data will provide nature and extent information that can be used to indicate that contamination is bounded or unbounded at the 4' depth.**

*Comment 3:*

Referring to Section 1.2.7, the last sentence states that there are no known land use or community actions under consideration or proposed at this time and cites a 1997 Brown & Root Environmental document. Have there been any changes in this area in the past three years?

**Response:** Currently there are no municipalities or known land use or community actions under consideration or proposed at this time that are close to NSWC Crane. Also, the Demolition Range and Old Rifle Range are located close to the center of the NSWC Crane (over two miles from the closest property boundary) and therefore the potential impact to human health and the environment from any soil contamination is very low.

*Comment 4:*

The groundwater concentration which will trigger soil and geophysical sampling at the DR-Navy is defined in Section 4.1.1. A 5 times factor has been applied to the definition of a "hot spot", yet there is no rationale explaining how this factor was derived or why it is appropriate. Provide a detailed discussion of the derivation of the 5 X factor in both Sections 4.1.1. and 1.4.2.1. of the QAPP. Provide a similar discussion of the 2 X factor for the ORR.

**Response:** The rationales for both 2x and 5x factors above background were provided on page 1-23 of the Draft QAPP.

**ORR**

A more statistically based approach for comparing ORR samples to background is presented below. The text will be modified throughout the document to reflect this approach.

Site soil metals data will be compared to corresponding metals data from the NSWC Crane Basewide Soil Background Study for soils of similar depositional environment, depth and grain size. The comparison will make use of the non-parametric Wilcoxon Rank Sum test at a 5% significance level. Using the Wilcoxon Rank Sum test, if site data are classified as representing a population having a concentration greater than the corresponding background population, soil in these locations will be classified as "contaminated."

**DRNavy**

**Response:** Based on USEPA Region 5's decision to defer action on SWMU 6 until closure (see attached letter from Mr. Ramanauskas dated September 20, 2000) the subject comment does not need to be addressed at this time.

*Comment 5:*

As noted in Sections 1.4.2.2 and 4.1.1., at the DR Navy, the need for soil and geophysical testing will be triggered by a combination of measured values: 1) exceeding the risk based target level (RBTL) and 2) exceeding the mean background by a factor of 5 times. This combination thereby defines the boundary of the "hot spot", but appears to be a liberal definition as the RBTL

could be exceeded without exceeding the mean background by as much as a factor of 5. Please provide an explanation of the appropriateness of this approach in light of the contamination known to be present in DR Navy soils.

**Response: Based on USEPA Region 5's decision to defer action on SWMU 6 until closure (see attached letter from Mr. Ramanauskas dated September 20, 2000) the subject comment does not need to be addressed at this time.**

Similarly, for the ORR, provide an explanation for the appropriateness of setting the contamination boundary at the areas exceeding both RBTLs and 2 times the mean background.

**Response: See response to comment number 4. "Contamination" for the purpose of this RFI is presence of operationally-related chemical substances that are above their risk-based limits, which have been established to protect human and/or ecological receptors. Therefore, if the presence of chemical substances (operationally-related or not) does not exceed their risk-based limits, no action is necessary. Likewise, if these substances are present above their risk-based limits, but are also present above the RBTL naturally (background), no action is necessary. The determination of what constitutes "above background" is discussed in the response to comment number 4.**

*Comment 6:*

Referring to Section 4.1.1., was X-Ray Fluorescence (XRF) considered as a field-screening tool for Manganese detection?

**Response: Based on USEPA Region 5's decision to defer action on SWMU 6 until closure (see attached letter from Mr. Ramanauskas dated September 20, 2000) the subject comment does not need to be addressed at this time.**

*Comment 7:*

Referring to Table 2-1, Page 2-11, the correct phone number for Peter Ramanauskas is (312) 886-7890.

**Response: The telephone number for Peter Ramanauskas on Table 2-1, page 2-11 will be changed to (312) 886-7890.**

*Comment 8:*

Referring to Sections 4.1.1. and 4.3.2., please provide rationale for submitting only the top and bottom intervals of each soil boring for subsurface laboratory analysis.

**Response: Based on USEPA Region 5's decision to defer action on SWMU 6 until closure (see attached letter from Mr. Ramanauskas dated September 20, 2000) the subject comment does not need to be addressed at this time.**

*Comment 9:*

On Page 2-3, the second to last sentence states that "This section identifies the QA responsibilities for the soils RFI." However, given that groundwater samples will also be taken,

the word "soils" should be deleted from this sentence.

**Response:** Based on USEPA Region 5's decision to defer action on SWMU 6 until closure (see attached letter from Mr. Ramanauskas dated September 20, 2000) the subject comment does not need to be addressed at this time.

*Comment 10:*

There should be a signatory space added to the title page for the Navy QA Manager. Also, once this person has been identified, he/she should be introduced into both Figure 2-1 and Table 2-1.

**Response:** The function of Navy QA Manager will be performed by the Navy's contractor, Tetra Tech NUS. This relationship has existed on past Tetra Tech projects at Crane and will continue during the term of Tetra Tech's contract with the Navy. Therefore any reference to the Navy QA Manager will be deleted including references to this position on Figure 2-1 and Table 2-1.

*Comment 11:*

In Section 2.2.5, Page 2-6, it should be mentioned that the Laboratory QA Officer will also conduct internal audits.

**Response:** A bullet will be added to the lists of bullets under Section 2.2.5, Laboratory Quality Assurance Officer that will read:

- Conduct internal audits

*Comment 12:*

Referring to the last sentence in Section 4.1.1, Page 4-4, the vague phrase, "...elevated region of manganese has not been bounded in the vertical direction...." should be clarified.

**Response:** Based on USEPA Region 5's decision to defer action on SWMU 6 until closure (see attached letter from Mr. Ramanauskas dated September 20, 2000) the subject comment does not need to be addressed at this time.

*Comment 13:*

In Section 4.1.1, Page 4-4, it is stated that "the presumed rectangular grid ... is expected to contain no more than 25 sampling location." We do not believe that an upper limit on the number of sampling locations is presently advisable. Rather, we would advise a statistically based sampling plan for hot spot detection which evaluates the number of sampling locations required given several considerations. The considerations are: 1) expected shape and size of a hot spot; 2) acceptable probability of a false negative conclusion (e.g. not detecting an actual hot spot); 3) shape of grid partitions (apparently they will be rectangular); and, 4) size of the area of concern. A statistical procedure certainly would be more credible than merely using professional judgement though professional judgement certainly should be used to facilitate the development of a maximally efficient design. The considerations listed on Page 4-4 as bullets certainly may be used for decisions, such as whether or not to stratify within the area of concern in order to use different sampling densities in different portions of the site. For example, it may be reasonable to sample with greater density in subareas with greater likelihood of having hot

spots. The statistical procedure is discussed in the following document which is available upon request:

Lubin, A.N.; Williams, M.H.; and Lin, J.C. Statistical Techniques Applied to Sediment Sampling (STATSS): Draft 03. U.S. Environmental Protection Agency - Region 5: Chicago, Illinois, 1995.

**Response:** Based on USEPA Region 5's decision to defer action on SWMU 6 until closure (see attached letter from Mr. Ramanauskas dated September 20, 2000) the subject comment does not need to be addressed at this time.

*Comment 14:*

In Section 4.1.2, Page 4-6, the second paragraph on this page is not entirely clear. What depths do the data points correspond to in Figures 4-2 and 4-3? Please add this information to the QAPP. When performing a krig of the historical soil sampling data, it may be worthwhile to look at each COC individually and then overlay them.

**Response:** The depths for the data points on Figure 4-1 (former Figure 4-2) are surface soils (0-2'). The proposed depths for the data points on Figure 4-2 (former Figure 4-3) are surface soils, which will be collected at 0-1' for consistency with the Background Study. The following text will be added to the second paragraph after the first sentence;

"The depths for the data points on Figure 4-1 are surface soils (0-2'). The proposed depths for the data points on Figure 4-2 are surface soils, which will be collected at 0-1' for consistency with the Background Study."

Individual krigs were performed at an early stage of the development of this RFI QAPP. It was felt that because the goal was to define the boundary of contamination >RBTLs (background correction takes place after that step is done), the parameterless krig showing maximum ratios of COCs/RBTLs provided a simpler picture (one figure vs. numerous) and was more useful for picking sample locations for the first round.

Also, see response to comment number 18.

*Comment 15:*

Referring to Section 4.4.1, Page 4-11, there is no rationale for why it wouldn't be advantageous to perform quarterly groundwater monitoring, and apply the decision rules to each quarter. From our perspective, it would be more conservative to sample for manganese on a quarterly basis as opposed to conducting a single collection event.

**Response:** Based on USEPA Region 5's decision to defer action on SWMU 6 until closure (see attached letter from Mr. Ramanauskas dated September 20, 2000) the subject comment does not need to be addressed at this time.

*Comment 16:*

Criteria for determining which IDW should be sent offsite for disposal should be added to Section 4.10, Page 4-19.

**Response:**

For soils, the only two TCLP constituents to be analyzed are arsenic and heptachlor epoxide. If neither of these exceed their TCLP criteria in soils (20x the TCLP regulatory limit) the material will be spread on the ground near the holes from which it was extracted. The following text will be added to Section 4.10;

The "Waste Soils from Soil Borings" discussion will now read: "Excess soil from hand augering or DPT operations produced during soil sampling will be drummed and retained onsite until soil analyses are provided for arsenic and heptachlor epoxide. If arsenic soil concentrations do not exceed 20x the TCLP extract limit (100mg/Kg) and heptachlor epoxide soil concentrations do not exceed 20x the TCLP extract limit (0.16mg/Kg) the soil will be returned to the boring hole to the extent possible with the remainder to be placed close to where the associated sample was collected and raked into the surface.

When a waste undergoes TCLP extraction, it effectively incurs a 20-fold dilution. To correctly compare TCLP extract analytical results with the TCLP limits requires multiplying the results by 20x to offset the dilution effect. The TCLP limits for arsenic and heptachlor epoxide using this 20x rule are based upon the following calculations and the fact that the TCLP procedure uses 100 grams (0.1kg) of soil - extracted into 2 liters of fluid:

#### Arsenic Calculation

- The TCLP extract limit for arsenic is 5mg/L;  $20 \times 5$  (expressed as mg/kg) is 100mg/kg
- 100mg/kg of arsenic in a soil sample is equivalent to 10mg/100g ( $100\text{mg} \times 0.1\text{kg}$ )
- 10mg of arsenic extracted into 2 liters of extract is equivalent to 5mg/L ( $10\text{mg}/2\text{L} = 5\text{mg/L}$ )
- Therefore, if the soil concentration of soluble arsenic is less than 100mg/kg, the TCLP extract limit of 5mg/L cannot be exceeded.

#### Heptachlor epoxide Calculation

- The TCLP extract limit for heptachlor epoxide is 0.008mg/L;  $20 \times 0.008$  (expressed as mg/kg) is 0.16mg/kg
- 0.16mg/kg of heptachlor epoxide in a soil sample is equivalent to 0.016mg/100g ( $0.16\text{mg} \times 0.1\text{kg}$ )
- 0.016mg of heptachlor epoxide extracted into 2 liters of extract is equivalent to 0.008mg/L ( $0.016\text{mg}/2\text{L} = 0.008\text{mg/L}$ )

Therefore, if the soil concentration of soluble heptachlor epoxide is less than 0.16mg/kg, the TCLP limit of 0.008mg/L cannot be exceeded."

#### *Comment 17:*

Procedures for validating the explosives chemical data should be inserted into Section 9.2.2. This is because neither of the cited references for performing data validation contain procedures for validating SW-846 method 8330 data.

**Response:** As is the case with most SW-846 analytical methods, CLP National Functional Guidelines do not directly correlate. However, the logic used for CLP parameters is

regularly applied to the QC review and data validation of SW-846 methods, including SW-846 method 8330. Therefore, the general logic used in EPA CLP guidelines, analytical objectives outlined in the QAPP, and analytical method requirements themselves will be used to validate explosive compound results. The following text will be added to the end of paragraph 2 in Section 9.2.2:

**“For the three explosive compounds to be investigated as part of this RFI, the general logic used in EPA CLP guidelines, analytical objectives outlined in other sections of this QAPP, and SW-846 method 8330 requirements themselves will be used to validate explosive compound results.”**

*Comment 18:*

Referring to the first paragraph of Section 12.4.3., be aware that a 3 dimensional map is acceptable with the understanding that it is to be used as an approximation of the extent of contamination. In order for a 3 dimensional map to be valid, the soils must be homogeneous and isotropic, neither of which occurs in nature. A more accurate method would be to make 2 dimensional maps by soil horizon and stack them. A common alternative is to make the 2 dimensional maps by depth, since the data is collected that way. All raw data sets utilized for kriging should be submitted in electronic format to the U.S. EPA and IDEM.

**Response: The Navy agrees that soils are not homogeneous and isotropic in nature. Although it is valid to krig and stack separate two-dimensional layers, it is more realistic to krig all data and all depths at one time to produce a 3-D model. Three-dimensional modeling gives a more accurate picture of the estimated volume of contaminated soil as it naturally exists in the subsurface, which is the objective of the RFI. With 3-D modeling, individual 2-D layers can be discriminated at any depth by slicing through the model. Two dimensional maps will not provide vertical extent information either below or above a given sample depth. Two dimensional maps will be provided, if required, however they will probably not be used to estimate the volume of contaminated soil. All raw data sets utilized for kriging will be submitted in electronic format to the U.S. EPA and IDEM.**

*Comment 19:*

On Page 12-6 it is stated that “All data, including statistical outliers, will be retained as part of the final record even though they may not be used in decision making.” Does this statement mean that the analysis will be done without the outliers? Analysis should be done both with and without statistical outliers unless the outliers are individually checked and found to be inaccurate information.

**Response: Numerous tests can be performed to determine statistical outliers for a given data set. These tests (as appropriate) will be run on data sets obtained for this investigation. However, it is important to note that *none* of the data will be eliminated *solely* based on the results of statistical outlier testing. Data identified as outliers will be examined for errors (i.e., mistakes in conversions, transpositions, etc.) and will be eliminated from the data set if errors or mistakes are the cause for the value being an outlier. If mistakes or errors are not noted following evaluation of the suspect data, they will be included as acceptable values, even if they were identified as outliers by the statistical test. The following text will be added as the last sentence of this section**

**“Data identified as outliers by statistical testing will be examined for errors (i.e., mistakes**

in conversions, transpositions, etc.). Incorrect data will be eliminated from the data set if errors or mistakes are the cause for values being outliers. If mistakes or errors are not noted following evaluation of the suspect data, they will be included as acceptable values, even if they were identified as outliers by the statistical test."

*Comment 20:*

Are the aerial photograph dates given for the Demolition Range and Old Rifle Range on Page A-5 correct?

**Response:** Yes. NSWC Crane maintains a large inventory of historical aerial photographs which extend from before WW II to more recent photos. The majority of the facility was flown shortly after WW II and the photos that include SWMUs 6 & 7 were examined prior to generating the QAPP.

*Comment 21:*

In the Health and Safety Plan, please provide revisions to Section 1.2 and Table 2-1 when the FOL/SSO, Field Technician, UXO/EOD Specialist, Equipment Manager, Analytical Laboratory, and Surveyor have been identified. Hasn't the analytical laboratory been identified as Laucks Testing Laboratories, Inc.?

**Response:** The following additions will be made to the Section 1.2

<b>Tetra Tech NUS Personnel:</b>	<b>Discipline/Tasks Assigned:</b>	<b>Phone No.</b>
Keith Simpson	FOL/SSO	(412) 921-8131
Phillip Blackwell	UXO/EOD Specialist	(770) 413-0965
Tom Patton	Equipment Manager	(412) 262-4583
<b>Non-Tetra Tech NUS Personnel</b>	<b>Affiliation/Discipline/Tasks Assigned</b>	<b>Phone No.</b>
Laucks Testing Laboratories, Inc	Analytical Laboratory	(206) 767-5060

(Note: the Tetra Tech NUS Field Technician and the Non-Tetra Tech NUS Surveying Subcontractor will be determined when the field schedule is established. This individual and firm will be identified in the RCRA Facility Investigation Report.)

The following additions will be made to TABLE 2-1 EMERGENCY REFERENCE, NSWC Crane, Crane, Indiana:

<b>AGENCY</b>	<b>TELEPHONE</b>
Field Operations Leader, Keith Simpson	(412) 921-8131
UXO/EOD Specialist, Phillip Blackwell	(770) 413-0965