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NAS JACKSONVILLE
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RESPONSE TO REGULATORY COMMENTS ON REMEDIAL INVESTIGATION FEASIBILITY STUDY FOR OPERABLE UNIT 1 (OU 1) NAS JACKSONVILLE FL
9/11/1995
NAVFAC SOUTHERN

Response to Comment
Naval Air Station Jacksonville
Operable Unit 1 - RI/FS

September 11, 1995

John Lindsay, Chief Coastal Resource Coordinator
NOAA

General Comments: PCBs appear to be the primary contaminant of concern posing a threat to NOAA trust resources. Elevated concentrations of PCBs were detected frequently in on-site soils at concentrations of up to 260 mg/kg, and in the forested stream at concentrations up to 15 mg/kg, indicating that PCBs have been transported from the site toward NOAA trust resource habitats. PCBs also exceeded the ERL in the St. Johns River. In addition to PCBs, other contaminants and media of concern are trace elements, PAHs, and dioxins in soil; and trace elements and pesticides in sediment.

Based on the above media and contaminants, cleanup of the site should consist of a remedy that will prevent source areas of contamination (soil and groundwater) from migrating to off-site areas. Capping of excavation, as included in each of the alternatives, should prevent soil from eroding into surface water drainage ditches. Groundwater treatment would be more protective of NOAA trust resources than just monitoring of groundwater. In addition, groundwater treatment for trace elements and organic compounds would be more protective than treatment for just organic compounds. Remediation of sediment contamination with PCBs from the forested stream may be warranted as it may be posing a threat to NOAA trust resources inhabiting the stream. NOAA recommends alternative 2 with sediment excavation for the PCB hot spots in the forested stream.

Response: Your comments regarding the RI/FS for OU 1 at NAS Jacksonville have been noted. The primary objective of the FS was to screen representative remedial technologies and develop several risk-reduction alternatives that satisfy either the USEPA or FDEP ranges of acceptable risk. Although Alternative 2, or Alternative 1 with its contingencies, were recommended, the selection of the preferred alternative will be made by the partnering team, with consideration of NOAA recommendations.

September 11, 1995
Hal Davis, Hydrologist
USGS Water Resources Division

Comment 1. Page 2-20, third full paragraph, first sentence: The phrase "the physical limits" should be replaced with "depth to the base".

Response: The first sentence of the second paragraph of Section 2.7.5 will be changed from "The physical limits . . . . ." to "The depth to the base . . ."

Comment 2. Figure 2-10: The screen length of all three shallow monitoring wells was 10 feet.

Response: Figure 2-10 will be corrected to show all shallow observation wells with 10-foot long screens.

Comment 3. Page 3-19, first paragraph, first sentence: The term "shallow aquifer" should be replaced with "surficial aquifer" to be consistent with other parts of the report.

Response: In the first sentence of the first paragraph "shallow aquifer" will be changed to "surficial aquifer".

Comment 4. Figure 3-8: The USGS measured stream location 4 is not located correctly. This measurement was taken at approximately where the letter "C" indicates a stream reach.

Response: On figure 3-8 the USGS stream discharge measurement location #4 will be moved to stream segment "C".

Comment 5. Page 3-22, second paragraph, fourth sentence: This sentence should be changed to: The discharge at No. 4 is due to groundwater seepage into the ditches down stream of the earthen barriers.

Response: The fourth sentence will be replaced with the above sentence.

Comment 6. Page 3-23, fourth bulleted item should read: The transmissivity of the surficial aquifer, determined from a 24-hour aquifer test, was 50 ft^2/day. At this location, a low permeability layer separates the surficial aquifer into upper and lower permeable zones. The transmissivity was determined for the lower zone, approximately 12 feet thick.

Response: The fourth bulleted item on page 3-23 will be replaced with the above sentence.

Comment 7. Page 3-24, second paragraph, first sentence: The phrase "Based on the groundwater level data" should be removed from this sentence.

This should be added as the third sentence: The water levels in paired shallow and deep surficial aquifer wells at OU1 showed no strong vertical gradients, indicating a good connection between shallow and deeper parts of the aquifer.

Second to last sentence: The phrase "and the USGS groundwater flow model" should be removed. Flow in the Hawthorn was not modeled.

Response: The above recommendations will be incorporated into the text.

Comment 8. Page 3-24, last paragraph: The last full sentence on the page should read "Groundwater northwest of the divide flows slowly in a westerly direction to tributaries that discharge into the Ortega River."

Response: The recommended change will be made.

Comment 9. Page 5-9, last paragraph, second sentence: This sentence indicates that groundwater flow velocities are shown on Figure 5-1 and they are not.

Response: In the second sentence of the last paragraph on page 5-9 the reference to flow velocities on Figure 5-1 will be removed. The figure only shows flow lines.

Comment 10. Page 5-15, second paragraph: Second sentence: Groundwater from OU1 also discharges to segment C. The second to last sentence should read: From stream flow measurements and groundwater modeling results, it appears that about one fourth of the total flow in the unnamed tributary above Segment A comes from Segment B and one fourth comes from Segment C. The flow from Segment B will be relatively free from contamination. The dilution factor in the last sentence should be updated to reflect that only one fourth of the water discharging into the unnamed creek is clean.

Response: In the second sentence Segment C will be added to the list of segments that receive potentially contaminated groundwater. The recommended change will be made to the second to the last sentence. The last sentence will be modified to read, "Therefore, we expect a 25 percent dilution in contamination levels when the surface water from Segments C and E mixes with the inflowing water from Segment B."

Comment 11. Page 5-15, last paragraph, first sentence: the segments mentioned should include C.

Response: In the first sentence of the last paragraph on page 5-15 Segment C will be added to the list of Segments that receive potentially contaminated groundwater.

Comment 12. Figure 5-1: It would be helpful if the creek segments A, B, C, G, and F were labeled on this figure.

Response: All stream segments, A through G, will be added to Figure 5-1.

September 12, 1995
Gerald A. Young, Associate Pollution Control Engineer
Department of Regulatory and Environmental Services
City of Jacksonville

Comment 1. Figure 5-2: which details Cross Section A-A', has volatile organic compounds (VOC) contour lines pictured. The 100 and the 1000 mg/l contour lines appear to be reversed. These lines are expected to look like those pictured in Figure 5-3. I realize I am dealing in expectations and do not have the test data available. Please clarify whether Figure 5-2 is correct as shown.

Response: The total VOC contour lines on Figure 5-2 were inadvertently reversed and will be corrected.

Comment 2. Table 9-7: which lists projected treatment requirements for ground water prior to discharge, does not have Polychlorinated Biphenyls (PCB) on the list. The Water Quality Division requests that PCB or its trade name Arochlor be added to the list because PCB are known to be in the soils of Operable Unit One.

Response: Table 9-7 presents the projected treatment requirements for groundwater prior to discharge to surface water. PCBs were not detected in groundwater and therefore were not included for treatment.

Comment 3. Table 11-1: which contains a list of monitoring wells to be tested under the Institutional Controls, needs an additional monitoring well. The Water Quality Division believes that monitoring well number MW-2 which is already in place should be added to this list.

Response: The monitoring well network proposed in Section 11.0 would be implemented to "assess the restoration of the surficial aquifer". No contamination has been identified at MW-2. Based on the USGS simulation of groundwater flow at and around OU1, MW-2 is located in either a lateral or upgrading position relative to the landfill.

September 21, 1995
Martha Berry, Remedial Project Manager
Federal Facilities Branch, USEPA

General Comments

Comment 1.: The Draft RI/FS Report does not describe the depth of the former landfill disposal cell. If a reasonably accurate estimate of the depth of the cell is available, it would be useful to provide to the reader.

Response: Only three boring logs from the Round 1 investigation describe landfill debris being encountered during the drilling activities. The following statement will be added to the end of the third paragraph in Section 3.6, Site Geology. "The landfill debris ranges from 10 to 16 feet thick at the three locations investigated during Round 1 (MW's 28, 29, and 30/31). Further investigations would be required to accurately characterize the landfill depth as part of the remedial design for the landfill."

Comment 2.: The dates on which water level measurement data were collected should be shown on all water level contour maps.

Response: The following statement will be added to all Figures that show groundwater contour lines. "Groundwater contour lines simulate long-term average-annual conditions determined from USGS numerical groundwater flow model assumed to be steady-state and to be approximated by water-level and stream flow measurements made on November 18, 1993 (See Appendix K)."

Comment 3. : The screened intervals for monitoring wells should be shown on the geologic cross sections provided in the Draft RI/FS Report. This information is needed to determine what portions of the aquifer are being monitored. Additionally, groundwater elevations should be shown on the cross sections. This information is necessary to determine if the vertical hydraulic gradient exists between the surficial and Hawthorn aquifers.

Response: The geologic cross sections (Appendix O) will be modified to show the screened intervals for the monitoring wells and the sampling intervals for the hydrocones. Groundwater level elevations are indicated for the shallow and deep surficial monitoring wells. Because of the scale on Figure 3-7 the screened intervals and water levels were not included. Reference to the geologic cross section in Appendix O will be included on Figure 3-7.

Comment 4. : Throughout the Draft RI/FS Report, reference is made to Table 9-11 which apparently summarized cumulative, residual risk for soil, groundwater, surface water, surface water and sediment. However, Table 9-11 was not included in the revised document.

Response: This table will be included in the final document. This Table was handed out at the October 2 Parterning Meeting in Tallahassee.

Comment 5. : Chapter 11 of the Draft RI/FS Report presented the description and evaluation of the five remedial action alternatives. Subsections which describe consolidation and capping of excavated soil and sediment, landfill soil and debris should refer to Section 11.1.1.1 for the basic details of the specified hybrid landfill cover.

Response: Changes to the text will be made to paragraph 1, page 11-10 to read, "The consolidated media (ie, soil from outside the landfill and sediment from the unnamed tributary) would then be capped under the cap/cover system described in Section 11.1.1.1."

Specific Comments

Comment 1. Page 6-21, Table 6-5: Footnote 4 noted that values in the Region III COC table dated March 1994 were used. The values from the most up-to-date Region III table available when the BRA document was being prepared should have been used. For example, the March 1995 Table lists a risk based soil screening concentration for aluminum of 7,800 mg/kg and a risk based tap water concentration for cobalt at 220 mg/l.

Response: The footnote refers to the March 1994 Region III COC table (which was and still is the most recent version of that table) which was published to support the CPC selection process (per the 1993 Region III Guidance). The March 1995 Table referred to in the comment is the Region III Risk-Based Concentration Table. The latter table contains concentrations associated with Hazard Quotient equal to 1.0 for non-carcinogenic substances, while the former contains concentrations associated with a Hazard Quotient of 0.1 for non-carcinogenic substances. The former table has not been updated since March of 1994 and may not be updated again according to Region III representatives. Revisions will not be made because no predicted change is anticipated. All future risk assessments will incorporate the screening concentrations listed in the most recent RBC Table with the concentrations adjusted for a Hazard Quotient of 0.1.

Comment 2. Page 6-37, Table 6-8: The first footnote of this table should be deleted. Region IV guidance excludes the use of institutional controls as a reason to rule out an exposure pathway.

Footnote 2 describes the reason why the current neighbor/worker pathway could be excluded from consideration in regard to the direct contact landfill cover pathway.

Several of the "Yes's" on this table were footnoted as being excluded because of the presumptive remedy. Please explain.

The yes listed for groundwater/diffusion - future resident pathway was incorrectly footnoted with an "8".

Response: The first footnote of Table 6-8 will be deleted. The ingestion and dermal contact exposures to landfill material and cover will be identified as a potentially complete exposure pathway, but will not be quantitatively evaluated because that exposure will be eliminated by the presumptive remedy.

The table will be revised to include a footnote which includes the following language: Six separate exposure pathways have been identified as potentially complete exposure pathways for which the presumptive remedy precludes the need to assess exposures and risks. The six pathways include ingestion and dermal contact with landfill materials and cover by neighbors and maintenance workers, inhalation of dust by neighbors and maintenance workers and the inhalation of vapors by neighbors and maintenance workers. The presumptive remedy, which will be implemented soon, includes a cap/cover of the entire landfill which will virtually eliminate inhalation exposures associated with contaminants present in the landfilled materials and the landfill cover. Since these pathways will soon be eliminated by a cap/cover, there is no need to evaluate the risks associated with them.

The superscripted "8" associated with the "Yes" listed for groundwater/ diffusion - future resident will be revised to indicate that "Potable use of groundwater will be evaluated only for groundwater outside of the landfill proper. Groundwater within the presumptive remedy will not be accessible."

Comment 3. Page 7-19, Table 7-4: There are several problems with the formatting of this table that should be fixed in the revised document.

Response: The formatting in Table 7-4 will be revised.

Comment 4. Page 7-23, Table 7-5: Footnote 4 of this table indicates that the screening values used were from a 1992 Region IV list. The screening values that should have been used are from EPA's Region IV Waste Management Division Freshwater Water Quality Screening Values for Hazardous Waste Sites (10/13/93 Version - copy enclosed). EPA is not initially requesting a revision based on my assumption the difference between the two tables will not result in a significant difference to the conclusions in the Baseline Ecological Risk Assessment. However, EPA is asking that ABB have the ecological risk specialists verify that assumption.

Response: The November, 1992 and October, 1993 USEPA Region IV surface water screening values were compared; there were no differences between the lists noted for the chronic screening values used in the ecological risk assessment. No changes to the ecological risk assessment are expected.

Comment 5. Page 11-2, Section 11.1.1.1, paragraph 1 and bullets: The text states that the components of the hybrid landfill cover would consist of the following components, from bottom to top:

- A 30-mil geomembrane placed on top of consolidated soil and debris;
- An 18-inch barrier protection layer; and
- a 6-inch vegetative layer.

The barrier protection layer is described as having a "gradation to prevent overloading the underlying geomembrane, and would satisfy the filtering criteria of the overlying vegetative cover to prevent clogging." It is not clear how the gradation of the barrier protection layer will prevent overloading. From an engineering standpoint, well-graded soil will contain a wide range of particle sizes, from silt to gravels. It is possible that larger diameter soil particles or gravels may puncture the geomembrane. Additionally, it is not clear how a poorly graded soil (assumed to be clay or sand) will overload the geomembrane. Please clarify these concerns regarding gradation of the protective layer.

Since the proposed cover does not contain a drainage layer, explain what the filtering criteria of the overlying vegetative cover is and how the barrier protection layer will prevent clogging.

Response: The purpose of the barrier protection layer over the geomembrane is to protect the geomembrane from damage during activities occurring on the landfill surface. The desired gradation of the barrier protection layer would be selected during the remedial design to provide adequate drainage of infiltrating precipitation and to prevent damage to the geomembrane. The statement in the text does not indicate that a "well-graded" or "poorly-graded" soil will be used. In fact, a sand may be considered if its gradation meets the criteria of protection and drainage. The primary consideration for the filtering criteria is that the barrier protection layer has a higher permeability than the vegetative soil.

Comment 6. Page 11-4, Figure 11-2: Concern has been expressed about the proposed hybrid landfill cover layers as presented in Figure 11-2. The 30-mil polyvinyl chloride (PVC) geomembrane is shown as being placed directly on landfill contents and subgrade fill. The risk is high that the geomembrane will be punctured by debris, and the overburden of up to 24 inches of soil and accumulated water may cause excessive settlement and damage to the geomembrane. Typically, the geomembrane is placed on top of the barrier protection layer. The combined system then provides a composite barrier of low permeability soil and geomembrane. The text should state that the 18-inch barrier protection layer soil will have a permeability of less than or equal to the native soil below the landfill.

Since a drainage layer is not included in the hybrid cover, describe how infiltrated water will be managed. PVC typically swells in the presence of water which may cause the loss of the PVC plasticizer component of the geomembrane and possibly cause a reduction in the geomembrane's tensile strength and puncture resistance. Consideration should be given to using high-density polyethylene (HDPE) geomembrane. Generally, with respect to the various types of geomembrane materials available, HDPE swells the least and PVC swells the most in the presence of liquids, including water.

Response: The design of the landfill will include regrading and the addition of borrow soil from off-site sources (Alternatives 1-5) and contaminated soil from on-site sources

(Alternatives 2-5). It is anticipated that these soils will be in contact with the geomembrane and that debris will be sufficiently covered to protect the membrane. Because this soil layer may not be a uniform thickness and gradation across the site, and because it may included contaminated oil, it is not considered a protection layer as part of the cap.

Under the current consideration for landfill capping the geomembrane would be placed only over those areas where radionuclide contaminated soil has been deposited. Slopes would be provided to allow water to drain off the sides of these locations and prevent accumulation on the geomembrane surface. HDPE may be considered as an alternative to PVC during the remedial design.

The text will be revised to describe the information presented above.

Comment 7. Page 11-7, Table 11-1: The wells proposed for the monitor program are fine for the purposes of the FS; however, based on the technical information, the program may need modification at a later date.

Response: Although contingencies have been added to several of the alternatives, the proposed list of monitoring wells presented in Table 11-1 is expected to be sufficient to monitor the effectiveness of the dynamic remedial alternatives. The wells proposed for monitoring were selected based on existing data. If during the future monitoring and remedial action new data indicate these locations are not sufficient to assess the restoration additional wells will be recommended.

Comment 8. Page 11-10, Section 11.1.1.2, paragraph 2: The text states that in addition to capping the landfill, contaminated soil will be excavated from the area outside the landfill and placed on top of the existing soil and debris prior to placing the hybrid landfill cover. Would the addition of excavated soil make a significant difference to the cost of the landfill cap?

Response: The excavated soil will be utilized to, where possible, bring the existing landfill surface to grade in preparation for the cap and final cover. Excavated soil used for this purpose will reduce the amount of borrow soil required to be purchased from off-site sources. Comparing the costs for the cover systems in Alternatives 1 and 2 show a net decrease in cost as a result of excavating soil.

Comment 9. Page 11-10, Section 11.1.2.3, paragraph 2: The cost estimate for enhanced bioremediation assumes that nitrogen and phosphorous are the limiting nutrients for microbial growth. Intrinsic bioremediation already appears to be occurring given the decrease in the concentrations of trichloroethene (TCE) and the increase in the concentrations of the degradation products, 1,2-dichloroethene and vinyl chloride. However, as is described in Appendix V of the Draft RI/FS Report, costs should include the consideration of enhanced methanotropic in-situ biodegradation through the addition of oxygen and methane via the injection trenches.
TCE does not readily degrade under aerobic conditions and typically requires anaerobic conditions for reductive dechlorination to occur. A major problem inherent in the anaerobic degradation of TCE is the formation of vinyl chloride, which is more toxic than TCE. Research has shown that less toxic products of biodegradation such as cis-1,2-dichloroethene (cis-1,2-DCE) accumulates preferentially when TCE biodegrades under oxygen-limiting conditions, rather than anaerobic conditions. The cis-1,2-DCE is less toxic to human health than vinyl

chloride and is more amenable to aerobic biodegradation. Oxygen-limiting conditions can be achieved by adding both oxygen and methane to maintain very low oxygen levels in the groundwater. Aerobic methanotropic bacteria, which utilize methane as a food source, can biodegrade TCE and vinyl chloride.

Response: Your comments are noted. We do not disagree.

Comment 10. Page 11-11, Figure 11-5: The figure presents details of the infiltration trench for enhanced bioremediation; however, approximate dimensions are not shown. Please show approximate dimensions.

Response: We will add depth dimensions of 15 to 20 feet to the figure. The width will depend on the type of trenching machine used.

Comment 11. Page 11-19, Section 11.1.3.3, paragraph 1: The text states that it is "anticipated that the coagulation of inorganics would capture sufficient radionuclides to achieve discharge criteria." Please a brief discussion regarding radiation monitoring to ensure that radionuclides are captured and contained within resulting water treatment sludge.

Response: If an alternative requiring an on-site groundwater treatment system is selected and documented in the ROD for OU 1, the technical specifications for the treatment system, including radionuclide monitoring, will be addressed during the RD phase. However, the following sentence will be added to the text at the end of paragraph 1, page 19, "Routine monitoring of effluent for inorganics, radionuclides, and organics would be performed to verify the effectiveness of the treatment system."

Comment 12. Page 11-30, Table 11-6: The table presents costs for Alternative 2. The cost for the hybrid cover system in Alternative 1 was $2,283,000; however, in Alternative 2, the cost is $1,933,000. Since additional excavated soil and sediment will be placed under the cover in Alternative 2, the landfill volume will increase as will the surface area of the cover; therefore, the cost of the cover should increase rather than decrease (if there is any significant difference at all) compared to Alternative 1. Additionally, the alternative 2 cost for O&M is less than the O&M costs for Alternative 1, yet both are specified for 30 years. Please clarify these discrepancies.

Response: The cost difference is due in part to the volume of contaminated soil consolidated beneath the cap vs. the volume of off-site clean borrow soil necessary to achieve subgrade elevations (more contaminated soil brought in means less clean borrow bought.) However, review of the cost estimates has identified some errors in volumes used to calculate costs. These errors will be corrected in the final document. O&M costs for Alternative 2 are less than for Alternative 1 because the groundwater component of the Alternative 2 achieves the RAO for groundwater in fewer years than alternative 1 even though some O&M costs associated with landfill maintenance continue for 30 years. The remediation times for groundwater will be cross-checked with the cost estimated and reconciled if necessary.

Comment 13. APPENDIX V: In Alternatives 1, 2, and 5 intrinsic bioremediation is listed as requiring $46,810/year for O&M. Please explain what this would be for.

Response: The O&M cost is for quarterly monitoring with sampling and analysis of 10 to 12 wells.

September 21, 1995
Jorge R. Caspary, Remedial Project Manager
Florida Department of Environmental Protection

Comment 1. General: The OU1 Risk Assessment, unaware to the Department, has undergone major changes from the preliminary version reviewed by the Department. While the Navy and its consultants have the right to make changes to documents that peer review may deem necessary, the lack of notification of these changes to a partnering member has meant that scarce departmental resources were used to conduct an on-board review and a subsequent re-review of a document that does not look like the original. It is, therefore, assumed that the Navy and its consultants do not understand the concept of on-board review of primary and secondary documents. The Department has advocated the use of this process as a necessary tool to save time -of already lengthy review schedules- since NAS Jacksonville was put on the NPL. Please note, it is imperative that the format and text of documents presented for on-board review sessions do not change from one version to the next. The Department, through its representatives, wishes to, if possible, finalize a document at an on-board review session. Should this not be possible, then the department looks forward to only reviewing the response to its comments to finalize or reject as Final a particular document. The Department therefore, suggests that in the future the format and text of "Preliminary" Drafts be consistent so as to prevent unnecessary confusion and a complete new revision of the document in question.

Response: Your comments are so noted. In the future ABB-ES will make every effort to conform to these requirements. It was the Navy's intent to present the document to communicate the approach which was being taken and to help identify any issues which should be addressed prior to finalizing the draft risk assessment. ABB regrets your expenditure of valuable resources due to the submission of the preliminary Draft without fully explaining our intended purpose of the document and your review. This was explained in during partnering.

Comment 2. : We could not find a response to FDEP's Comment No. 1 issued on April 26, 1995. Please indicate where has the language asked for been added to the text. (NAS Jacksonville Partnering Meeting, April 1995 - Comment 1: Add language in text in FS as to why no partial cap was evaluated due to the shield requirements need to prevent radiation exposure.

Response: The response to the April 1995 comment 1 has been addressed.

Comment 3. FDEP's Comment No. 2: (NAS Jacksonville Partnering Meeting, April 1995 - Comment 2: FDEP's policy is any risks greater than 10^{-6} are unacceptable as compared to the range of risks (10^{14} to 10^{-6}) that EPA consider to be evaluated as to whether risks warrant additional action.) added and noted.

Response: No response required.

Comment 4.: The Table of Nutrients was found as Table R-1-2 yet FDEP's guidance concentrations are missing. The Department requested they be part of the Table.

Response: FDEP requested that guidance concentrations be included in the table of essential nutrient screening values derived by ABB-ES. FDEP has not published guidance values for these essential nutrients in soil. For groundwater, the only guidance values are for iron (secondary standard of 300 mg/liter) and sodium (primary standard of 160,000 mg/liter). The iron standard was included in the CPC selection table as a published FDEP guidance concentration (even though it is not health-based and really has no bearing on the selection of human health CPCs) and therefore need not be added to the other table which summarizes screening values developed by ABB-ES. The primary standard for sodium was not included because groundwater is brackish. The sodium primary standard will be added to the CPC selection table. However, sodium will still not be selected as a CPC.

Comment 5.: Table 2-3 has apparently been sent to Appendices R. Apparently FDEP's comment No. 4 regarding its dermal guidance was not part of Appendix R-9 titled Dermal Guidance. Please indicate where has FDEP's guidance been added to the text.

Response: FDEP's "guidance" for dermal exposure assessment which includes the 0.6 mg/cm^2 soil adherence value is actually part of the documentation of the derivation of industrial use soil cleanup goals (not guidance for conducting site-specific baseline risk assessments). The draft risk assessment utilized the recommended USEPA soil adherence value of 1.0 mg/cm^2 since the risk assessment was conducted consistent with USEPA Superfund risk assessment guidance. The value utilized in the draft risk assessment is more conservative than the FDEP value which has been cited. The uncertainty section of the risk assessment will be revised to include a discussion of the uncertainty in the soil adherence factor and acknowledge that a different value was used by FDEP to derive the soil cleanup goals published in both 1994 and 1995.

Comment 6.: FDEP's comment No. 5: Please explain where Pages 36 and 37 of the "Preliminary Draft" are located in the new version.

Response: The identification of Florida screening values used in CPC selection are presented on pages R-1-7 and R-1-8 of the draft RI/FS.

Comment 7. FDEP's Comments No. 6: (Pg. 40, Remedial Goal Options (RGO), 1st sentence; need to add FDEP 10-6.), 7 (Pg. 44. 6.2.1.1 need to divide presentation and evaluation of surface soils between areas north of Child street and other areas so as not to get dilution effect.), and 8 (Pg. 45, 6.2.1.2; need to identify which surface water samples are "upstream". Additionally, need to be specific as to which risk based screening levels were used.) . Noted.

Response: No response needed.

Comment 8. FDEP comment No. 9: (Pg.; need to add to text in 6.2.1.2 that assumed that levels of contamination in near subsurface (1-2 ft) is reflected in surface measurements given that Bechtel scanned the surface during the radiological survey that would detect activity down to a maximum of two feet.) The text is not clear. Please clarify the Text.

Response: The document will be revised by adding the following text to the end of the first paragraph in Section 6.1.2.1: Levels of contamination at depth of 1-2 feet below ground surface are reflected in the surface soil data (0-1 feet below ground surface), particularly for the radiological survey given that Bechtel scanned the surface using instrumentation that would detect activity down to 2 feet below ground surface.

Comment 9. FDEP's comment No. 10: (Pg. 54, 6.2.2.4, Groundwater, Line 4; need to add unfiltered before groundwater heading.) Was section 6.2.2.4 edited We couldn't find it in the new text. Please indicate its new location in the new version.

Response: The discussion of groundwater appears on page 6-34 of the draft RI/FS. The section heading has been revised from "6.2.2.4 Groundwater" to "Surficial and Intermediate aquifer". The text will be clarified by adding the statement, "Only unfiltered groundwater sample results were used in the risk assessment for potential groundwater exposures", to the end of the third paragraph in Section 6.1.2.2.

Comment 10. FDEP's comment No. 11: (Pg. 56, Table 6-9; need to check background screening concentrations (FDEP) and evaluate any impacts to fauna and flora or human health for cyanide and selenium.) It is unclear whether impacts to human health and fauna and flora were completed for cyanide and selenium. Please indicate where Table 6-9 can be found in the new version.

Response: Table 6-9 of the Preliminary Draft is Table 6-5 of the Draft RI/FS. That table includes the Florida Class III Freshwater Standards for reference. The surface water standards for cyanide and selenium were not used in the human health CPC selection process, however, because these values were derived for the protection of aquatic life, not human health. A footnote will be added to Table 6-5 indicating that these surface water standards were not used as screening criteria for human health CPCs. The ecological CPC selection tables for surface water in the Draft RI/FS are Tables 7-4, 7-5 and 7-6; selenium and cyanide were only detected in the forested stream area (Table 7-5). USEPA Region IV surface water screening values were employed in the ecological CPC selection process as per USEPA Region IV guidance. All analytes with concentrations that exceeded the USEPA Region IV surface water screening values were retained as CPCs and evaluated in the risk assessment. The FDEP surface water criteria were used in the risk assessment (Table 7-20 of the Draft) to evaluate risks to aquatic receptors from exposure to analytes retained as CPCs.

Comment 11. FDEP's comment No. 12: (Pg. 59, Table 6-10; As with the above comment for benzo(a)..., chrysene, flouranthene, pyrene, bis(2-ethylhexyl)phthlate, 4,4-DDT/DDD/DDE, arsenic, cadmium, copper, lead, mercury, silver, nickel, and zinc.) Indicate where in the text were the constituents asked for by FDEP (i.e., chrysene, copper, lead, etc.) been evaluated.

Response: Table 6-10 of the preliminary draft is Table 6-6 of the Draft RI/FS. No Florida sediment values were used in human health CPC selection because none of the sediment

values are health risk-based. Table 6-6 will revised by adding a footnote which indicates that Florida sediment values are not considered applicable to human health CPC selection since they are solely based on protection of aquatic life. Selection of ecological CPCs for sediment appear in Tables 7-7 through 7-9 of the Draft RI/FS. USEPA Region IV draft sediment screening values were employed in the ecological CPC selection process as per USEPA Region IV guidance. All analytes with concentrations that exceeded the USEPA Region IV sediment screening values were retained as CPCs and evaluated in the risk assessment. The FDEP sediment criteria were used in the risk assessment (Table 7-23 of the Draft) to evaluate risks to aquatic receptors in the St. John's River from exposure to analytes retained as CPCs.

Comment 12. FDEP's comment No. 13: (Pg. 65, Table 6-11; as with the above comment for tetrachloroethene and xylene.) indicate where in the text were the constituents asked for by FDEP (i.e., tetrachloroethene and xylene) been evaluated.

Response: Table 6-11 of the preliminary draft is Table 6-7 of the draft RI/FS. Tetrachloroethene and xylenes are included in the table. Florida guidance concentrations are used in the CPC selection process. Tetrachloroethene was not selected as a CPC because of low frequency of detection (1/47) and it was not selected as a CPC in surface water or sediments (which are potential receiving media for groundwater) per USEPA Risk Assessment Guidance for Superfund (RAGS), 1989). Xylenes were not selected as a CPC because the maximum detected concentration was below the RBC, the MCL, and the Florida Guidance Concentration.

Comment 13. FDEP's comment No. 14: (Pg. 70; FDEP is concerned with SODIV having funds to implement presumptive remedy ASAP to eliminate and existing exposure that may be present.)

Response: No response needed.

Comment 14. FDEP's comment No. 15: (Pg. 73, Table 6-12; need to add text indicating the exposures for the maintenance worker, and remedial contractor from fugitive dust emissions, VOC's and radiation will be evaluated in the Remedial Action Contractor (RAC) Health and Safety Plan (HASP) and Field Sampling and Analysis Plan (FSAP).) where in the new revision is the text requested by FDEP been added?

Response: Table 6-12 of the preliminary draft is Table 6-8 of the Draft RI/FS. The table will be revised by adding a footnote , " Potential exposures for the maintenance worker and remedial contractor from fugitive dust emissions, VOCs and radiation should be addressed in the Remedial Action Contractor Health and Safety Plan and Field Sampling and Analysis Plan."

Comment 15. FDEP's comment No. 16: (Appendix C, Table C-8; all 42 samples are from the 1993 ABB-ES round #2 sampling. Background wells comprised of 10 sets of wells (1 shallow and 1 deep) plus USGS wells requested for flow monitoring/modeling. Locations were statistically evaluated and determined to be representative of background conditions.) indicate where Table C-8 in the new version.

Response: Table C-8 of the preliminary draft (groundwater background analytical data) now appears in Table R-5.8 in Appendix R.

Comment 16. Eco Risk Comments Responses: please indicate where the revised EPA's accounting for Bechtel's radiological work been computed.

Response: The radiological work done by Bechtel was incorporated into the background surface soil data set by averaging the Radium $_{226}$ data from Bechtel with Bismuth$_{214}$ and Lead$_{214}$ data collected by ABB-ES (as per Doug von Cleef's [ESE] memo dated 10 April 1995). Two times the average value (1.28 pCi/g) was used as the background screening concentration for Radium$_{226}$ and Radium$_{228}$ in surface soil for the ecological risk assessment (Tables 7-2 and 7-3 of the Draft RI/FS).

September 22, 1995
Jorge R. Caspary, Remedial Project Manager
Florida Department of Environmental Protection

General Comments

Comment 1.: In the future, the Department will only review, either at on-board sessions or its headquarters, Draft versions of Primary and Secondary documents. "Preliminary" versions should not be sent in for review.

Response: Your comments are so noted. In the future ABB-ES will make every effort to conform to these requirements. The "preliminary" draft was intended only as a presentation of our ideas and concepts and not for detailed comments. ABB regrets your expenditure of valuable resources due to the submission of the preliminary Draft without fully explaining our intended purpose of the document and your review.

Comment 2. : While a large number of wells has been used to define groundwater quality and flow, aquifer parameters, and contaminant fate and transport, the document fails to provide the reader with a comprehensive set of tables containing monitoring well total depths and screen intervals. Please provide this information.

Response: A Table containing Total depth, Ground Elevation, Screened Interval, Screen Length, and depth to Bottom of the Bentonite Seal will be generated and included as Appendix F-1.

Comment 3. : The Department has agreed to focus and streamline the RI/FS program consistent with the Superfund Accelerated Cleanup Model (SACM). Under this model, the presumptive remedy is to cap Site 26. The Department has agreed to consider the presumptive remedy under SACM based on the contingency that monetary funds will be available to design, construct, and maintain the cap and, if warranted, to remediate groundwater exceeding Departmental standards.

Response: Noted

Specific Comments

Comment 4. : For future reference, all maps should be dated. For instance; in Figure 2-1 the dates in which the DPT sample locations were obtained should be added to provide the reader a time reference. In order to avoid redrawing the figures and including dates on all the maps in question, please provide a table indicating the dates of activities pertinent to each figure.

Response: The dates for the RI activities will be included on the appropriate Figures in Section 2.0. Please note that the sample collection dates are included on the Off-Site Sample Log Tracking Form (Appendix A). The RI activity dates are as follows:

DPT	**9-30-93 to 10-30-93**
Geophysics	**4-12-93 to 4-16-93 and 7-12-93 to 7-16-93**
SW/SD	**8-19-93 to 9-9-93, 8-18-94, and 9-13-94**
MWs	**5-17-93 to 7-23-93**
CD MWs	**10-11-93 to 11-22-93**
Air	**9-28-93 to 10-1-93**
Soil Gas	**1-16-95 to 1-27-95**

Comment 5. : Figures 4-19 and 4-20 are reversed. Please fix.

Response: The correction will be made.

Comment 6. Figure 4-35 and 5-1: while the extent of contamination is, for the most part known, there are still aerial data gaps; therefore, dashed lines should be used where contamination is inferred. Please redraw these two figures to show any existent data gaps.

Response: Based on the Round 1 monitoring well, DPT, and Contamination Delineation monitoring well data the maximum distance between data points is no more than 400 ft. This is approximately 4.2% of the total perimeter of the VOC plume as depicted on Figure 4-35. We believe that dashed lines are not warranted based on the density of the data points.

Comment 7. Page 68: Third paragraph of the "Preliminary" version referred the reviewer to Figure X-X. Please indicate what figure does it represent on the Draft version.

Response: The reference was to Figure 4-35. This was corrected in the subsequent draft.

Comment 8. : The "Preliminary" version referred to Figure 4-36 and it was not submitted in neither version. Please submit.

Response: This figure did not exist. The reference was in error. The reference in the text will be deleted.

Contaminant Fate and Transport

Comment 9. : Figure 5.2 does not show the groundwater seepage velocities. Resubmit this Figure.

Response: The reference to "seepage velocities" will be removed from the text. As you have noted, seepage velocities were not indicated on the Figure 5-1.

Comment 10.: Figures 5-2 and 5-3 are incomplete. Provide vertical and horizontal scales.

Response: Because this is a Schematic drawing and not meant to be to scale, the words "Not to Scale" will be included on Figures 5-2 and 5-3.

Comment 11. Section 5.3.1.1: Dissolved VOC Plumes: the statement "By assuming that there is no remaining source of VOCs in the landfill area (which seems to be a conclusion based on existing mapped distribution of VOCs)" is inaccurate. There is a source of VOCs in the landfill area called "LNAPL Area". As shown in Figure 5-1, part of the LNAPL plume is located inside the landfill. Modify the text.

Response: The statement in question (First sentence, Last paragraph, Section 5.3.1.1) will be changed to read, "It is apparent from figure 5-1 that although the LNAPL area may still be contributing VOCs to the LNAPL-area plume, the landfill appears to no longer be contributing VOCs to the Landfill-area plume. therefore, by assuming that there is no remaining source of VOCs in the landfill area, the time to naturally flush the VOCs from the aquifer into the unnamed stream has been determined based on the results of a simple analytical dispersion model.

The term LNAPL has not been used for areas within the landfill (i.e., south of Child Street). While a thin layer of floating produce is present in MW-29 the groundwater samples collected during the soil gas investigation, in that area of the landfill, indicate VOC concentrations several orders of magnitude below potential solubility concentrations.

Surface Water and Sediment

Comment 12.: The Navy and its consultant indicate throughout the text that groundwater discharges to the surface waters belonging to the unnamed tributaries draining OU-1 which in turn discharge to the St. Johns River. Since the Department is tasked with protecting the surface waters of the State, groundwater should be monitored adjacent to the tributaries, to demonstrate compliance with surface water standards. This factor should be accounted for in the FS.

Response: Groundwater monitoring has been proposed as part of the FS alternatives. The proposed groundwater monitoring program is presented in Table 11-1 Two of the well pairs, MW-94/95, MW-101/102 and MW-67/100, are located at the point of groundwater discharge immediately adjacent to the unnamed stream in the area of the plume.

Comment 13.: Given the surficial aquifer adjacent to the landfill is being used outside of the Station's property boundary and has resource potential, it is likely that a permanent deed restriction on water consumption will not be sought by the Department; therefore, it is advisable that the engineering Feasibility Study (FS) document consider source controls and either active or passive remediation of the groundwater as well as surface water contamination preventive measures.

Response: Noted.

Diane Lancaster
Facilities and Environmental
NAS Jacksonville

Comment 1. Section 5.3.1: Could not determine velocity of GW on Figure 5-1.

Response: The reference to "seepage velocities" will be removed from the text. Seepage velocities were not indicated on the figure.

Comment 2. Section 6.1.1.1: Figures 4-7 and 4-8 seem to show sampling adjacent to OU1 in housing and do not correlate to Tables R-2.1 and R-2.2. Found soils in Figure P-5.1 with sample No. in R-2.3.

Response: The reference to Figures 4-7 and 4-8 in Section 6.1.1.1 is incorrect the reference should be to figures in Appendix P-5. The text will be changed. Also the word "Soil" will replace the words "Contamination Delineation" in the Title of Appendix R-2.

Comment 3. Pg. 6-58 and 6-59: One paragraph of the two is nearly identical. one paragraph needs to be deleted.

Response: The duplicate paragraph, the forth paragraph in Section 6.1.5.1, will be deleted.

Comment 4. Pg. 6-59 and 6-60: See comment No. 3.

Response: Same as Response to No. 3. The duplicate paragraph will be deleted.

Comment 5. Pg. 6-61: Future land use cancer risk sentence confusing.

Response: This sentence will be revised to read "Cancer risk for radiological parameters in surface water ($4x10^{-7}$) is less than the USEPA Superfund target risk range of 10^{-6} to 10^{-4} and the 10^{-6} risk level of concern identified by FDEP."

Comment 6. Pg. 6-62: Delete first three lines.

Response: The first three lines of page 6-62 will be deleted.

Comment 7. Pg. 6-64, Line 5: correct "Section *and* 6.1.5.6".

Response: Last sentence of the first paragraph will be revised to read "As discussed in Section 6.1.5.6 neither . . . ."

Comment 8. Pg. 6-72: Last page(s) are missing (from Pg. 6-73).

Response: The remaining pages of chapter 6 will be included in the revised document.

Comment 9. Pg. 7-8, Line 14: "Described in Appendix"

Response: The word "in" will be inserted between the words "described" and "Appendix" in the first sentence of the third paragraph.

Comments 10. Pg. 7-59, first paragraph, last two sentences: Please clarify "grammatically".

Response: The last sentence of the first paragraph will be change to read "While, no record currently exists regarding the occurrence of this species at NAS Jacksonville, its preferred habitat does include areas of limited vegetative growth such as that found in OU1 (USFWS, 1988)."

Comment 11. Table 7-12: Terrestrial Invertebrates, General approach: change "OU8" to "OU1 soil".

Response: "OU8" will be changed to "OU1" in Table 7-12.

Comment 12. Page 7-77: "LC_{50}" usually pertains to airborne concentrations, "LD_{50}" was used previously. "LD_{50}" be used vice "LC_{50}" ?

Response: LC_{50} and LD_{50} are used correctly. Definitions of these will be added to the Glossary.

Comment 13. Pg. 7-98: Aluminum range of 60.9 to 1,740 mg/l? Is this a typo? 60.9 mg/l does not exceed 87 mg/l.

Response: This is not a typo. The sentence will be changed to read "Aluminum was detected at concentrations ranging from 60.9 to 1,740 mg/l; many of the concentrations exceed the USEPA chronic water quality criterion (87 mg/l) for aluminum."

Comment 14. Pg. 7-118: Could not find sampling point 25 on Figure 7-3.

Response: Sample identification O1D02501/O10D02501D is location SD026. Many samples were renumbered for risk modeling. The new and old numbers are cross indexed in Appendix R-2.

Comment 15. Section 9.2.2: Is this still relevant since we documented a detached plume?

Response: While some leachate generation is probably still occurring the amount is assumed to be small. This conclusion is supported by the distribution of VOCs in the plume. With installation of the cap/cover it is anticipated that the existing degree of infiltration will continue to allow "flushing". It is not anticipated that new sources will release contaminants due to existing contaminant plume orientations and the age of the contaminants.

Comment 16. Pg. 9-9, last sentence: correct "unnamed".

Response: We will correct the spelling of "unnamed".

Comment 17. Pg. 9-10, first bullet in Section 9.2.7: Same as #16.

Response: We will correct the spelling of "unnamed".

Comment 18. Pg. 9-11, 4th bullet and Pg. 9-23, last sentence: Same as #16

Response: We will correct the spelling of "unnamed".

Comment 19: Section 11.1.2.1: Wouldn't borrow soil be needed for the excavated soil? What would be used to bring the existing surface to grade?

Response: Yes, borrow soil will be needed. Detailed estimates will be generated during the Remedial Design.

Comment 20. Excavated soil from trenching needs to occur prior to capping. If Alternative 1 with the contingency are chosen, would have to either implement contingency prior to capping, or dispose soil as required by testing. If soil tested and meets HW parameters may be costlier than feasible.

Response: Cost estimates for disposal will be generated and added to Appendix V.

Comment 21. Figure 11-6: Suggest bold lines for LNAPL trench on Figure.

Response: Figure 11-6: will be changed.

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Comment 1 Section 3.9: Groundwater is identified in Section 5.1.3 as the primary transfer mechanism for transporting contaminants away from the source areas at OU1. Groundwater levels were measured on twelve occasions from May 1993 through July 1994, but no hydrographs indicating the magnitudes of seasonal fluctuations are provided. No depth to groundwater or unsaturated zone thicknesses are reported. These data are essential to evaluating the feasibility of technologies such as soil vapor extraction or bioventing to treat contaminant sources in the unsaturated zone.

Response: Hydrographs for selected wells are presented in figure 6 of the USGS report on groundwater simulation in Appendix K. The water table contour map shown on Figure 3-9 viewed in conjunction with the geologic cross-sections shown in Appendix O directly reveals the thickness of the vadose zone. Depth to the water table is generally less than 5 feet, except near the center of the landfill (PSC 26) where the vadose zone thickness increases to about 8

feet. The magnitude of seasonal variation (9/21/93 through 7/14/94 - 9 measurement dates) is shown on the table in Appendix G. It can be seen that the magnitude of water level variation during that period of measurement is typically about one to one and a half feet.

Comment 2. Section 4.2.9.8: Figure 4-35 indicates the total VOC concentration in groundwater, which is comprised of chlorinated solvents (TCE, DCE, VC) and fuel constituents (BTEX). Since the metabolic pathways for the biodegradation of these two classes of organics are distinct, their spatial distributions and discussions thereof should be presented separately. It would also be helpful to indicate the source areas on this figure.

Response: Total VOCs are presented in Figure 4-35 to gain understanding of the areal extent of contamination at the site. Individual organic compounds are presented for each groundwater sampling well in Figures 4-28, 4-32 and 4-34.

Evaluating individual compound concentrations is a useful analytical tool for evaluating in-situ dechlorination activity, but not for the exact reason specified in Comment 2. During anaerobic dechlorination of chlorinated ethenes, the chlorinated ethene compound is used as an electron acceptor for the microbiological metabolism of carbon. In the situation where petroleum hydrocarbons (such as BTEX compounds) are also present in the subsurface environment with the chlorinated ethenes, the petroleum hydrocarbon compound can be used as the carbon source that drives the dechlorination process (assuming anaerobic conditions). Hence, it is useful to depict BTEX and chlorinated compound concentrations (as shown in Figures 4-28, 4-32 and 4-34), to determine not only what extent dechlorination has occurred at a site (shown by individual chlorinated ethene compounds), but also to track organic carbon loading conditions (BTEX concentrations) of the aquifer that may affect chlorinated solvent dechlorination.

Comment 3. Section 5.3.1: The streamlines indicated on Figure 5-1 along Section B-B' show the groundwater flowing under the abandoned spent solvent disposal pit ultimately discharges to a drainage ditch. If this is the case, there would not be a plume downgradient of the drainage ditch as it would have been intercepted by this surface water feature. Figure 5-2 and 5-3 show streamlines parallel to the water table which can not occur if the aquifer is recharging.

Response: The groundwater flow paths shown on Figure 5-1 are a summary of USGS modeling results shown in Figure 17 of Appendix K and therefore depict an accurate groundwater flow pattern for current conditions. The physical features surrounding the landfill are different today than they were when disposal of wastes was begun at this site. Therefore, historically, groundwater flow patterns could have been significantly different from those depicted in Figure 5-1. Furthermore, there are no assurances that the only locations for spent solvent disposal are as indicated on the figure. The current VOC plume could have originated from other portions of the landfill from the spent solvent disposal pits shown during a previous time when the groundwater flow conditions were different.

Figures 5-2 and 5-3 are intended to be simple illustration showing the direction of contaminant migration. However, the indication of rainfall infiltration affecting the flow lines may be useful. Therefore the schematics of groundwater flow shown in Figures 5-2 and 5-3 have been modified to indicate the component of flow due to rainfall infiltration.

Comment 4. Section 5.2.1: Halogenated Aliphatic compounds (TCE, 1,1-DEC, 1,2-DCA, VC) and one aromatic compound (benzene) are identified as posing risk. It is noted that anaerobic biological degradation of TCE results in the production of 1,2-DCE and VC. Since these transformation products are present, it is suggested that significant anaerobic degradation is occurring. Comments on this section include the following:

a) The shallow nature of the surficial aquifer and high recharge rate (10-16 in/yr) by oxygenated rainfall suggest aerobic conditions should prevail. The hydrogeologic characteristics of the aquifer appear inconsistent with an anaerobic environment.

Response: Without additional site soil and groundwater analytical data (e.g. TOC and inorganic concentration and Eh data), it is not clear what the effects of precipitation groundwater recharge are on groundwater pH and dissolved oxygen concentrations. Possible reasons for the prevalence of anaerobic conditions in the groundwater at JAX OU-1 include high soil and groundwater organic and inorganic oxygen demand and the low solubility of oxygen in water in equilibrium with the atmosphere (approximately 9.2 mg/l om fresh water at 20^0 C)

b) Determining microbial redox processes based solely on patterns of electron acceptor depletion or end product accumulation is not possible. Other redox sensitive constituents (e.g., H_2, SO_4, H_2S, CH_4, Fe^{2+}, NO_3, O_2, Eh) are required to confirm the reductive dehalogenation of TCE to DCE to VC.

Response: Based on historical chemical use at NAS Jax, the only chlorinated ethene solvent used at the base was TCE (Section 1.3.2). In addition, the microbiological dehalogenation of TCE to cis-1,2-DCE to vinyl chloride is well documented. Coupled with vinyl chloride and 1,2-DCE concentration data presented in Figure 4-28, which indicate that these compounds are not simply contamination present in the TCE (vinyl chloride concentrations up to 20 ug/L and concentration ratios of 1,2-DCE:TCE up to 2:1), there is strong evidence of the reductive dehalogenation of TCE at JAX OU1.

Additional evidence that would be required to strengthen the assumption that reductive dehalogenation is occurring at JAX OU1 include Eh (as mentioned), patterns of electron acceptor depletion (e.g. upgradient vs. plume and downgradient concentrations of Fe^{+3} and Fe^{+2}), patterns of electron donor depletion (e.g. upgradient vs. plume and downgradient concentrations of TOC), and patterns of dehalogenation daughter compound formation (e.g. vinyl chloride and ethylene).

c) Given that the surficial aquifer would likely be aerobic if it were in a pristine state, it is possible that the aerobic degradation of other organics depletes the oxygen and creates the anaerobic environment necessary for the reductive dehalogenation of TCE. The aerobic degradation of petroleum hydrocarbons derived from the LNAPL area might explain anaerobic conditions in the northern VOC plume. Aerobic Biodegradation of other easily degradable organics placed in the abandoned spent solvent disposal pit might explain anaerobic conditions in the southern VOC plume.

Response: The respondents concur with this commonly-accepted deduction.

Comment 5. Section 5.3.1: It is stated that the magnitude of the seepage velocity is indicated along various flow lines in Figure 5-1. If velocities are proportional; to the length of the selected flow lines, a scale should be provided.

Response: The groundwater seepage velocity were not included on Figure 5-1. The text reference will be removed.

Comment 6. Section 5.3.1.1: It is stated on page 5-11 that the LNAPL may still contribute to the dissolved plume. However, on page 5-12 it is assumed for purposes of calculating the flushing time that there is no remaining source of VOCs in the landfill area. Calculated Flushing times for LNAPL, constituents are therefore greatly underestimated, as the analytical dispersion model used assumes no source. This calculation should consider the LNAPL, source and its time dependent depletion.

Response: The reference on page 5-11 is to the LNAPL area north of Child Street while the reference on page 5-12, "remaining source of VOCs", is for the landfill area south of Child Street. The LNAPL source has been estimated to degrade (see Section 5.3.1.2) in much less time than the estimated time of flushing of the VOC plume. When this is combined with the fact that the dispersion model involves a greatly simplified geometry due to the fact that the receiving stream for this plume is not perpendicular to the plume migration direction, the time dependent depletion was assumed to be a minor perturbation to the flushing-time estimation.

Comment 7. Section 5.3.1.3: Expected groundwater TVOC levels are calculated by assuming equilibrium partitioning between soil contamination and leaching water. This calculation does not account for dilution of the leachate in the groundwater, which is a function of the recharge rate and distance to the groundwater divide. If dilution is accounted for, predicted TVOC levels are more in line with observations.

Response: Interesting comment; we would like to see the calculations and assumptions involved which have enabled the reviewer to arrive at a calculated concentration that is more in line with observations. Our statement implies that if there were a large area of soil contamination at the high contamination level, it would no doubt be detected in shallow monitoring wells at a higher level than we have observed. This is not necessarily incompatible with the reviewers comments.

Comment 8. Section 8.2: It is stated that a presumptive remedy exists for the landfill (i.e., capping), enabling the FS process to be streamlined and focused. While such a presumptive remedy may exist, Alternatives 2-5 involve some form of treatment and their evaluation constitutes the bulk of the FS. The FS should develop these alternatives in detail.

Response: The Feasibility Study (FS) does develop the alternatives in the detail necessary for an FS according the guidance provided by the EPA and the Navy. Any further detail would be part of Remedial Design.

Comment 9. Section 8.3: It should be noted that "additional remediation of residual petroleum-contaminated soil is not included in this FS because petroleum contaminants provide an excellent source of carbon for intrinsic bioremediation of organics, and the relatively low concentrations that remain will not impede achieving RAOs" and that "a residual concentration of approximately 20,000 mg/kg will remain." Section 5.3.3.1 notes that "it appears LNAPL may still contribute to the dissolved plume." Section 5.3.1.2 presents "a calculated natural unaided cleanup of about 10 to 50 years." These statements indicate that residual LNAPL will remain a long-term source of groundwater contamination, even though the first statement suggests there is a benefit to leaving in place. The removal or *in situ* treatment (e.g., bioventing) of the LNAPL contaminated soils would expedite the remedial action and reduce the risk to human health and the environment. Elimination of the residual LNAPL source should be a viable alternative.

Response: The facts that 1) the LNAPL residual does not pose an immediate risk, and 2) it provides a source of carbon for natural biodegradation, appears to outweigh any concern that it might be a long-term source. It may just as likely be naturally degraded long before the VOC plume is remediated (see Section 5.3). Long term monitoring will dictate whether any further action on the LNAPL residual is required.

Comment 10. Section 10.5: Table 10-5, *In situ* Treatment, Intrinsic Biodegradation. The tendency of reductive dehalogenation to transform TCE to VC, a known carcinogen, with no further dehalogenation needs to be evaluated. While TCE can be completely dehalogenated when sufficient electron donor is supplied, the electron donor-poor condition of most aquifers suggest that complete reductive dehalogenation is difficult to achieve.

Response: The respondents concur with the implication that the biological remediation process would need to be monitored at JAX OU1 to ensure the complete degradation (dechlorination or dechlorination and co-metabolic oxidation) of TCE to innocuous products occurs. Groundwater monitoring with the contingency to further enhance in-situ dechlorination of chlorinated ethenes was specified for the intrinsic bioremediation alternative (Table 10-5 and Section 11.1.1.3), and groundwater monitoring and pilot-scale studies were specified for the enhanced bioremediation alternative (Table 10-5 and Section 11.1.2.3).

Comment 11. Section 10.5: Table 10-5, *In situ* Treatment, Enhanced bioremediation. Enhancing and managing the *in situ* bioremediation of both aromatic (BTEX) and halogenated aliphatic (TCE, DCE, VC) compounds presents significant engineering challenges. Multiple degradation pathways for these two classes of chemicals exists, some of which are incompatible (e.g., enhanced aerobic degradation of BTEX would inhibit degradation of TCE) and other difficult to manage *in situ* (e.g., enhanced anaerobic degradation of BTEX and TCE in an aerobic aquifer).

Response: The respondents concur with the implication that the engineered enhancement of in-situ bioremediation at JAX OU1 has the potential to be somewhat challenging, however not for the reasons cited in the comment. The underlying premise of in-situ bioremediation is to enhance or create subsurface environmental conditions that will support/promote in-situ biological remediation (anaerobic, aerobic, or sequential anaerobic/aerobic). Once microbially-favorable environmental condition of choice have been established in the subsurface, biological degradation of both BTEX and chlorinated ethenes can occur readily. It should also be noted that the feasibility of promoting in-situ bioremediation at JAX OU1 will be determined in pilot scale application prior to full-scale implementation.

Regarding the compatibility of concurrent biological degradation of BTEX and chlorinated ethene compounds, either anaerobic, aerobic, or a combination of anaerobic/aerobic conditions can be used to effectively degrade all the compounds of concern. As indicated in Response 2 on page 21 of this response document, the anaerobic dechlorination of chlorinated ethenes can occur concurrently with the anaerobic microbial metabolism of petroleum hydrocarbons such as BTEX (although the anaerobic biodegradation of benzene can be difficult). Similarly, BTEX compounds can be biologically degraded under aerobic methanotrophic (methane-oxidizing) conditions which also support/promote the co-metabolic oxidation of chlorinated ethenes (vinyl chloride, cis-1,2-DCE, and TCE).

Comment 12. Section 10.5: Table 10-5, *In situ* Treatment, Stripping and vapor extraction. This technology was eliminated because it would not achieve RAOs for SVOCs. In addition to stripping halogenated aliphatic VOCs from the groundwater, the oxygen introduced by the process would promote the aerobic biodegradation of aromatic VOCs and polyaromatic SVOCs. should this technology be eliminated?

Response: In-situ air sparging would not only promote the stripping of VOCs from the groundwater, but would also introduce oxygen into the groundwater which can, in turn, promote the aerobic biodegradation of SVOCs. However, the technology of air sparging (stripping) itself will not achieve RAOs for SVOCs, and physical implementation problems (high iron concentrations and horizontal low permeability layers) would appear to decide against air sparging/biosparging. The technology of bioremediation has been dealt with separately. Other issues would relate to cost and not feasibility of technology application (i.e. economically feasible to place many SVE and sparging wells in plume, and are there vinyl chloride issues for off-gas treatment). Therefore this technology was eliminated.

Comment 13. Section 11 (General Comment): The descriptions of the alternatives are insufficient. The detailed evaluations of the identified alternatives are difficult to compare. A conceptual flow diagram showing the details of the alternatives for all media of concern might be considered.

Response: The descriptions of the alternatives are sufficient for the purpose of the FS. More detailed descriptions will be needed for Remedial Design.

Comment 14. Section 11.1.1: Without treating or removing the residual LNAPL source, can RAOs be achieved in 25 years (see comment 10)?

Response: It is likely that after 25 years the LNAPL residual may be totally degraded.

Comment 15. Section 11.1.1.1: Inclusion of a 30-mil geomembrane in the landfill cap will (a) eliminate recharge through the landfill, (b) inhibit the production of leachate, (c) lower the water table, and (d) eliminate the source of oxygen to the surficial aquifer, thereby promoting anaerobic conditions. Not all of these effects may be desirable. Note also that it is the 2 ft of soil, rather than the 30-mil geomembrane, that shields the radionuclides. What is the intent of the geomembrane?

Response: The intent of the geomembrane is primarily to eliminate rainfall recharge though the landfill. Under revised alternatives this will occur only in areas of radionuclide contaminated soil where leaching of radionuclides into groundwater is a concern.

Comment 16. Section 11.1.1.3: RI results have not proven anaerobic degradation of TCE; other indicators should be quantified to support this degradative pathway (see Comment 4). Quarterly monitoring of indicators of bacterial activity and modeling are proposed to assess the type and rate of natural biodegradation. We know of no model that simulates the key geochemical and biological processes embodied in this pathway. Even if a model were developed, the uncertainty associated with modeling the key processes is such that a model would likely have limited predictive utility.

Response: The RI data present strong indications that the anaerobic dechlorination of TCE is occurring at JAX OU1. See response 4 on page 23 of this response document. Monitoring (i.e. groundwater sampling and analysis), not modeling, was proposed to assess the type, rate and extent of compound-of-concern removal that is occurring at JAX OU1. Both chemical and biological monitoring data can be used to achieve these goals. The two references to model and modeling will be replaced with monitor and monitoring respectively.

Comment 17. Section 11.1.2.3: See Comments 4 and 12. The infiltration trench conceptual design shown in Figure 11-5 includes two sets of perforated pipe and a groundwater mixing pump. This design appears complex, and might actually inhibit the dispersal of nutrients and carbon into the groundwater.

Response: The purpose of this conceptual design is to provide a rapid dispersal of nutrients and carbon throughout the entire trench volume, and then with the pumps shut off to allow this "pulse" of amendments to be carried downgradient and be naturally dispersed longitudinally throughout the aquifer. It is important to apply amendments to the entire plume cross-sectional area to uniformly enhance biological activity such that biodegradation is stimulated throughout the plume. Although the design may appear to be complex, this type of design is necessary to satisfy the requirements above and not introduce additional water into the groundwater plume; this design only adds the amendments to the plume. We doubt that it could inhibit amendment dispersal into the groundwater.

Comment 18. References: Reference for Hoaglin et. al. (1983) is missing.

Response: We can not find this reference.

October 2, 1995
Jorge R. Caspary, P.G., Remedial Project Manager
Florida Department of Environmental Protection

General Comments

Comment 1.: Department personnel and management have analyzed the alternatives presented in the Feasibility Study. Based on the factors presented below, the Department requests the consideration of an alternative that uses a soil cap without a geomembrane, contaminant plume containment, active LNAPL recovery, and vadose soil treatment. Factors supporting this alternative included:

a. Stormwater runoff from the landfill would necessitate a large pr-treatment water storage system; the costs of which have not been computed in the FS. Additionally, major stormwater permit modifications are needed to account for an impervious membrane,
b. The use of an impermeable geomembrane would limit the availability of nutrients necessary for the degradation of known residual contamination.
c. The use of an impermeable geomembrane, by virtue of the limiting groundwater recharge, would possibly change groundwater flow patterns.
d. An engineered contaminated groundwater containment system that included managed recharge to the waste disposal area of groundwater treated to applicable standards could enhance natural degradation and achieve protectiveness while minimizing costs.
e. Reduction of known LNAPL and contaminated soil source areas will make natural degradation more effective and reliable, achieve protectiveness and return impacted natural resources to their beneficial use more quickly.
f. Principal risks from exposure to radiological and chemical hazardous in soil could be effectively reduced with a soil cap, achieving protectiveness while minimizing costs.

In light of the factors presented above, and the unique conditions at OU-1, the Department requests the following alternative be incorporated into the FS and appropriate costs computed: "Soil removal, consolidation, and landfill soil cap. Groundwater plume containment and modified intrinsic bioremediation. Contingency for active LNAPL removal and vadose zone soil treatment at the LNAPL area."

Response: Additional alternatives are being considered and prepared for inclusion in the FS. However, considerations were given to the items mentioned:

a. Stormwater runoff from the landfill would be captured and collected in the surface water detention pond included in all alternatives.
b. Degradation of residual contamination under the landfill is not a primary concern because of the apparent detachment of the groundwater plume from the landfill.
c. Groundwater flow patterns would be affected by the construction of a low permeability cap. Several scenarios were evaluated as part of the RI and are presented in Appendix K.
f. A soil cap would reduce risks from exposure to soil contaminated with radionuclides but would not prevent leaching, migration, and exposure via groundwater unless a low-permeability layer is included in the cap.

Specific Comments

Comment 2. Section 8: The document briefly discusses the LNAPL Area and the current IRA underway; however the discussion should be expanded to include the amount of free product present in the LNAPL Area, projected times needed to achieve LNAPL recovery and subsequent actions. The LNAPL Area is part of OU 1 and, ideally, the IRA should be accomplished by the time the OU 1 chosen alternative is underway. Also, the FS fails to discern the administrative process to be followed in involving the LNAPL Area in the upcoming Record of Decision for Operable Unit 1.

Response: A FFS was prepared to address the LNAPL removal. The FFS was focused in nature and was intended to streamline the RI/FS process. Specific technical information, such as the volume of recoverable LNAPL, was addressed and supported in the FFS. Consistent with the streamlined approach, only a summary of the LNAPL IRA was provided in Section 8. The administrative process to be followed in involving the LNAPL Area is discussed in Appendix A of the FFS. A reference to the FFS will be added to Section 8.3.

Comment 3. Page 9-5, second paragraph: The document implies that detection limits and background values may prevent compliance with FDEP's excess cancer risk of $1x10^{-6}$. This sentence is too general. Justification for possibly not achieving remedial standards and guidance numbers should be fully explained in the Feasibility Study. Also, discuss for which medium this sentence refers to. In addition, briefly discuss Data Quality Objectives achieved for the data validation problems encountered in ABB'S database.

Response: Please refer to the response to comment 8 on page 30. In addition, the reference to detection limits will be deleted from this paragraph.

Comment 4. Page 9-11: It is unclear what "non-risk drivers" does the document refer to.

Response: "Non-risk drivers" are chemicals present at the site that on an individual basis do not pose a risk above acceptable levels and, therefore, do not have action levels. As indicated in the text, the concentrations of these contaminants will likely be decreased during remediation. However, for purposes of calculating residual risks, they were assumed to remain constant. As such, the residual risks are conservative and likely to overestimate the actual risks that would remain after remediation.

Comment 5. Page 9-11, Soil outside the landfill: Add a sentence referring the reviewer to figure 11-3.

Responses: Reference will be added.

Comment 6. Table 9-2 and Appendix U Soil Calculations: For Alternatives 2 to 5 the volume of total soil to be removed has been computed at 9,000 cubic yards; however, this quantity may be exceedance of the actual number of cubic yards to be removed. For instance, Area 1 has been dimensioned at 50x180x1 feet yet there is little justification, based on the data presented, to remove soil past the two north and south sampling points. Likewise, in Area 7 there is no sampling points between SL127 and SL121 yet soil is proposed to be removed between these to points and around the family housing area where data points are shown as non-existent. The areas as proposed to be removed should be revised and cost projections modified accordingly. Further, the Department wishes to discuss this point with the consultant's engineering staff at the upcoming October 10-12 partnering meeting.

Response: As shown in Appendix V, the cost of surface soil excavation and landfilling was estimated at $158,000 for each of the four alternatives requiring soil removal. When compared with the total estimated cost for Alternative 1, the difference in total cost of each of these 4 alternatives was greater than $158,000. Therefore, the conservative estimate used did not affect the comparative analysis of the alternatives in terms of cost. Also note

that excavation volumes based strictly on investigation phase sample results often underestimate excavation volumes, especially when sample spacing is large or positive detections are not bounded by non-detect samples. Some interpolation between samples is necessary to estimate volumes.

Comment 7. Page 9-28: Table 9-11 is missing from both copies of the FS sent to FDEP.

Response: The tables will be added.

Comment 8. Page 9-28: Explain which are the "practical implementation issues preventing achieving residual cancer risks as low as $1x10^{-6}$. For more on this issue, refer to comment No. 2.

Response: The practical implementation issues that prevent achieving residual cancer risks as low as 1×10^{-6} arise as a consequence of the following two factors:

> **1. Background concentrations of some constituents are already at levels that pose a cancer risk of greater than 1×10^{-6}.**
> **2. The EPC targets for a cancer risk of 1 x 10-6 are lower than the abilities of existing technology to reliably measure (as indicated by the EPCs less than CRQL/CRDL).**

Comment 9.: The Navy should develop a table summarizing the USGS aquifer modeling efforts for groundwater flow, contaminant fate and transport, and aquifer characteristics. Also, no discussion of vertical gradients is presented. This factor would have to be considered in Alternative 2-5.

Response: The USGS aquifer modeling efforts are summarized in Appendix K, and include only groundwater flow. No contaminant transport numerical modeling has been conducted by the USGS. The USGS report summarizing their analysis of the 24-hr aquifer test conducted north of Child Street is located in Appendix J. ABB-ES and USGS concur that there is no measurable vertical gradient in the surficial aquifer, except perhaps beneath the streams which are the discharge points for the OU 1 groundwater flow system. None of the shallow-deep monitoring well pairs have shown vertical gradients, thus justifying the single-layer groundwater flow model developed by the USGS. See Appendix K for the USGS discussion of this fact.

Comment 10.: Are the RI/BRA for OU-1 Final? If they are not, please indicate.

Response: The RI/BRA document are available as Drafts Finals. When the outstanding comments are resolved, these will be available in the final form.

Comment 11.: Were seasonal variation noted for the "unnamed tributary"? Briefly discuss this issue in the FS since it affects all of the alternatives.

Response: Seasonal variation of flow in the unnamed tributary have not been measured. Such variations would only affect the alternatives due to variation in the quantity of flow to be handled by the treatment system in Alternatives 3 and 5. And, this would include only groundwater flow variations since direct surface runoff is not collected by the collection

trenches. Should the seasonal flow variation be considered important in the Remedial Design phase, the USGS model could be used to simulate the different rates by simply modeling infiltration rates that might be expected during both very "wet" seasons and very "dry" ones.

Comment 12. Table 10-2: What geotechnical parameters have been obtained to indicate that a hybrid cover will have the "least amount of settlement" at OU-1? Settlement is usually site specific and this statement may be premature.

Response: The referenced statement indicates that the hybrid cover poses less risk of settlement because of its smaller thickness and, therefore, loading relative to other cap designs. The actual magnitude of potential settling will be evaluated as part of the remedial design.

Comment 13.: There is a discrepancy between the duration needed to achieve Remedial Action Objectives (RAOs) for alternative 1. Section 11.1.1 indicates 25 years; however, Appendix U indicates that "it could take as long as 44 years" to reach RAOs. Explain this discrepancy.

Response: Section 11.1.1 will be changed to indicate a 25 to 44 year cleanup time. The 25-year cleanup time is based on the assumption that natural (intrinsic) bioremediation will reduce groundwater contamination to RAO levels within the non-retarded contaminant. If no biodegradation occurs, it has been estimated that flushing alone will require 44 years for a contaminant with a retardation coefficient of 1.8 (see Chapter 8).

Comment 14. Section 11.1.1.2: The FS focuses solely on the landfill yet the LNAPL Area is, and will be, an integral part of the remedy selection and ROD development. How does the Navy LAN to administratively address the LNAPL recovery area? This issue should be further explored at a BCT meeting and incorporated in the FS.

Response: Agreed that further exploration with the partnering team would be beneficial. However, the administrative process to be followed in involving the LNAPL Area is discussed in Appendix A of the FFS.

Comment 15. Section 11.1.1.3: How can it be stated that "up to 44 years will be needed to achieve RAOs" yet "modeling will be needed to assess the type and rate of natural biodegradation"? These two sentences contradict each other. It would seem that the 44 year period of time needed to achieve RAOs is based on an already established contaminant rate of degradation. Also, detail the model(s) to be used to determine natural degradation.

Response: The word "modeling" will be changed to monitoring.

Comment 16. Table 11-1: Some shallow wells (3'-13' S.I.) are presented as deep wells. Please fix this table. Also show in a figure the locations of the wells proposed for monitoring and all monitoring wells located in the vicinity of the proposed wells.

Response: The table will be corrected.

Comment 17: Alternative 2: Alternative 2 proposes nutrient infiltration via trenches with actual trench design based on pilot scale studies. Ideally, pilot scale nutrient infiltration tests should be stated as soon as the FS has been finalized. Should alternative 2 be chosen and the infiltration test prove unsuccessful no contingency is presented in the FS. Note, failure of any components and/or parameters in the pilot test will probably need a Record of Decision revision. Also, it is unclear whether Bechtel Environmental (RAC) has accepted the 6 nutrient infiltration trenches" conceptual design.

Response: The purpose of the FS phase is to identify and evaluate remedial alternatives with representative technologies. For comparative analysis purposes, a "6 nutrient infiltration trench" concept was chosen as the representative technology for enhancing the intrinsic bioremediation. If an alternative requiring enhanced bioremediation is selected in the ROD, the technical parameters for that engineering components will be addressed in the ROD. Upon acceptance of the ROD, the technical specification for the selected enhancement component will be addressed as part of the Remedial Design. Furthermore, RAC concerns regarding the implementation of the remedy are most appropriately addressed during that phase.

Comment 18. General: Given the above factors please explore the cost of injecting nutrients via injection wells.

Response: The purpose of the FS phase is to identify and evaluate remedial alternatives with representative technologies. For comparative analysis purposes, a "6 nutrient infiltration trench" concept was chosen as the representative technology for enhancing the intrinsic bioremediation. If an alternative requiring enhanced bioremediation is selected in the ROD, the technical specifications for the nutrient delivery method would be addressed as part of the design. Injection wells were briefly considered and rejected because of implementability concerns (see response to comment 17 on page 27 of the response document).

Comment 19. Cost Estimates: What is the uncertainty range for the costs presented in this section? or are the costs presented no going to vary at all? Also, specify "undeveloped design details"? The cost of these "details" are sometimes up to 20% of the cost of an activity and given the current SODIV's fiscal climate, it is unlikely such percentage will be acceptable. Also, have these costs been reviewed and accepted by the Remedial Action Contractor?

Response: The purpose of the FS phase is to identify and evaluate remedial alternatives with representative technologies. During the FS, technologies were chosen to represent each engineering component of the remedial alternatives. (For example, a slurry wall was chosen as the representative technology for vertical containment.) The costs generated during the FS are costs associated with combinations of representative technologies. These costs were prepared for comparative purposes only, and are not actual implementation costs. For an FS cost estimate, only the major items are included. Undeveloped design details are contingencies to cover cost items that are not typically identified until the remedial design stage. A cost estimate prepared at the remedial design stage would provide the detail for these costs.

Comment 20. Cost Estimates, Appendix V page 7: The cost of equipment and trench installation ($896,000) seems excessive. Indicate sources for this estimate. Once again, the cost of "undeveloped design details" ($273,900) is unclear. What "details" is this table referring to?

Response: As mentioned above, the costs presented in the FS were generated for comparative analysis purposes only, and are not implementation costs. As shown in Section 12 the comparative analysis evaluates the alternatives with respect to several criteria, one of which is cost. For alternatives that recommend enhanced bioremediation, the cost of equipment and trench installation comprises a relatively small fraction of the total estimated cost. As such, a conservative estimate for this line item does not affect the over-all comparative analysis of the remedial alternatives. Furthermore, as engineering designs can vary in complexity. Costs associated with developing the details of the design during the RD/RA phase were estimated in the FS and were labeled as "undeveloped design details".

Comment 21.: Where are the Navy's costs for negotiating groundwater access restrictions by deed? The Department suggests costs for Alternatives 1 and 2 be thoroughly reviewed.

Response: Institutional controls, including negotiating groundwater access restrictions by deed, is recommended for all alternatives. The cost estimates presented in Appendix V include $20,000 for institutional controls, which includes deed restrictions.

Comment 22. Page 12-6 Potential Contingencies: Detail the "adverse effects of sediment excavation". Also, the contingency presented in this section is, in essence, Alternative No. 2. Likewise, the Navy should explain in the FS at what stage of the monitoring program would the "contingency" be implemented. It is worth noting that the timeframe for contingency implementation would become part of the ROD.

Response: Although construction techniques are available to reduce erosion, sediment deposition resulting from upstream excavation will result in adverse affects, including destruction of existing organisms, in the downstream portions of the stream system.

October 2, 1995
Jorge R. Caspary, PG., Remedial Project Manager
FDEP

Comment 1. General - Professional Certification: The Feasibility Study presents engineering analysis and decisions, and it is an engineering document. The final submittal should be signed, sealed and dated by a Florida registered Professional engineer with responsible charge for its preparation.

Response: Noted.

Comment 2. Section 8.2: The presumptive remedy policy of the USEPA applies to municipal landfills. The policy assumes that municipal landfills, in general, are relatively homogenous, contain principally municipal solid wastes, and have low levels of contaminants in large volumes of widely distributed media. Although the historic record is vague, OU 1 appears to have been used as an industrial land disposal facility that accepted a wide range of industrial liquid and solid wastes and possibly some smaller volumes of household garbage. Unlined pits were reported to be a common disposal method for industrial liquid wastes at OU 1.

The presumptive remedy policy was not intended for an industrial land disposal facility such as OU 1, per se. Therefore, site-specific conditions at OU 1 conforming to the presumptive remedy assumptions should be explicitly described to justify its application. In particular, any RI data that confirms OU 1's similarity to a municipal landfill such as its homogeneity, similarity of wastes, and low levels of contaminates in widely dispersed media should be emphasized. No hotspots of highly contaminated soils or LNAPL reservoirs should exist within the OU 1 "landfill" boundaries if the strict presumptive remedy concept applied in this FS is to be valid.

Response: As indicated the EPA fact sheet entitled "Presumptive Remedy for CERCLA Municipal Landfill Sites", presumptive remedies are not limited to those sites containing solely municipal solid wastes. In fact, for CERCLA landfills, such as OU 1, that contain large volumes of heterogeneous mixtures of municipal and industrial and/or hazardous wastes, EPA considers containment to be the appropriate response action, or "presumptive remedy". Therefore, it is our understanding that source containment, the principle of the presumptive remedy for landfills, is applicable to the site specific conditions at OU 1. However, the source containment must be addressed from a site specific stance. For example, while some leachate generation is probably still occurring, the amount is small. It is not anticipated that new sources will release contaminants. As such physical collection of leachate and treatment independent of groundwater, may not be necessary to meet the RAOs or the intent of source containment.

Comment 3. Page 8-3, Paragraph iv: Selective disregard of petroleum contaminated soil is not consistent with State rules and regulations. More compelling justification for disregarding the remediation of petroleum contaminated soil at OU 1 must be provided than is in this paragraph. in particular, significant volumes of soil contaminated with petroleum hydrocarbons as well as other chemicals are known in the LNAPL area north of Child Street. Free product has also been reported in shallow monitoring wells south of Child Street. Remediation of petroleum contaminated soil should be explicitly addressed in the FS since it is a potential source of continuing groundwater contamination.

Response: Respondents disagree that petroleum contaminated soils were selectively disregarded. As discussed in Chapter 5, there are indications of significant biological degradation of these contaminants. As such, the residual contamination present is addressed as part of intrinsic bioremediation and was considered when determining overall site cleanup times. Furthermore, as shown in Sections 6 and 7, these contaminants were shown to pose a low risk.

Comment 4.: Surface water standards and sediment guidance concentrations should be identified as chemical-specific ARARs and TBCs, as appropriate. In addition, the Groundwater Guidance Concentrations contain primary and secondary drinking water standards as well as "free-from" minimum criteria promulgated under Rule 62-520, F.A.C., Rule 62-550, F.A.C. that apply to groundwater quality. The Groundwater Guidance Concentrations are chemical-specific ARARs and not TBCs.

Response: Respondents recognize that the FDEP considers these groundwater guidance values to be ARARs. As indicated in Table T-5, this was considered in the remedial response process.

Comment 5. Page 9-4, paragraph iii: CERCLA 121(e) permits on-site response action to proceed as described in the text. Please note, however, that discharges to "Waters of the State" or air emissions are not likely to be considered on-site response actions and may require permits depending on site-specific conditions and the nature of the release.

Response: Noted. The facility has taken into account the permitting issues. Currently, the facility is in the process of obtaining an NPDES permit. It is our understanding that the nature of the potential discharge has been taken into account, and will be consistent with the limits set forth in that permit.

Comment 6. Page 9-5, paragraph ii: Adequate detection limits should have been specified in the Sample and Analysis Plan and QAPP to achieve the anticipated chemical-specify ARARs. In some limited cases, PQLs are higher that the corresponding chemical-specific ARAR due to technical limitations. In these limited cases, the PQL applies as the criterion. CLP CRQLs and c re often higher than typical PQLs obtained from most competent laboratories. The CRQL or CRDL should not be used as default quantitation limits if the laboratories can report lower values confidently. refer to the Florida Groundwater Guidance Concentration list for typical PQLs from water sample analyses.

Response: The Sample and Analysis Plan and QAPP specified practical quantitation limits for the analytes/compounds analyzed during the RI/FS. Even though reference to the CLP CRQLs and CRDLs were made, the analytical data generated did not default to these values. Rather, any detection above the instrument detection limits is reported by the laboratory. The reporting limits are sample specific depending on several factors including percent moisture and dilution factors. Based on CLP protocols, inorganics values which are quantified between the contract required detection limits (CRDL) and the instrument detection limits were flagged with a "B" in the analytical tables. Likewise, organic values reported between the instrument detection limit and the contract required quantitation limits were flagged with an estimated (J qualifier), to alert the data user of less certain quantification in this region.

Comment 7. Page 9-5, paragraph iv: Recommend using the terms "higher-risk" action and "lower-risk" action value for the terms "high-end" action values and "low-end" action value.

Response: Respondents disagree. Although, the text notes that FDEP has indicated a preference to achieving the $1x10^{-6}$ level, an acceptable exposure level is represented by an excess lifetime cancer risks in a range of $1x10^{-4}$ to $1x10^{-6}$. These terms "low end" and "high end" were intended to provide a relative measuring tool for risk reduction within the acceptable risk range. As such, there is a potential that a change to the recommended terms would imply that the less aggressive action levels were not acceptable in terms of risk reduction.

Comment 8. Section 9.2.1: Refer to comment #2 for limitations and justifications for use of presumptive remedies at municipal landfills.

Response: Noted. Please see response to comment 2 on page 35 of this response document.

Comment 9. Section 9.2.2: This section recognizes that a "continuing source of contamination from the landfill" could generate leachate. The proposed response, however, for leachate is "to manage its effect on other media" and not to reduce its generation potential by remediating source areas. Leaving source areas may reduce the effectiveness and reliability of groundwater remediation alternative and increase the length of time to achieve groundwater cleanup standards depending on how leachate is managed. Refer to comments nos. 2 and 3.

Response: While some leachate generation is probably still occurring the amount is assumed to be small. This conclusion is supported by the distribution of VOCs in the plume. Although the installation of the partial cap/cover system is anticipated to continue to allow some "flushing", it is not anticipated that new sources will release contaminants due to existing contaminant plume orientations and the age of the contaminants.

Comment 10. Section 9.2.6.: "However, the EPCs for these chemicals are lower that the corresponding CRQLs". Refer to comment no. 4.

Response: For risk assessment, the protocol calls for establishing the EPC as the average of a constituent for all the sample points. If the constituent is ND in a given sample, the protocol calls for using one-half the CRQL in the averaging process. Hence, if there are a large number of NDs in the data set, the calculated EPC can be less than the CRQL. In such a case the EPC is an artifact, and is not measured directly.

Comment 11. Page 9-11, paragraph v: what are "non-risk drivers"?

Response: "Non-risk drivers" are chemicals present at the site that on an individual basis do not pose a risk above acceptable levels, and therefore, do not have action levels. As indicated in the text, the concentrations of these contaminants will likely be decreases during remediation. However, for purposes of calculating residual risks, they were assumed to remain constant. As such the residual risks are conservative and likely to overestimate the actual risks that would remain after remediation.

Comment 12. Table 9-2: It appears that some of the default Action levels are "CRQLs". This is not necessarily acceptable as action levels. Refer to comment no. 6.

There are more recent Soil Cleanup Goals that were released in April 1995. the Department had shared this information with the Navy in a timely manner and these more recent Goals should be used instead of the earlier July 5, 1994 values. Updated values are being approved by the Department. the Navy may wish to use these values when they are available, depending on the timing for their final submittal.

Response: Please refer to the response to comment no. 6 in reference to "CRQLs". The majority of the document was completed prior to the issuance of the April values.

However, respondents will access the selected action levels in light of the new Soil Cleanup Goals. It is our understanding that the September 1995, values are the most recent.

Comment 13. Page 9-14, Paragraph vi: "Although compliance with guidance concentrations is technically not enforceable,..." Refer to comment no. 6.

Response: Florida Guidance concentrations are, in general, enforceable since they include MCLs. We will make appropriate changes to the text.

Comment 14. Table 9-4: FAC 62-550.310 and FAC 62-550.320.

Response: Footnote 2, FAC 17-550.310 and FAC 17-550.320 will be changed to FAC 62-550.310 and FAC 62-550.320.

Comment 15. Table 9-5: ARARs are not additive since risk criteria may be different for each isomer.

Response: The laboratory analysis result was reported as total DCE, not separated into cis and trans. The action level for 1,2-Dichloroethene(total) on Table 9-5 will be changed to 70 ug/l. This concentration is the lower of the two isomers (cis- and trans-).

Comment 16. Table 9-6: Where is the Florida Surface Water Standard for 1,1,1-Trichloroethane found? It is not listed in Chapter 62-302 (February 27, 1995). A standard of 173,000 ug/l for any chlorinated hydrocarbon sounds high. The BOD alone could be a problem. The Region IV Freshwater Quality Screening Values (November 16, 1992) suggest an "Acute Screening Value" of 5,280 ug/l and a "Chronic Screening Value" of 528 ug/l.

Response: Respondents concur that the Surface Water Standard for 1,1,1-Trichlorethane is not found in Chapter 62-302 FAC. It was, however, included in Chapter 17-302 (May 1993). This reference will be deleted.

Comment 17. Page 9-23, paragraph i: How were background concentrations determined and have they been accepted as representative? If this issue was discussed in the RI and BRA, a reference would be sufficient.

Response: Figure 2-3 depicts the locations of the background monitoring wells. Furthermore, Appendix P-4 presents the background statistical evaluation. Respondents will add a reference.

Comment 18. Section 9.3.2.2: Confirm the surface water classification of the St. Johns River at NAS JAX as "marine". Class III freshwater criteria should apply to the unnamed tributary.

Repines: The classification of "marine" was selected in accordance with Chapter 62-302 FAC, during the RI and RA.

Comment 19. Section 9.3.4: Were detected chemical concentrations screened relative to sediment guidance concentrations (e.g., Region IV screening criteria and Florida's SQAG for Coastal waters). If this issue was discussed in the RI and BRA, a reference would be sufficient.

Response: Yes, they were screened relative to EPA Region IV criteria. We will reference Chapter 7.

Comment 20. Table 9-8 and 9-9: "CRDL/CRQL": Refer to Comment no. 6.

Response: See response to comment 6 on page 35 of this response document.

Comment 21. Table 9-10: Were any of the baseline risks of hazard indices based on reported detection limits? If this issue was discussed in the RI and BRA, a reference would be sufficient.

Response: Risks are based on EPCs which incorporate one-half of the reporting limit for NDs as per EPA Risk Assessment Guidance.

Comment 22. Page 9-28, paragraph i: "Practical implementation issues prevent achieving residual cancer risks as low as $1x10^{-6}$ ". Section 9.0 started out as a straight forward identification of ARARs and RAOs. It seemed to jump directly into feasibility analysis at the end identifying "practical implementation issues", "risk reduction scenarios", and expected "residual risks". These issues should be addressed during alternatives formation, screening, and detailed analysis. The approach in this section appears to be designed to draw the reader into foregone conclusions.

Response: Respondents agree that these topics are more appropriately discussed in later sections of the text. The discussions of "implementation issues", "risk reduction scenarios", and expected "residual risks", will be deleted from this section.

Comment 23. Page 10-4, paragraph ii: 53FR1446 (NCP) preamble refers to "hybrid closure" where a RCRA closure is not "applicable". It does not discuss a "hybrid cap". Hybrid closures are either Alternative Clean Closures or alternate Land Disposal closures. The alternate Land Disposal Closures is "identical to RCRA landfill disposal closure except that the cover requirements are relaxed because the wastes being contained <u>do not pose a threat to groundwater"</u> (emphasis added). The "specific conditions at OU 1" should be described to support t the rationale that a hybrid closure is justified. If a hybrid closure is justified, an ARAR Wavier using the equivalent standard of performance criterion would be needed.

Response: The intent of this sentence was not to imply or justify the need for a hybrid closure. Required modifications to the text will be made. Furthermore, while some leachate generation is still occurring, the amount is small. The detached plume described in the RI supports the referenced statement, and indicates that the wastes do not pose a threat to groundwater, except potentially from newly deposited soils containing radionuclides. These areas would be covered with t he geomembrane to prevent leaching.

Comment 24. 10-21/ii: This paragraph makes a distinction between "a cumulative, residual risk" and "cumulative risk based on individual risks". What is the distinction? If this issue was discussed in the RI and BRA, a reference would be sufficient.

Response: There is no distinction, we will change the latter to "cumulative, residual risks".

Comment 25. Section 11: There are inconsistencies between the estimated times of cleanup reported in text and appendices.

Response: Respondents agree. The E-mail memo dated 7/5/95 in Appendix U will be removed. It was superseded by the Memorandum dated July 7, 1995, which has the appropriate cleanup times. We will edit the text in Chapter 11 to correspond to the cleanup times given in the July 7 Memorandum. The duration for Alternatives 3 and 5 should be 26.5 years.

Comment 26. Section 11.1.1.1: There will be some amount of geomembrane leakage no matter how good the materials and method of installation. Given the proposed cover design, how will water that mounds on the geomembrane be removed to prevent hydrostatic pressures that increase the rate of infiltration through the geomembrane.

What are the criteria (Quantity and Quality) for stormwater management for this particular site and how will stormwater management affect the feasibility of the capping alternative.

Response: These are design considerations and should be addressed during the Remedial Design phase. In general, the cap will be slopped to prevent accumulation of surface water on top of the geomembrane. Storm water management was considered to the extent that a retention pond has been located as shown on Figure 11-1.

Comment 27. Section 11.1.1.2: Excessively contaminated soil in the LNAPL area should be explicitly addressed either by proposing remedial alternatives for cleanup or presenting compelling rationale for leaving it. Refer to comments no. 2 and 3.

Response: LNAPL is being removed and the contaminated soil will be left in place as it is acting as a biological food source for biodegradation. See response to Comment 3 on page 35 of this response document.

Comment 28. Section 11.1.3: Note that there maybe an unintentional consequence of capping with this alternative using an impermeable geomembrane. Intrinsic bioremediation of groundwater may be slowed by capping with an impermeable membrane since recharge would be reduced. The Navy may wish to consider other capping scenarios such as consolidating "risk-driving" media within a containment unit with a smaller impermeable cap while simultaneously treating source areas to reduce continuing groundwater impacts. Stormwater runoff volumes would be less, some recharge would remain, and intrinsic bioremediation would not be impacted as much.

Response: We are considering additional alternatives as suggested. However, the suggestion that reduction of recharge may slow intrinsic bioremediation is unfounded. In

fact, it may enhance the reductive dechlorination of the chlorinated organics by helping to maintain anaerobic conditions.

Comment 29. Section 11.1.2.3: Injection of nutrients into groundwater may require UIC and other Department approvals. Are the trenches as proposed practical considering landuse (residential housing and associated utilities)?

Response: The required approvals are noted. The trenches were selected as a representative technology for comparison purpose. If utilities or other constraints limit the practical implementation of trenches, other nutrient delivering methods, such as vertical wells, would be considered. If an alternative requiring enhanced bioremediation is selected in the ROD, the technical specifications for this engineering component will be addressed during the Remedial Design phase.

Comment 30. Figure 11-5, Figure 11-9: operations and Maintenance requirements will be high with systems of this complexity.

Response: Comments noted; it is anticipated that he trench injection system will be in operation once a month to inject a "pulse" of nutrient and carbon source in to the natural groundwater flow system.

Comment 31. Tables 11-3, et al: Note that, although "Federal and state landfill closure ARARs are not applicable, they are relevant and appropriate..

Response: The not
e will be added to the appropriate Table.

Comment 32. Table 11-7: If the FS does an adequate job of feasibility analysis, would it not be sufficient to meet the requirements of NEPA. If so, why would an EIS be required?

Response: The FS was intended to meet the substantive requirements of NEPA for all on-site activities. Although the unnamed tributary is not within the boundaries of the Operable Unit, sediment contamination in the unnamed tributary is considered to be a result of activities within the Operable Unit or Area of Concern. If excavation of the sediment is required, the tributary will be included within a Corrective Action Management Unit. As such the substantive requirements of NEPA would be applicable. Table 11-7 will be modified appropriately.

Comment 33. Section 12.1.2: Refer to comment no. 31.

Response: The note will be added to the appropriate Table.

Comment 34. Section 12.3: There appears to be no substantive difference between "alternative 1 with contingencies" and alternative 2 with the exception of sediment removal. Recommend not considering the former.

Response: The use of contingencies allows for a phased implementation of the remedial action. The phased approach make the alternatives significantly different. Guidelines for implementing the contingencies, such as groundwater contaminant concentrations, will be outlined in the ROD.