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Project Manager: M. KIMES
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CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Christopher T. Penny
Navy Technical Representative
Installation Restoration Section (South)
Environmental Program Branch
Environmental Division,
Atlantic Division (LANTDIV), Code 182
Naval Facilities Engineering Command
1510 Gilbert Street
Norfolk, VA 23511-2699

Re: Naval Station Roosevelt Roads - EPA ID # PR2170027203

- 1) Draft Human Health Risk Assessment for SWMU #14 (Fire Training Pit Area), dated February 4, 2000;
- 2) Revised Corrective Measures Study (CMS) Final Report for SWMU #6/AOC B, dated May 30, 2000.

Dear Mr. Penny:

The United States Environmental Protection Agency (EPA) Region 2 has completed its review of the above documents transmitted on behalf of the Navy by Baker Environmental Inc. EPA's comments on the above documents are given below.

Draft Human Health Risk Assessment for SWMU #14

EPA has completed its review of the Draft Human Health Risk Assessment (HHRA) for SWMU #14, submitted by letter dated January 28, 2000. Based on that review and a review by our contractor, Booz Allen & Hamilton, EPA finds that while the HHRA evaluation for exposure to surface soils is generally adequate, deficiencies in site characterization preclude a full evaluation of all potential risks, as discussed in the enclosed Booz Allen Technical Review, dated June 23, 2000. Those deficiencies in site characterization were never previously noted because of factual misstatements [as well as inappropriate recommendations] regarding SWMU #14 in the July 1996 Phase I RFI Report for Operable Units 1, 6, and 7. With the submission of this HHRA you have now advised us of such misstatements; yet the deficiencies in site assessment now apparent, preclude a complete evaluation of all potential risks. Accordingly, EPA does not fully approve the HHRA and the

recommendation, given in Section 3.0 [as well as in the July 1996 Phase I RFI Report for Operable Units 1, 6, and 7] that no further action is required for SWMU #14.

The deficiencies in site characterization result from the fact that, as discussed in the enclosed Booz Allen Technical Review, possible impacts to groundwater have not been investigated, despite the detection of poly-aromatic hydrocarbon (PAH) constituents in surface soil samples at levels exceeding EPA's generic "soil screening levels"(SSLs) for possible groundwater impacts. For example, benzo(a)anthracene was detected at 3,400 ug/kg, while EPA's generic SSL is 2000 ug/kg based on a dilution attenuation factor (DAF) of 20 [at a DAF of 1 the SSL is 80 ug/kg], and benzo(b)fluoranthene was detected at 7,600 ug/kg, while the SSL based on a DAF of 20 is 5000 ug/kg [at a DAF of 1 the SSL is 200 ug/kg]. Furthermore, because an older unlined fire training pit, reportedly used from the early 1960s through 1983, apparently underlays the present concrete structure, which was constructed in 1983, possible impacts to soils underlying the present concrete structure, have never been determined. The only site investigation work at this SWMU was sampling of the surface soils outside of the present concrete structure and associated concrete apron. Based on statements in the July 1996 Phase I RFI Report for Operable Units 1, 6, and 7 [see Section 5.2.5 (page 5-18) and Section 7.1.5 (pages 7- 5)], EPA accepted the recommendation in the Phase I RFI Report that, because no evidence of releases was found in surface soil samples (which was erroneous), further investigation at SWMU #14 was not warranted [see Section 7.1.5, pages 7- 6].

In light of the above, EPA requests the Navy to either submit either:

- a) a supplemental site characterization workplan to investigate subsurface soils underneath the present concrete structure and groundwater that may have been impacted by releases from either the existing concrete-lined structure, as well as the prior unlined fire training pit; or
- b) a revised HHRA [and a streamlined Corrective Measures Study (CMS) report, as discussed below] addressing the comments in the enclosed Technical Review as well as those below.

If the Navy submits a revised HHRA rather than a supplemental site characterization workplan, EPA requests that the following be addressed, in addition to comments in the enclosed Technical Review:

1. Groundwater concentrations for those PAHs detected in surface soil samples at levels exceeding their generic SSLs should be extrapolated utilizing those surface soil concentrations divided by a dilution attenuation factor of 10. [Usage of the DAF of 10 is recommended to

be conservative in assessing potential risk, and is reasonable since groundwater is expected to be relatively shallow based on the depth to groundwater in the nearest background well installed along the perimeter road west of this SWMU.] Potential human health risks from groundwater exposures should then be evaluated utilizing those extrapolated groundwater concentrations. This evaluation should include both current usage scenarios and possible future residential usage scenarios. However, as groundwater is not utilized as a drinking water source, that exposure scenario does not need to be evaluated, but the HHRA must explain why it is not.

2. If the Navy chooses to submit a revised HHRA, in lieu of a supplemental site characterization workplan, that HHRA and the conclusions thereof, would, in effect, be predicated on the maintenance of the present concrete fire training pit and associated apron as an engineering control to prevent exposure to the [uncharacterized] soils beneath. Based on the previous operation of an unlined fire training pit at that location, soils beneath the existing concrete fire training pit and associated concrete apron are likely to contain PAHs, and possibly other hazardous constituents, at concentration levels greater than those evaluated in the HHRA. If such is the case, without the presence of the existing concrete fire training pit and associated apron those soils may pose unacceptable risks.
3. Therefore, if the site remains not adequately characterized, EPA cannot approve an HHRA recommending an unrestricted no further action status, without the final determination also including a proposal for an institutional control, which would require maintenance of the concrete fire training pit and associated apron as an engineering control, and/or a requirement that both surface and subsurface soils underlying the present concrete fire training pit and associated apron would be adequately characterized when those structures are removed, and if found to pose unacceptable risks, those soils would be acceptably remediated at that point. The proposal for such a remedy should be described in a streamlined CMS Final Report.

Accordingly, within 60 days of your receipt of this letter, please submit for SWMU #14 either:

- a) a draft CMS report, which proposes institutional controls as discussed above, and a revised HHRA reflecting the above comments, along with those in the enclosed Technical Review, or
- b) a supplemental site characterization workplan to adequately characterize all media (including soils underlying the present concrete

fire training pit and associated apron, as well as groundwater) that may have been impacted by releases from either the present structure at SWMU #14, or the previous fire training pit at that same location.

Of course, a revised HHRA incorporating the results of the supplemental site characterization, and possibly also a CMS, would still likely be required following implementation of the supplemental site characterization.

In addition, within 60 days of your receipt of this letter, please submit an appendix to the July 1996 Phase I RFI Report for Operable Units 1, 6, and 7, noting and/or revising all factual misstatements and/or inappropriate recommendations regarding SWMU #14, especially in Section 5.2.5 (page 5-18) and Section 7.1.5 (pages 7- 5 and 7-6).

Revised Corrective Measures Study (CMS) Final Report for SWMU #6/AOC B

The revised CMS Final Report dated May 30, 2000 was submitted to address EPA's comments given in my letter of March 15, 2000. SWMU #6 consists of an abandoned, partially subterranean concrete bunker that was formerly used for storage of waste paints and other liquid wastes. AOC B consists of the adjoining, open-air, bricked floor of demolished building 25, and was formerly used for storage of waste oils and other wastes.

Based on our review of the revised CMS Final Report, including a Human Health Risk Assessment (HHRA), EPA cannot fully approve it. EPA has several concerns with the results of the HHRA discussed in Section 3.0 of the CMS Report, and the conclusions and recommendation, given in Sections 3.3.2, 3.4, and 4.0 of the CMS Report, that there are no unacceptable risks to human health and that no further action is required. EPA has the following comments on the HHRA and CMS Report, and the recommendation that no further action is required:

1. Since the calculated total hazard index (HI) for young children under a possible future military residential usage is 1.4, a possible unacceptable threat is indicated. However, in Section 3.3.2 of the CMS Report, it is stated that "...these two COPCs [arsenic and 4,4"-DDT] target different organs of the human body. Therefore, it can be concluded that no unacceptable adverse human health effects would result for the future residential child...". While segregation of hazard indices by effect is allowed, EPA's "Risk Assessment Guidance for Superfund" ("RAGS"), December 1989, states in Section 8.2.2 (Aggregate Risks for Multiple Substances), page 8-14, that "Segregation of hazard indices...is complex...because it is necessary to identify all of the major effects and target organs for each chemical...." and that "If the segregation is not carefully done, an underestimate of true hazard could result." This is particularly significant in that all of the indicated risk to young children under future residential usage results from exposure to a single

medium, surface soils. The submitted HHRA does not adequately document that segregation is appropriate in this case. Therefore, the HHRA must either more fully document that segregation of hazard indices for possible future exposure of young children to surface soils is acceptable, or the statement in the CMS (on page 3-7) that "...it can be concluded that no unacceptable adverse human health effects would result for the future residential child...", must be deleted. In addition, should segregation of hazard indices for young child exposure to surface soils not be warranted, the CMS must be revised to include proposals for institutional (land usage restriction or other requirements discussed below) and/or engineering (such as fencing or capping) controls, in the absence of actual remediation of those surface soils.

2. There is no explanation of why exposure to contaminated pooled [surface] waters inside SWMU #6 was not evaluated under a possible future military residential usage scenario for either adults or young children; yet that exposure route was evaluated for current on-site commercial/utility workers. The HHRA must be revised to evaluate that exposure under future military residential usage, unless institutional controls [such as a requirement that building 145 (i.e., the bunker) and the surrounding contaminated soils, as well as any contaminated pooled (surface) water that may have accumulated inside the bunker, be removed prior to any future military residences being constructed nearby], and/or engineering controls (such as fencing and/or sealing of the roof openings) are proposed as part of the CMS recommended remedy.
3. There is no explanation of why construction workers were evaluated only for exposure to subsurface soils, while exposures to contaminated surface soils, pooled [surface] waters inside SWMU #6, and contaminated groundwater [which could accumulate if a construction excavation intersect the water table] were not evaluated. The HHRA must be revised to evaluate those exposures for construction workers.
4. In Section 3.2.2 (Identification of COPCs [constituents of potential concern]), it is stated that detected constituents in the single pooled [surface] water sample collected inside the bunker structure at SWMU #6 were compared to EPA Region 3 tap water risk based concentrations (RBCs) "because human health comparison criteria do not exist for surface water." Yet the constituents lead and mercury, which were both detected at concentrations over ten times their respective maximum contaminant levels (MCLs) [refer to National Primary Drinking Water Regulations (NPDWRs)], were not retained as COPCs and evaluated in the HHRA because it is indicated that tap water RBCs are "not established" [refer to Table 2-10] for those two constituents. That is inappropriate. Lead was detected at 735 ug/l, compared to its MCL of 50 ug/l [under the NPDWRs, there is now "Treatment Technique" Action Level for lead of 15 ug/l], and mercury was detected at 22 ug/l, compared to its MCL of

2 ug/l. Even though MCLs were promulgated as drinking water standards, they are relevant health based concentrations, and their usage as RCRA corrective action standards in non-drinking water situations is long-standing based on EPA guidance. Since accidental ingestion of the pooled [surface] water is a reasonable exposure route, and was evaluated in the HHRA for on-site commercial/utility worker exposure, lead and mercury must be retained as COPCs in the evaluation of pooled [surface] water risks, under all possible usage scenarios, both that previously evaluated (on-site commercial/utility worker), plus those additional usages discussed above (construction worker and possible future military residents).

Within 45 days of your receipt of this letter, please submit a revised CMS Final Report for SWMU #6/AOC B, including a revised HHRA, addressing the above comments.

General Comments Applicable to both Documents

In addition, the HHRAs for both SWMU #6/AOC B and SWMU #14, evaluated possible receptor exposures to contamination on a SWMU specific or local area specific (as with SWMU #6/AOC B) basis only, and did not evaluate the effect of cumulative exposure by a given receptor population to all [or multiple] contaminated SWMUs and AOCs at Roosevelt Roads. Therefore, if it is subsequently established that, due to an absence of acceptable institutional and/or engineering controls at un-remediated contaminated SWMUs and AOCs, a given receptor population may be exposed to risks from multiple SWMUs and AOCs at the facility, those HHRAs may have to be revised to evaluate the effect of cumulative exposure to multiple SWMUs and AOCs at the facility.

Furthermore, as noted in previous correspondence, before any final determination for SWMU #6/AOC B and/or SWMU #14 can be considered fully approved, it must undergo public notice and public comment, either pursuant to permit modification procedures given at 40 CFR § 270.42, or as part of the public notice and public comment for the Draft renewed RCRA permit for the facility, pursuant to 40 CFR § 124.10, when implemented.

Please telephone Mr. Tim Gordon, of my staff, at (212) 637- 4167 if you have questions regarding any of the above.

Sincerely yours,



Nicoletta DiForte
Chief, Caribbean Section
RCRA Programs Branch

Enclosure

cc: Mr. Jose J. Lajara, Attn. Ms. Luz Muriel-Diaz, PREQB w/encl.
Ms. Madeline Rivera, NAVSTA Roosevelt Roads w/encl.
Mr. Mark Kimes, Baker Environmental w/encl.
Mr. John Tomik, CH2M Hill w/encl.
Ms. Connie Crossley, Booz Allen w/encl.

TECHNICAL REVIEW

JANUARY 4, 2000, DRAFT HUMAN HEALTH RISK ASSESSMENT REPORT FOR SWMU 14 - FIRE TRAINING PIT AREA

NAVAL STATION ROOSEVELT ROADS CIEBA, PUERTO RICO

**JUNE 23, 2000
REPA2-0203-017**

1. The January 4, 2000, Draft Human Health Risk Assessment Report for SWMU 14 - Fire Training Pit Area (HHRA), does not consider exposures to contaminants in the drainage area (the ditch extending from the pit along the adjacent runway shoulder). As this area is considered part of SWMU 14 and receives runoff from SWMU 14, contamination in this area and the potential for exposure is similar to that of the fire training pit. Consequently, this area should have been included in the risk evaluation for SWMU 14. Naval Station Roosevelt Roads (NSRR) should provide rationale as to why the drainage area was not considered in the risk assessment.
2. Soil samples obtained from SWMU 14 were analyzed for volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), poly chlorinated biphenyls (PCBs) and total petroleum hydrocarbons (TPH). Given the nature of the activities conducted at this SWMU, including the burning of multiple items (e.g., waste solvents, fuels, oils, wood, trash, plastics, etc.), the possibility exists that the formation of dioxins/furans occurred as a result of the combustion process. NSRR should clarify why the sampling parameters did not include dioxins/furans.
3. Potential contaminant migration from soil to groundwater in the area of SWMU 14 is not considered in the HHRA. Review of the HHRA indicates that NSRR conducted surface soil (1-2 ft. below ground surface) sampling outside the concrete pad at SWMU 14. These soil samples reported several poly aromatic hydrocarbons (PAHs) concentrations above the EPA Region 3 risk-based criteria (RBC) for industrial soil. Based on these exceedences, a comparison of the detected PAH concentrations to EPA's Soil Screening Levels (dilution attenuation factor of 1) was conducted to assess the potential for PAHs to migrate from soil to groundwater. This comparison indicates that a majority of the PAHs detected at SWMU 14 exceed their respective Soil Screening Levels (SSLs). For example, benzo(a)anthracene was detected at 3,400 ug/kg; the SSL is 80 ug/kg. In addition, benzo(b)fluoranthene was detected at 7,600 ug/kg; the SSL is 200 ug/kg. Despite the elevated detections in soil around the pad, there is

no discussion regarding the potential migration of these contaminants to groundwater. In addition, the HHRA does not present any discussion regarding hydrogeology at the site, or the depth to groundwater at the site. NSRR should provide a discussion on the hydrogeology of the site and the potential for contaminant migration from soil to groundwater.

4. The HHRA considers only current risk at the site. If, however, under future land use conditions, the concrete pad is removed and/or construction related activities occur, there is the potential for exposure to subsurface soil or groundwater. Given the potential for future exposures to these environmental media, or if residential properties are constructed in the immediate area of SWMU 14, a revised risk assessment to include these exposure pathways may be necessary. The following are recommendations for addressing future risk at the SWMU:

- The HHRA evaluates risks using the existing concrete pad as an institutional control. As a result, no sampling or analysis was performed beneath this pad. Should the concrete pad be removed or breached, sampling and analysis of the soil and groundwater beneath the pad may be required. Furthermore, since only surface soil samples were collected at SWMU 14, subsurface soil and groundwater would need to be included as potential exposure media. This evaluation would also have to include the potential for contaminants to migrate from the soil beneath the concrete pad to groundwater, and potential risks due to exposure to groundwater in the area of SWMU 14.
- The HHRA does not consider the potential exposures of future military adult/child residents to SVOCs via indoor air inhalation. If future use of this area includes the potential for a residence to be constructed, exposure to the future military adult/child resident via inhalation of SVOCs into indoor air should be considered.

5. Review of the HHRA identified several errors and discrepancies. Although these discrepancies do not change the conclusions regarding risk at the site, any future risk assessments should consider the identified deficiencies. These errors include:

- The HHRA does not provide toxicological profiles for each chemical of concern (COC). Standard Risk Assessment Protocol (USEPA Risk Assessment Guidance for Superfund, Part A, 1989) requires that toxicological profiles be provided within a risk assessment for the selected COCs, if available. This omission of toxicological profiles has no bearing on the calculated risks at the site. However, if conditions and/or uses of SWMU 14 change, and/or if a revised HHRA is needed, NSRR should include toxicological profiles for each COC in the revised risk assessment report.

- Standard risk assessment protocol allows for the use of central tendency (CT) exposure parameter values, if these CT values are balanced with reasonable maximum exposure (RME) values in the calculation of risk and hazard estimates. Based upon a review of the exposure parameters presented in the HHRA, NSRR has used a majority of CT values for evaluation of risks at SWMU 14. This technique can lead to an underestimation of calculated risks. It should be noted, however, that a recalculation of total risks for each pathway at the site was conducted using a majority of EPA recommended RME values. Based upon these calculations, it appears that the lack of RME parameters in the evaluation does not have a significant impact on the risk estimates in the HHRA.

6. The following discrepancies were found in the risk calculation tables. These discrepancies result in slightly elevated chronic daily intakes (CDI) and total risk estimates; however, the associated affects on the results of the HHRA are not considered to be significant:

- Section 3.2.3 correctly indicates that an exposure frequency (EF) of 180 days/year should be used to calculate the CDI for the construction worker. However, a review of the calculations presented in Appendix B shows that a more conservative EF of 250 days/year was actually used to calculate the CDI.
- Section 3.2.3 correctly indicates that a body weight (BW) of 45 kg should be used to calculate the CDI for the youth trespasser. However, a review of the calculations presented in Appendix B shows that a more conservative BW of 70 kg was actually used to calculate the CDI.

7. Several of the exposure parameters (Table 2-4) used in calculating risk estimates at the site are either incorrect or are not consistent with standard EPA guidance. For example:

- Exposure Frequency (EF): Superfund Standard Default Exposure Factors (OSWER 9285.6-03) recommends an exposure frequency of 25 years for the commercial/utility worker. NSRR presents a value of 22 years in the Draft HHRA. The recommended EF value of 25 years should be used for the commercial/utility worker.
- Ingestion Rate (IR): NSRR has proposed a CT IR of 50 mg/day for an adult, and 100 mg/day for a child. The Exposure Factors Handbook (EFH) (USEPA, 1987) and the Superfund Standard Default Exposure Factors Guidance both recommend an RME value of 100 mg/day for an adult, and 200 mg/day for a child. The use of CT values is appropriate when the risk calculations are balanced by RME values; therefore, NSRR

should ensure that a balance of RME and CT exposure parameters are used in the risk calculations.

- NSRR has calculated an IR of 60 mg/day for a construction worker. The EFH recommends a value of 480 mg/day. NSRR has calculated the reduced IR using a soil to skin adherence factor which is not an EPA approved methodology. Further, the use of a soil to skin adherence factor in the calculation of an ingestion rate is not appropriate. NSRR should use an IR of 480 mg/day for the construction worker.
- Dermal Absorption Factor (DAF): The DAF for SVOCs is incorrectly presented as 0.01. According to EPA's Dermal Draft Guidance (USEPA, 1997), a DAF of 0.1 should be used for SVOCs. NSRR should use the recommended DAF value of 0.1 for SVOCs.
- Surface Area (SA): The SA values presented also represent CT exposure parameters. The EFH recommends an RME SA value for an adult of 5,800 cm². In addition, NSRR has used the 50th percentile total body surface area values for calculation SA for a child and youth. NSRR should use the EFH recommended RME SA values for both an adult and a youth.
- Adherence Factor (AF): The use of an AF of 0.2 is also the lowest possible value allowed for the AF based upon a review of the Dermal Guidance. EPA's 1992 Dermal Guidance presents an approved AF range of 0.2 to 1.0. NSRR should use a more conservative AF value.
- Inhalation Rate (IR_h): NSRR presents an IR_h for an adult (1.27 m³/hr) and child (0.69 m³/hr) only. The IR_h presented for the child appears to underestimate the potential risks associated with the inhalation pathway of a youth. NSRR should present a calculated IR_h for both the child and youth receptors.