



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5  
77 WEST JACKSON BOULEVARD  
CHICAGO, IL 60604-3590

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NSWC CRANE  
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REPLY TO THE ATTENTION OF:

February 18, 2003

DW-8J

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

Re: Draft SWMU 7 Phase III Soils  
RFI Report Comments  
IN5 170 023 498

Dear Mr. Brent:

The United States Environmental Protection Agency (U.S. EPA) has reviewed the Draft SWMU 7 Phase III Soil RFI Report dated November 2002.

Comments on the report are enclosed. Please revise the report to address these comments.

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

Sincerely,

Peter Ramanauskas  
Environmental Engineer  
WMB, Corrective Action Section

Enclosure

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cc: Bill Gates, SOUTH DIV (w/ encl)  
Doug Griffin, IDEM (w/ encl)  
Allen Debus, U.S. EPA (w/ encl)  
Dr. Arthur Lubin, U.S. EPA (w/ encl)

**U.S. EPA COMMENTS**  
**Draft Phase III Soils RFI Report (November 2002)**  
**For Solid Waste Management 7 (Old Rifle Range)**  
**Naval Surface Warfare Center - Crane, Indiana**

**RFI COMMENTS**

**GENERAL COMMENTS**

*Comment 1:*

The Navy has included a human health risk screening evaluation in this RFI report. Plans for this assessment were not included in the workplan for this RFI, nor was it included in the project objectives. Please provide rationale for the performing the evaluation and why a screening evaluation is adequate for this SWMU.

*Comment 1:*

Neither the lateral nor vertical extent of contamination at the Old Rifle Range (ORR) and the Old Pistol Range (OPR) appear to have been fully delineated. As described in Specific Comments 4, 5, and 6 below, the highest concentrations of some contaminants exist at the furthest lateral and vertical edges of the investigation. Therefore, further investigation of the nature and extent of contamination is warranted.

*Comment 2:*

The dataset size for the ORR for both the surface and subsurface evaluations is 28 samples, while the size for the OPR is 18 samples. However, in contrast, the dataset sizes used to describe background conditions was substantially smaller – 15 samples for the surface soil comparison and 5 samples for the subsurface. While it is recognized that the background data for this evaluation is taken from a broader basewide study, the calculation of upper tolerance limits (UTLs) for background and, more so, the application of Analysis of Variance (ANOVA) evaluations (especially for the subsurface soil evaluations) on small datasets may result in false conclusions or conclusions with a high level of uncertainty.

*Comment 3:*

Although it is recognized that the Decision Rules used to conclude that the extent of contamination has been adequately defined are presented in an approved Quality Assurance Project Plan (QAPP), there are concerns related to the appropriateness of these Rules in light of the above.

In summary, these rules state the following:

- (i) If there is a statistical difference between site and background concentrations, and if the concentrations exceed the Risk-Based Target Level (RBTL), then the extent of contamination has NOT been defined.
- (ii) If there is a statistical difference between site and background concentrations, but concentrations do NOT exceed the RBTL, then the extent of contamination has been defined.
- (iii) If there is NO statistical difference between site and background concentrations, and if the concentrations exceed the RBTL, then the extent of contamination has been defined.

The use of small datasets (especially one with only 5 datapoints), suggests that the uncertainty associated with the Rules may be unacceptably high. Please address this concern particularly related to possible false negative conclusions.

*Comment 4:*

The procedure to screen the list of detected compounds to select chemicals of potential concern (COPCs) does not follow recent guidance related to inclusion of background contamination. As outlined in U.S. EPA's "Role of Background in CERCLA Cleanup Program" (OSWER 9285.6-07P, May 1, 2002), U.S. EPA has established a policy that risk assessments should retain constituents that exceed risk-based screening concentrations, regardless of whether or not those constituents are believed to be from background sources. This enables the risk manager to have a more complete picture of the risks associated with hazardous contaminants present at the site. The risk characterization section of the report should then include a discussion of elevated background concentrations of COPCs and their specific contribution to site risks.

EPA-Region 5 recognizes that NSWC Crane has conducted a site-wide sampling program to establish site-specific background data on the presence of naturally-occurring inorganic constituents (i.e., metals). Consequently, the risk assessment for SWMU 2 should be revised to provide a qualitative discussion (in the risk characterization section) which identifies any constituents that exceed risk-based screening levels but were eliminated from the risk assessment based on comparison to site-specific background levels.

## **SPECIFIC COMMENTS**

*Comment 1:*

Section 2.1.1, Old Rifle Range: Pages 2-2 and 2-3 provide a description of the follow-up ditch sampling conducted at the ORR. Sample locations are presented on Figure 2-1. There is reference to Ditches 1 through 4 in the first paragraph of page 2-3, but these ditches are not adequately presented and identified in any of the figures. For clarity and ease of review, revise the document to provide a figure specifically identifying the area where the ditch sampling occurred, including identification of the ditches and relevant sampling locations. In addition, provide the locations of the referenced "in-ground rusty pipe and valve" and the "concrete

storage pads adjacent to the yellow-D burn pits" (page 2-2, second paragraph) on the figure.

*Comment 2:*

Section 2.2.2, Subsurface Soil Sampling: This section indicates that, after sampling, boreholes were backfilled with the remaining soil cuttings. Section 4.9 of the RFI QAPP indicated that these cuttings would be drummed and retained until waste characterization analyses were complete. Provide the justification for this apparent deviation from the QAPP.

*Comment 3:*

Section 3.1, Soil Sampling Results, Tables 3-3 through 3-8: It is recognized that the detection of the polynuclear aromatic hydrocarbons (PAHs), energetics and a single pesticide parameter was sporadic in both the ORR and the OPR. It is suggested that the background level (e.g., the UTL) for these parameters be presented on Tables 3-3 through 3-8. This would provide another point of reference and clarification for only retaining arsenic and manganese in further evaluations. Additionally, it is suggested that if all results (for a high percentage of results) for a single parameter were reported as non-detected (e.g., RDX), then no value be provided for the mean or standard deviation for that parameter. The minimum and maximum of both the detected values and the detection limits provides sufficient information. Revise the RFI Report accordingly.

Although not materially affecting this current evaluation, Table 3-8 indicates that there was some variability associated with the study detection limits, particularly for the PAHs. Because of this range of limits, often times the use of  $\frac{1}{2}$  the sample quantitation limit (SQL) or the detection limit may not be ideal for statistical calculations because data of this limited variability may affect the statistics (e.g.,  $\frac{1}{2}$  of 8 ug/kg as compared to  $\frac{1}{2}$  of 40 ug/kg).

*Comment 4:*

Section 3.1.1, Old Rifle Range Positive Detections: Upon review of the tables and figures, it was observed that the highest detections of beryllium and manganese for the entire investigation were found in soil sample 07SB21001 (the surface sample collected at Soil Boring 21). As shown on Figure 2-1, this soil boring location is well beyond the western boundary of SWMU 7. Given that these results are the highest levels of the investigation, the lateral extent of contamination in this area does not appear to have been delineated. Further sampling is warranted at locations further west, north, and south (as well as downgradient) of this location. Revise the RFI Report to address this concern.

*Comment 5:*

Section 3.1.1, Old Rifle Range Positive Detections: At a number of soil borings and for a number of parameters, the contamination increases with depth. Arsenic concentrations increase with depth in the following borings: SB01, SB02, SB08, SB11, SB12, SB13, SB17, SB18, SB21, SB22, SB23, and SB26. Manganese concentrations increase with depth in the following borings: SB01, SB05, SB06, SB07, SB08, SB12, SB15, SB16, SB20, SB26, SB27, and SB28. Beryllium

concentrations increase with depth in the following borings: SB07, SB08, SB16, SB20, and SB 27. In addition, levels of the following contaminants increase with depth in SB04: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Levels of the following contaminants increase with depth in SB15: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene. Because of this apparent widespread increase in contamination with increasing depth, the vertical extent of contamination for a number of parameters has yet to be delineated. Further sampling is warranted at depths below four feet throughout the SWMU to determine the nature and vertical extent of contamination. Revise the RFI Report to address this concern.

*Comment 6:*

Section 3.1.2, Old Pistol Range Positive Detections: At a number of soil borings and for a number of parameters, the contamination increases with depth. Arsenic concentrations increase with depth in the following borings: SB30, SB31, SB34, CP35B, CP36B, CP37B, CP38B, CP39B, CP41B, CP42B, CP44B, CP45B, and CP46B. Manganese concentrations increase with depth in the following borings: SB31, SB32, SB33, SB34, CP35B, CP36B, CP40B, CP42B, CP45B, and CP46B. Beryllium concentrations increase with depth in the following borings: SB32, SB33, SB34, CP35B, CP36B, CP39B, CP40B, CP41B, CP42B, CP44B, CP45B, and CP46B. Because of this apparent widespread increase in contamination with increasing depth, the vertical extent of contamination for a number of parameters has yet to be delineated. Further sampling is warranted at depths below four feet throughout the SWMU to determine the nature and vertical extent of contamination. Revise the RFI Report to address this concern.

*Comment 7:*

Section 3.2.2, Old Rifle Range Surface Soil Background and RBTL Comparisons, Table 3-9: The report clearly states the assumptions for the appropriate application of an ANOVA evaluation – particularly the need to evaluate the residuals from the calculations. However, the information provided on Table 3-9 is unclear. It is presumed that the ANOVA was calculated on the actual concentrations or the ranks of the data, depending on whether a parametric or nonparametric method was used. However, this table also lists the underlying distribution for both the site and background datasets, with name datasets identified as lognormal. Please confirm the structure of the ANOVA evaluation (i.e., where any data transformations were considered). Additionally, if the “distribution” is provided for informational purposes only, consider providing this information on a table separate from the ANOVA. Revise the RFI Report to provide the requested information.

*Comment 8:*

Section 3.2.3, Old Rifle Range Subsurface Soil Background and RBTL Comparisons: As identified in the General Comments, the dataset size for the subsurface soil ANOVA evaluations contains five data points. Revise the RFI Report to address (e.g., in Section 3.2.3 and 3.2.5, and/or Table 3-9) uncertainties that may or may not exist due to the small data set.

*Comment 9:*

Section 3.3, Geostatistical Modeling of Arsenic and Manganese: UTLs were calculated for arsenic and manganese; the background data for arsenic was defined as following a normal distribution while manganese was defined as following a lognormal distribution. Review the appropriateness of concluding that manganese should be evaluated with a lognormal distribution. This is suggested because of the small dataset sizes and more importantly, since the calculated UTL for manganese is substantially greater than even the maximum detected concentration. Although this comment does not materially affect the current evaluation of the ORR and OPR, it does raise an area for clarification of the background UTLs used in other investigations and evaluations.

*Comment 10:*

Section 3.3, Geostatistical Modeling of Arsenic and Manganese: Figures 3-1 through 3-18, present the kriging results. Although the ANOVA did not indicate that ORR subsurface soils for arsenic concentration were statistically different than background, it is suggested that a figure presenting those results be included, especially in light that the dataset size used for that ANOVA determination was very small. Also, consider including a graphical representation of the beryllium data since it was determined that both ORR and OPR data for surface soil, and subsurface soils for ORR were statistically different than background. Revise the RFI Report accordingly to provide this additional information.

As indicated in Specific Comment 9 above, it is requested that the use of lognormal statistics for manganese be re-examined. Figures 3-14 and 3-15 present the kriging results for manganese. However, clarify the inconsistency and revise as appropriate, why one graphic is a comparison to a background concentration calculated using normal statistics, and why the second graphic is a comparison to the UTL calculated using lognormal statistics.

## **HUMAN HEALTH SCREENING EVALUATION COMMENTS**

### **SPECIFIC COMMENTS**

*Comment 1:*

Section 4.2, Exposure Assessment: The RFI Report does not include a discussion of how the RBTLs mentioned on page 4-2 were developed. In addition, the RFI Report does not explain how the RBTLs differ from U.S. EPA's risk based screening levels from Region 9, known as the Preliminary Remediation Goals (PRGs) which are used to select COPCs for this SWMU 7 screening risk assessment. Revise the RFI Report to include this information. In addition, explain why two sets of screening levels have been used in the RFI Report.

*Comment 2:*

Section 4.2, Exposure Assessment: Table 3-9 identifies "Lowest Risk Based Screening Levels" stated to have been taken from the QAPP for the project. Revise the RFI Report to explain how these screening values differ from the Region 9 PRGs. Additionally, footnote 4 to Table 3-9 indicates that the "Lowest Risk Based Screening Levels" for RDX, 2,4,6-trinitrotoluene, and manganese have been newly developed for this Phase III Soils report. The footnote should be expanded to clearly provide the input parameters and equations that were used for these three constituents, so that the calculated screening values can be evaluated.

*Comment 3:*

Section 4.2, Exposure Assessment: The text on page 4-2 states that in the future base personnel engaged in ammunition burning may open-burn Yellow D waste six days a week. However, this potential future exposure scenario was not evaluated in the screening risk assessment. The screen for occupational exposures using the PRG values accounts only for occupational exposures of five days per week, based on wind suspension of dust and entrained in ambient air. There is no acknowledgment that burning of ammunition carries its own set of exposures and risks nor an assessment of these risks which may be thought of as an input to inhalation exposure separate and distinct from soil-to-air particulate emissions. It is unclear how the facility intends to address risk related to soil contaminants from previous activities at the site and risk related to on-going and future soil and air contamination from open-burning of wastes at the site. This issue of potential cumulative exposures should be discussed. Revise the RFI Report accordingly.

*Comment 4:*

Section 4.2, Exposure Assessment: As presented, the RFI Report does not include a discussion of the trespasser scenario, other than merely to identify it as a bulleted item on page 4-2. The potential for trespassing at the site should be further discussed. Either explain that the assumed future potential on-site residential exposure scenario was used to conservatively represent and account for trespasser exposure, or revise the RFI Report to specifically include evaluation of a trespasser scenario.

*Comment 5:*

Section 4.3, Risk Characterization: The report takes the position that so long as the screening level risk is below a target risk of  $1 \times 10^{-4}$ , then the risk is acceptable. U.S. EPA generally considers risk-based approaches to be protective if they achieve a risk which falls within the  $10^{-4}$  and  $10^{-6}$  range. However, all things being equal, U.S. EPA's preference is for risk-based approaches that are at the more protective end of the risk range. A target risk level of  $1 \times 10^{-6}$  should be used as the point of departure in the discussion of site risks. Revise the text of the RFI Report to specifically identify and discuss those risks (chemicals and exposure routes) that exceed a target risk of  $1 \times 10^{-6}$ . For estimates of risk which fall within the NCP RRR, U.S. EPA will make a judgment on an acceptable level of risk which may be allowed to remain in situ. Although the facility may make suggestions regarding remedial levels, U.S. EPA will make site-

by-site determinations based on the level of conservatism and degree of uncertainty inherent in the quantitative and qualitative assessments of risk.

*Comment 6:*

Section 4.3, Risk Characterization: It is difficult to understand the cumulative risk posed by the site, as presented. Conclusions from a previous risk assessment were used to identify a small subset of constituents for which sampling was performed for this Phase III report. There is no discussion as to what risk may be associated with any other constituents previously detected. There is also no discussion as to whether there is consistency in the screening procedures between the previous risk assessment and the current screening report. Screening out constituents using different criteria and different exposure scenarios for various phases of the site investigation makes it impossible to understand what level of cumulative risk may exist. Revise the RFI Report where necessary to more clearly define the risks associated with the site.

*Comment 7:*

Section 4.3, Risk Characterization: The text on page 4-3 states that the only risk exceeding  $1 \times 10^{-4}$  is that attributable to industrial worker exposure to the surface soil at the ORR. This does not appear accurate, as noted in the results summary table on the same page. In fact, the highest risk for all the exposure scenarios was residential exposure to surface soil at the ORR, calculated to be  $6.6 \times 10^{-4}$ . The remainder of the report fails to fully discuss this risk result, saying only vaguely that risk for a hypothetical residential receptor might be reduced if a more representative exposure point concentration could be calculated, which would require additional environmental sampling. This is not an acceptable manner to discount the results of the screening risk assessment. The RFI Report should be revised to discuss risk results for the residential receptor in greater detail.

*Comment 8:*

Section 4.3, Risk Characterization: The screening risk assessment states that only those constituents exceeding a risk level of  $1 \times 10^{-4}$  are carried forth in a refined assessment. This inappropriately eliminates the risk due to other constituents that exceed U.S. EPA's lower bound point of departure for the NCP target risk range of  $1 \times 10^{-6}$ . This applies specifically to the following contaminants: arsenic in surface soil at ORR (industrial and residential exposures); benzo(a)pyrene in subsurface soil at the ORR (residential exposure); arsenic in surface soil at the OPR (industrial and residential exposures); arsenic in subsurface soil at the OPR (industrial and residential exposures). Revise the RFI Report to address the contribution of these other constituents to the total risk in the refined risk assessment.

*Comment 9:*

Section 4.3, Risk Characterization: USEPA's *Supplemental Guidance for Developing Soil Screening Levels at Superfund Sites* (OSWER Directive 9355.4-24, March 2001) recommends that outdoor worker incidental soil ingestion be set at 100 mg/kg. In contrast, the screening

assessment uses a dated generic industrial worker soil ingestion rate of 50 mg/kg. The risk estimates calculated in Appendix H (Attachments 2 and 3) and the report text on pages 4-4 and 4-5 for the 2-day/year and 6-day/year worker should be updated to reflect a more conservative soil ingestion rate of 100 mg/kg for outdoor workers. Revise the RFI Report accordingly.

*Comment 10:*

Section 4.3, Risk Characterization: Tables 4-16 through 4-19, discussed on page 4-5 of the report, include Soil Screening Levels (SSLs) for Migration to Groundwater. Revise the RFI Report to identify the source of the SSLs data for manganese and 2,4,6-TNT. Neither U.S. EPA's SSL guidance or the U.S. EPA Region 9 PRG tables provide SSL groundwater migration values for these constituents.

*Comment 11:*

Section 4.4, Uncertainty Analysis: The process/site knowledge that suggests PAHs are not site-related contaminants has not been adequately described. PAHs are common by-products of combustion, and combustion of wastes by open-burning has occurred at the site. Furthermore, the information on rural PAH levels provided in Appendix H, Attachment 4 highlights that PAH levels at the site are all higher (up to an order of magnitude) than the reported typical levels in rural soils. Remove the discussion suggesting that PAHs are of no concern at the site based on comparisons to typical soils. In addition, revise the RFI Report to present further evidence that PAHs cannot be site-related and suggest what non-site related anthropogenic sources may be responsible.

*Comment 12:*

Section 4.4, Uncertainty Analysis: The alternate screening level of 5,500 mg/kg for residential exposures to manganese is based on an U.S. EPA Region 1 publication from 1996. The authors of Crane RFI Report should confirm that U.S. EPA Region 1 continues to endorse this alternate value and should determine if the value includes only soil ingestion or whether it also includes dermal exposure and particulate inhalation similar to the PRG value. The discussion in U.S. EPA's Integrated Risk Information System (IRIS) database on the use of modifying factors does not discuss the relative improbability of young infants being exposed to manganese in soil. Instead, IRIS indicates that early infant exposure to manganese has adverse neurological impacts that are likely irreversible and not manifested for many years after exposure. Since it is impossible to preclude the exposure of babies under 12 months of age to soils, it would seem that a conservative approach as was used to develop the U.S. EPA PRGs should be considered. Revise the RFI Report to include further justification for the use of the less conservative screening level for manganese, or remove this discussion from the RFI Report.

*Comment 13:*

Section 4.4, Uncertainty Analysis: Comparison of site-specific arsenic levels to national background soils data is not sufficient rationale to exclude arsenic contamination at the site, as

indicated on page 4-7. Arsenic levels in soil that present a human health risk and that exceed site-specific background levels warrant further evaluation. Revise the RFI Report accordingly.

*Comment 14:*

Section 4.5, Summary and Conclusions: The summary and conclusions should be expanded to address risk attributable to arsenic, manganese, and benzo(a)pyrene which are associated with risks exceeding  $1 \times 10^{-6}$  at both the ORR and the OPR. It is unacceptable to limit the identification of potential risk drivers to the one constituent exceeding a risk level of  $1 \times 10^{-4}$  at the ORR area only. Revise the RFI Report accordingly.

*Comment 15:*

Section 4.5, Summary and Conclusions: The risk attributable to the hypothetical residential scenario has not been adequately discussed. Revise the RFI Report to identify what potential further investigative or remediation steps are envisioned to either refine the residential exposure scenario or to address the high risk levels identified.

*Comment 16:*

Section 4.5, Summary and Conclusions: The conclusions section should acknowledge that evaluation of a worker scenario including six days per week exposure has not been adequately addressed. Further investigation and review is necessary to evaluate the potential risks that may be posed to daily open-burning operations on-site staff. Revise the RFI Report as needed to address these additional information needs.