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U S NAVY RESPONSES TO REGULATORY COMMENTS ON DRAFT REMEDIAL INVESTIGATION REPORT FOR SITE 45 NAS PENSACOLA FL
5/21/2008
NAVFAC SOUTHERN

Responses to FDEP Comments
dated May 21, 2008
(incorporating UF comments dated October 3, 2007 and February 11, 2008)
on the
Draft Remedial Investigation Report for Site 45 (Building 603 Lead Site),
Naval Air Station Pensacola, Florida

Comment 1 – The report describes surface soil as soil from zero to six inches below land surface (bls) and subsurface soil as greater than six inches bls. Chapter 62-780 FAC defines surface soil as soil located from zero to two feet bls and subsurface soil as soil greater than two feet bls.

Response - The Navy concurs. The definitions of surface and subsurface soil specified by Chapter 62-780 will be added to the text. Please note that use of the Chapter 62-780 definitions will not change the results and conclusions of the risk assessment because risks were evaluated using maximum concentrations in surface and subsurface soil, as shown in Tables 6-6 through 6-13. Therefore, it will not be necessary to revise these tables.

Comment 2 – Tetra Tech has two different scenarios for the "hypothetical future resident" for groundwater. The Department does not distinguish between groundwater ingestion under residential and industrial scenarios. Also, the Department calculates groundwater Cleanup target Levels for carcinogenic compounds based on a $1x10^{-6}$ risk of cancer. Please review this issue and address it in the final RI.

Response - The conceptual site model (Table 6-4) identifies the "hypothetical future resident" as the only receptor that potentially will be exposed to groundwater through ingestion and inhalation. On page 6-21, the text states that "future residents could also be exposed to groundwater only if drinking water wells were installed on the site in the future. This is very unlikely since the main source of water for the base is the Navy-owned well field located at NTTC Corry Station north of NAS Pensacola." An industrial scenario for groundwater exposure was not evaluated. To evaluate risks using the USEPA Methodology, a "risk ratio" technique was used where the exposure point concentration is divided by the appropriate risk-based concentration. For calculation of risks associated with exposure to groundwater, the risk-based USEPA Region 9 PRGs for tap water were used in lieu of the Florida GCTLs because many of the Florida GCTLs are not risk-based (Section 6.1.3.3, page 6-22). The USEPA Region 9 PRGs correspond to a risk level of 1×10^{-6} or a hazard index of 1.0.

Comment 3 – NAS Pensacola is using the Residential Soil Cleanup Target Levels (SCTLs) as the screening levels for this site. The Department would like to also propose using the industrial SCTLs as the screening values for this site if it could be restricted to industrial use only. If NAS Pensacola does decide to use this option, land use controls for soil would be necessary.

Response - The Residential SCTLs were used for screening to provide the most conservative evaluation of the nature and extent of contaminants at Site 45. Land use controls will be considered during the selection of the preferred remedy in the FS.

Comment 4 – Table 4-2, NAS Pensacola Background Values for Groundwater: The Florida Marine Surface Water Cleanup Target Level for mercury should be 0.025. Please add this value to the table in the final version of the RI.

Response - The Navy concurs. The correct CTL will be added to Table 4-2.

Comment 5 – General Comments on Figure 4-4, Monitoring Well Locations with groundwater concentrations Exceeding GCTLs:

Comment 5a – Additional monitoring wells will need to be installed at this site to delineate groundwater contamination both vertically and horizontally. The Department requires this prior to approving any remedial alternative for this site. If Pensacola is considering monitored natural attenuation as the remedial alternative for this site specific conditions listed in Rule 62-780.700, FAC will need to be met prior to approval of this remedy.

Response - Additional monitoring wells were installed to delineate lead contamination in site groundwater, according to the result of previous investigations. Other metals with elevated concentrations, particularly aluminum, do not appear to have resulted from activities at Site 45. Aluminum was not reported above the regulatory level in the shallow wells nearby or in the soil samples and Iron was not reported above the regulatory levels in the soil samples. Further discussion regarding the future of this site will be addressed and evaluated during the FS phase.

Comment 5b – Monitoring wells (PEN-45-05D, PEN-45-07D, PEN-45-11D, and PEN-45-13D) all have aluminum groundwater contamination that exceeds the Natural Attenuation Default Criteria (NADC) of 2000 ug/l for Aluminum at this site. This situation will need to be discussed further prior to approval of an Monitored Natural Attenuation remedy for this site.

Response - The Navy agrees that further discussion by the NAS Pensacola Partnering Team seems appropriate. Please note that the monitoring wells identified in the comment are all deep monitoring wells, which are located upgradient, side gradient and downgradient of the area initially investigated for lead contamination in soil. Additionally, monitoring wells PEN-41-09D & 13D, which reported the higher detected concentrations for aluminum and iron had high turbidity readings with 300 NTU and 414 NTU, respectively.

The distribution of aluminum concentrations in groundwater does not suggest that Site 45 was the source, because there are no reported detections of high concentrations in the soil or in the shallow wells.

Comment 6 – General comments on Tables 4-5, Organic Analytical Results for Soil and Table 4-6, SPLP Analytical Results Compared to Groundwater Criteria:

Comment 6a – The list of Contaminants of Potential Concern (COPCs) in surface soil for Leachability to groundwater (SCTLgw) is incomplete. Benzo(a)anthracene and benzo(b)fluoranthene (Table 4-5) exceed their SCTLsgw. These chemicals were dropped as COPCs for leachability without explanation and remain of concern for surface soil. Aluminum, iron, lead and manganese (Table 4-6) exceed site-specific background and their SCTLsgw based on SPLP.

Response - Because the Benzo(a)pyrene equivalent concentrations for the soil samples in question were substantially greater than direct exposure criteria, the CPAHs in question were identified in the screening process and carried over to the human health and

ecological risk assessments for evaluation. The recommendations for action at Site 45 specifically address these CPAHs. The text will be revised to include further discussion of leachability.

Soil samples with the highest soil lead or arsenic concentrations were submitted for SPLP extraction. The SPLP samples were analyzed for TCL VOCs and TAL metals. Aluminum, iron, lead, and manganese were detected in the leachate at concentrations greater than GCTLs. The GCTLs for aluminum, iron, and manganese are not health-based standards; therefore these analytes were evaluated quantitatively in the human health and ecological risk assessments

Comment 6b – The list of COPCs in subsurface soil for Leachability to groundwater (SCTLgw) is incomplete. Aluminum, cadmium, iron, lead and xylenes (Table 4-6) exceed site-specific background and their SCTLsgw based on SPLP. These constituents remain of concern for leachability in subsurface soil.

Response - Soil samples with the highest soil lead or arsenic concentrations were submitted for SPLP extraction. The SPLP samples were analyzed for TCL VOCs and TAL metals. Xylenes, aluminum, cadmium, iron, and lead were detected in the leachate at concentrations greater than GCTLs. However, xylene and cadmium were not detected in the submitted soil samples at concentrations greater than the leachability SCTLs; nor were they detected in groundwater samples. Aluminum, iron, and lead were detected in groundwater at concentrations greater than their respective GCTLs; and are being addressed as a groundwater issue.

Comment 6c – Table 4-5 does not include Florida GCTLs for α-chlordane. Although Florida does not have specific criteria for α-chlordane, it does have SCTLs for total chlordane. Since no other chlordanes were detected in soil at this site, the SCTLs for α-chlordane would be equal to those for total chlordane (residential SCTL = 2.8 mg/kg industrial SCTL = 14 mg/kg and the SCTL for leachability to groundwater = 9.6 mg/kg). Please insert this new data into Table 4-5 and any other applicable sections in this report.

Response - Table 4-5 has been revised to compare the α-chlordane results to the Florida criteria for total chlordane.

Comment 6d – The BAP Equivalent totals calculated in this table are not correct, all of the contaminants listed below need to be included, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene, in this calculation. The table that lists these constituents is, "Final Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C.", dated February 2005, on page 62 in Table 20, "Toxic Equivalency Factors for Carcinogenic PAHs". Attached is a copy of the worksheet that explains how to complete this calculation. Please review this issue and address it in the final RI.

Response - Table 4-5 has been revised to calculate the BAP equivalents as specified in the Final Technical Report. After discussion with FDEP, the BAP equivalent totals for samples where the CPAH concentrations were below detection limits are presented as NA in the table.

Comment 7

Comment 7a – This table does not include Florida GCTLs for α-chlordane or γ-chlordane. As stated in a previous comment, Florida has criteria for total Chlordane (GCTL = 2 ug/l). The sum of the detected chlordanes in groundwater should not exceed this value.

Response - The table will be modified to include the GCTL for total chlordane and the sums of the detected chlordane isomers in the groundwater samples. Note that chlordane was only detected in 2 of the groundwater samples and the sums of the α- and γ-chlordane isomers were less than the GCTL for both samples.

Comment 7b – Please include the correct nomenclature to identify whether or not the monitoring well is deep or shallow in this table. Please review this issue and address it in the final RI.

Response - The screened intervals for each monitoring wells are included in this table. The majority of the shallow wells are screened from 3-13 feet and the deep wells are screened from 40-50 feet. S or D qualifiers are not part of the correct well nomenclature.

Comment 8

Comment 8a – The report states that the Site is primarily covered in asphalt so the soil-to-air inhalation pathway is not considered significant and is not considered further. Although soil may not constitute a significant percentage of the site, 100% of the inhaled fugitive dusts will originate from soil. The inhalation pathway may not constitute a significant portion of the risk, but it is relevant and should remain in the risk assessment evaluation.

Response - It may have been stated that the site is primarily covered in asphalt and that the inhalation pathway would not be significant; nonetheless, the pathway was evaluated in the risk assessment. The development of receptor-specific SCTLs considered inhalation of air and dust emissions. This is identified in the conceptual site model (Table 6-4) and in the text in Section 6.1.3.1 for each of the potential receptors. Specifically, the text states: "This receptor could be exposed to … soil by … inhalation (i.e., airborne particulates/vapors) …. Moreover, Appendix J provides sample calculations for the derivation of receptor-specific SCTLs where the inhalation pathway is included in the calculation. Note that the volatilization factor and the particulate emission factors are included in the calculations to indicate that volatilization and particulate emissions are considered.

Comment 8b – We recommend adding the incidental ingestion of groundwater to the construction worker scenario due to the likely exposure to shallow groundwater during construction activities.

Response - Although possible, exposure to groundwater by a construction worker would be regarded as negligible relative to direct exposure to soil. The text will be modified to reflect that this exposure pathway is possible, but its contribution to overall risk would be insignificant.

The following revisions will be made to the text in Section 6.3.1:

- Construction/Excavation Worker – A plausible on-site receptor under future land use if major construction activities were to occur. This receptor could be exposed to

surface and subsurface soils by incidental ingestion, dermal contact, and inhalation (i.e., airborne particulates/vapors). The construction worker is assumed to be exposed to soil for 250 days per year (USEPA, 2002b) assuming a Reasonable Maximum Exposure (RME) scenario. Although possible, direct exposure to groundwater by a construction worker is not quantitatively evaluated in the risk assessment. This scenario is considered to be unlikely and risks from exposure to groundwater (via incidental ingestion of small amounts of water) are regarded as negligible relative to direct exposure to soil. In addition, evaluation of exposure of construction workers to groundwater is not specified or recommended in Rule 62-777 FAC.

Comment 8c – An exposure frequency of 30 d/y for the site maintenance worker (based on professional judgment) seems low given the Pensacola area climate. Some documentation from NAS Pensacola regarding the expected frequency of groundskeeping and maintenance events for this part of the base will be important in helping to justify this exposure assumption.

Response - The EF of 30 days/year is recognized as professional judgment for evaluating risk at the site. A EF of 30 days/year for the maintenance worker has been used in human health risk assessments performed at various Navy facilities in Florida for at least 10 years (e.g., Naval Training Center, Orlando (June 1999) and NAS Whiting Field (January 1998) for reasonable maximum exposure (RME) scenarios. This exposure frequency has also been used in previous risk assessments at NAS Pensacola, (e.g., Site 43). It should be recognized that this provides a point of reference to the industrial worker who is assumed to have an EF of 250 days/year and for whom risks have also been calculated.

Comment 8d – Adult and adolescent recreational users and trespassers were assumed to be exposed to on-site soil for 45 d/y based on professional judgment. Although 45 d/y may be an appropriate exposure frequency for a trespasser, it is low for recreational users. We recommend using an exposure of 200 d/y for the recreational scenario. This value has been used by the FDEP for recreational scenarios at other sites.

Response - As stated, the exposure frequency for recreational users and trespassers is based on professional judgment. The 45 days per year is based on an estimate for swimming frequency in the southeast; this estimate is stated in EPA Region 4 guidance (Supplemental Guidance to RAGS: Human Health Risk Assessment Bulletins, EPA Region 4). Although the recreational user or trespasser at this site is not equivalent to a swimmer, it helps to predict the frequency that one may trespass or recreate, which may be similar to going to a lake or pond to swim. The Navy believes that the swimming frequency of 45 days per year was sufficiently conservative with regards to evaluating a reasonably maximum exposed individual. We believe that it is unlikely that a recreational user or trespasser would be at the site for an average of 4 days per week. Increasing the exposure frequency to 200 days per year renders these receptors essentially equivalent to an industrial worker. It is unlikely that the Navy would tolerate trespassers on the property with a frequency of 200 days per year.

In addition, a recreational EF of 45 days/year has been used in human health risk assessments performed at other Navy facilities in Florida (e.g., Naval Training Center, Orlando (June 1999) and NAS Whiting Field (January 1998) for reasonable maximum

exposure (RME) scenarios. This exposure frequency has also been used in previous risk assessments at NAS Pensacola, (e.g., Site 43).

Comment 8g – The IEUBK Model for lead was used to assess exposure to lead in children from groundwater. The average groundwater lead concentration was used as the exposure point concentration in the model. Receptors are usually exposed to groundwater from only one well. Averaging contaminant concentrations across wells would not accurately represent potential exposure scenarios. The exposure point concentration for lead in groundwater should be the maximum detected concentration.

Response - With an average groundwater lead concentration of 11 ug/L, which is less than the GCTL of 15 ug/L, and an average surface soil lead concentration of 571 mg/kg, the IEUBK model indicates that approximately 21.3 percent of children assumed to be exposed to surface soil are expected to experience blood-lead levels greater than 10 ug/dl. This estimate is greater than USEPA's goal of limiting exposure to lead so that no more than 5 percent of the exposed children have an estimated blood-lead level greater than the established level of concern (i.e., 10 ug/dl). Using the maximum lead concentration of 59.5 ug/L will obviously result in a greater percentage of exposed children having a blood-lead level greater than 10 ug/dl; specifically, 47.8 percent of children would experience a blood-lead level greater than 10 ug/dl. This change will be incorporated to satisfy FDEP's request for using the maximum detected groundwater concentration for evaluating potential risk associated with groundwater exposure.

Comment 8e – It is assumed that the grounds maintenance worker will spend at least part of the day outdoors. Therefore, we recommend using the US EPA default outdoor worker soil ingestion rate of 100 mg/d for this scenario (US EPA, 2002).

Response - The Navy disagrees with increasing the soil ingestion rate from 50 to mg/kg to 100 mg/kg. The soil ingestion rate is consistent with FDEP's exposure assumption for an industrial worker, which forms the basis for the derivation of the industrial SCTLs.

Comment 8f – Future adult recreational users/trespassers under the same conditions as the adolescents (95^{th} percentile value for soccer players in moist conditions) have a skin adherence factor of 0.08 mg/cm^2 (US EPA, 2004). We recommend changing the adult skin adherence factor to reflect the same conditions as the adolescent.

Response - Changing the skin adherence factor from 0.07 mg/cm^2 to 0.08 mg/cm^2 will pose a negligible change to the overall risk, and would have no significant impact on any risk management decisions. The adherence factor of 0.07 mg/cm^2 is taken from Exhibit 3-5 in EPA's Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (EPA, July 2004). It is consistent with residential exposure conditions. The value of 0.08 mg/cm^2 is the 95^{th} percentile adherence factor for an adult soccer player in moist conditions. This value is also presented in the referenced guidance (EPA, July 2004).

Comment 9 – Table 6-9, Comparison with SCTLs for Leachability to Groundwater and Csat Limits – Sub Surface Soil and Table 6-13, Comparison with SCTLs for Leachability to Groundwater and Csat Limits – Sub Surface Soil: The site specific SCTLs for leachability to groundwater determined by SPLP should be included in both of these tables.

Response - Soil samples with the highest soil lead or arsenic concentrations were submitted for SPLP extraction. The SPLP samples were analyzed for TCL VOCs and TAL metals. Xylenes, aluminum, cadmium, iron, lead, and manganese were detected in the leachate at concentrations greater than GCTLs, However, xylene and cadmium were not detected in the submitted soil samples at concentrations greater than the leachability SCTLs (Tables 6-9 and 6-13); nor were they detected in groundwater samples (Table 6-3). Aluminum, iron, lead, and manganese were detected in groundwater at concentrations greater than their respective GCTLs; however, none of these metals has a Leachability SCTL. The comment suggests that the results of these analyses should be incorporated into Tables 6-9 and 6-13 for comparison purposes. However, the soil concentrations do not correspond to leachate concentrations that approximate the metals' GCTLs. Essentially, a site-specific SPLP for these metals has not been derived. The Navy believes that this information is not appropriate for these tables; a discussion in the text similar to what is presented in this response may suffice as an evaluation and interpretation of the SPLP data.

Comment 10 – Page 6-60 states that the 95% UCL is "..a representation of the upper limit that potential receptors would be exposed to over the entire exposure period". The 95% UCL is an upper limit on the mean concentration receptors would be exposed to, not the upper limit of the exposure concentration.

Response - The Navy concurs. The text and definition of the 95% UCL on page 6-60 will be revised as specified in the comment:

> **Exposure Point Concentrations**
>
> EPCs for soil were calculated using the Florida UCL Calculator (Version 1.0). Uncertainty is associated with the use of the 95 percent UCL on the mean concentration as the EPC. As a result of using the 95 percent UCL, the estimations of potential risk for the RME scenario were most likely overstated because this is ~~**a representation of**~~ the upper limit **on the mean concentration** that potential receptors would be exposed to over the entire exposure period. In some cases, the maximum concentration was used as the EPC. Use of the maximum concentration as the EPC tends to overestimate potential risks because receptors are assumed to be exposed continuously to the maximum concentration for the entire exposure period. Uncertainty was also introduced when the nondetects results were assigned a value of one-half the nondetect quantitation limit in the calculation of the EPC. This may either overstate or understate the risks to potential receptors.

Comment 11 – General Comments Table 7-1, Occurrence, Distribution and Selection of Ecological COPCs for Surface Soil:

> **Comment 11a** – The USEPA Region 4 surface soil screening value for benzo(a)pyrene is 0.1 mg/kg. The Table should be changed to reflect this value.
>
> **Response** – The Navy concurs, the screening value for benzo(a)pyrene in Table 7-1 will be increased to 0.1 mg/kg.
>
> **Comment 11b** – An ecological soil screening level was developed for total PAHs in June 2007. This new value (1.1 mg/kg) is based on protection of mammals exposed to high molecular weight PAHs and is very similar to the US EPA Region 4 screening value of 1 mg/kg.

Response - Comment noted. However, this Report was submitted for review in March 2007, prior to the Ecological Soil Screening Level document for PAHs becoming available in June 2007. Future documents will include the new screening level. Because the Region IV screening value (1.0 mg/kg) is more conservative than the Eco-SSL value (1.1 mg/kg), no changes to the document will be made to address this comment.

Comment 11c – An ecological soil screening level was derived for manganese (220 mg/kg for the protection of plants) in April 2007. This value should be added to the Table. The conclusion that manganese is not a COPEC at this site remains valid.

Response - Comment noted. However, this Report was submitted for review in March 2007, prior to the Ecological Soil Screening Level document for manganese becoming available in April 2007. Future documents will include the new screening level. Because the Region IV screening value (100 mg/kg) is more conservative than the Eco-SSL value (220 mg/kg), no changes to the document will be made to address this comment.

Comment 12 – Section 8, Conclusions: The Department agrees with the proposal to remove the soil contaminated with lead and PAHs proposed in this section. However, the amount of soil to be removed is yet to be determined. The Department would like to re-evaluate this situation after the comments in this letter have been resolved.

Response – The details for implementing a removal action at Site 45 would be evaluated as part of the Feasibility Study.

Comment 13 – Appendix I: The Department has reviewed the background study for soils and we do not concur with the conclusions determined by this analysis. Please review the attached comments from the U of F dated February 11, 2008. The Department will be open to discuss this study after the comments from U of F have been addressed.

Response - In the statistical approach used by U of F the Site 45 arsenic soil data was compared directly (bright line comparison) to twice the mean of the background dataset for three separate depth intervals (0 to 0.5 ft; 0.5 to 2 ft; and 2 to 4 ft). Background for these depth intervals was apparently calculated by U of F from the dataset that was derived using the geochemical method presented in Appendix I of the Site 45 RI report. In that geochemical analysis, which incorporated Site 45 data, it was determined that 5 soil samples from Site 45 were enriched with respect to arsenic and were outliers. The remainder of the samples fell within the background range. As a secondary population screening, the U of F conducted ANOVA analysis of the three depth intervals and concluded that the mean of the Site 45 data for the first two intervals (0 to 0.5 ft and 0.5 to 2 ft) was significantly higher than the site-wide background means for those same depth intervals.

It should be noted that the RI recommends that remedial options be evaluated in the FS for the initial 5 locations and depths at Site 45 identified as outliers (as part of the site-wide geochemical analysis for background - Appendix I). For this report, and in the interest of expediency, the Navy will accept the U of F conclusions that the Site 45 means for arsenic in the upper two depth intervals are significantly greater than the site-wide means for the same depths. We have also performed a bright-line comparison of the residual Site 45 data (after eliminating the five locations originally identified as outliers) against the U of F screening criteria, which were twice the mean of the background value for the first two depth intervals - 5.8 mg/kg and 3.2 mg/kg, respectively. Our analysis concludes that only one additional location, PEN45SB0402, at the 0.5

to 2 ft depth (5.6 mg/kg) needs to be added as an area to be considered in the FS. Furthermore, we compared the results for the third depth interval (2 to 4 ft) to the U of F screening criteria (2.6 mg/kg) and found no locations exceeding the criteria.