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NAS CECIL FIELD, FL  
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TECHNICAL MEMORANDUM REGARDING NO FURTHER ACTION RECOMMENDATION  
FOR OPERABLE UNIT 3 (OU 3) SITE 7 AND SITE 8 NAS CECIL FIELD FL  
9/1/1996  
ABB ENVIRONMENTAL SERVICES INC

32215-003  
04.07.03.0001

**No Further Action Recommendation for Operable Unit 3  
NAS Cecil Field  
Jacksonville, Florida**

**Summary**

The Remedial Investigation (RI) at Operable Unit (OU) 3 has been completed. The RI report includes human health and ecological risk assessments (Chapters 6 and 7).

Having evaluated the results of the RI, ABB Environmental Services, Inc. (ABB-ES) recommends no further action (NFA) at OU 3. This recommendation is based on:

- the low level of risk to human and ecological receptors
- the designation of OU3 as an industrial area in reuse plans

This memorandum describes the basis for the NFA recommendation. Details of the RI and the risk assessments will be presented in the RI report and are not repeated in this memorandum.

**Background**

OU 3 consists of Site 7, Former Fire-Fighting Training Area, and Site 8, Fire-Fighting Training Area, Boresite Test Range, and Hazardous Waste Storage Area. Both sites are located in the southern part of the main base

Site 7 Conceptual Understanding. Site 7 is a former fire fighting training area, located near the northwest end of the old 310 flightline. Site 7 is approximately 1200 feet northwest of the flightlines 9 and 27 (east and west runways) and approximately 600 feet east of Lake Fretwell. The Initial Assessment Study (IAS) reports Site 7 consisted of two burning areas on the old asphalt flightline and an unlined pit adjacent to the flightline. The IAS reports that from the 1950's to 1975, waste paints and paint thinners, spent chlorinated and nonchlorinated solvents, and petroleum-oil-lubricant (POL) wastes were burned during firefighter training. Extinguishing material and unburned wastes were left on site, where they would evaporate, infiltrate through the cracks in the asphalt and into the soil, or migrate by surface runoff.

Currently, Site 7 is used as an ordnance storage area. Storage structures are located at the end of the old flightline. Explosive ordnance is stored in Building 865; unarmed ordnance in portable storage units. Building 865 was erected sometime after fire-fighting training ceased in 1975 and before 1980, as evidenced by aerial photographs.

Site 8 Conceptual Understanding. Site 8 is located approximately 1500 feet south of the flightlines 9 and 27. Historically, Site 8 has been used as a boresite testing area for aircraft gunnery. Aircraft would taxi to the concrete pad and "sight in" aircraft guns by firing at targets in front of a backstop located 600 feet southwest of the concrete pad. Upon closure of Site 7, Site 8 was also used as a fire-fighting training area, with activities taking place in three bermed pits located adjacent to the concrete pad. Firefighter training activities took place from 1975 until 1984. Unspent materials would either evaporate, infiltrate the soil, or migrate by surface runoff.

From the late 1970's until 1980, the site was also used for storage of unlabeled drums containing hazardous waste. Reportedly, some of the drums stored in the open field between the concrete pad and the backstop were shot through by aircraft guns, spilling liquid waste on the ground.

Currently, ordnance is loaded onto aircraft at Site 8. Loading activities take place on the taxiway, topographically upgradient of Site 8 sample locations. Presently, no fire-fighting training occurs at Site 8.

**Future Land Use**

NAS Cecil Field will be closing under the Base Realignment and Closure (BRAC) and reverting to civilian use. However, the runways and areas surrounding them, including Sites 7 and 8, have currently been designated for aviation use in the BRAC reuse plan. Therefore, Sites 7 and 8 are expected to remain industrial.

**Risk Assessment Summary and Rationale for No Further Action**

The risk assessment results are summarized in the attached tables by site and by medium. Along with each risk assessment summary, observations are listed that support the NFA at these sites. Also included is a conclusion for each medium that provides the rationale for the NFA recommendation.

**Table 1.**  
**Risk Assessment Results, Site 7**  
**NAS Cecil Field**

	Risk Assessment Results	Observations
Surface Soil	<p><i>Human Health</i>            Cancer risk estimates are less than <math>1 \times 10^{-6}</math> and noncancer risk estimates are less than 1.</p> <p><i>Ecological</i>            Risks are not expected for ecological receptors.</p>	<p>None</p> <p>None</p>
<p><b>Conclusion:</b> No action is recommended for surface soil because human health and ecological risk estimates are acceptable.</p>		
<p>Surface Soil            "Hot Spot"            (Two surface soil sample locations)</p>	<p><i>Human Health</i>            For both the current and future exposure scenarios, the cancer risk estimate is <math>5 \times 10^{-6}</math>. The primary contributor to the risk estimate is benzo(a)pyrene. This risk estimate is within the EPA's acceptable risk range but is greater than FDEP's <math>1 \times 10^{-6}</math> risk target. Lead concentrations exceed EPA's guidance concentration.</p> <p><i>Ecological</i>            Possible risks to small mammals, plants, and invertebrates are predicted. The primary risk contributor for these receptors is lead. It is predicted that exposure to lead and cadmium may present a risk to small mammals. Based on comparisons to phytotoxicity benchmarks, plants exposed to lead, cadmium, zinc, and possibly antimony may be adversely affected. Based on comparisons to invertebrate toxicity benchmarks, invertebrates exposed to lead and copper may be adversely affected.</p>	<ul style="list-style-type: none"> <li>• The estimated risk is within the same order of magnitude as FDEP's risk target.</li> <li>• Recent resampling results indicate that lead concentrations are orders of magnitude lower than the maximum of 178,000 mg/kg measured previously. The lower concentrations do not exceed the EPA guidance concentration. (Because the results from resampling were not available until after the risk assessment was completed, they could not be used in the human health risk assessment.)</li> <li>• Recent resampling results indicate that lead concentrations are orders of magnitude lower than the maximum of 178,000 mg/kg measured previously. (Because the results from resampling were not available until after the risk assessment was completed, they could not be used in the ecological risk assessment.)</li> <li>• For small mammals, ranges of HIs for cadmium are only 1 to 2 for lethal effects and 1.5 to 2.7 for sublethal effects.</li> <li>• Effects to plants are likely overestimated because the benchmarks established for antimony were based on only one study.</li> <li>• Because no stressed vegetation was observed at Site 7, it is unlikely that plants will be adversely affected by "hot spot" soil.</li> </ul>

**Table 1.  
Risk Assessment Results, Site 7  
NAS Cecil Field**

Risk Assessment Results	Observations
<p><b>Conclusion:</b> No action is recommended for surface soil in the "hot spot".</p> <p>Because lead was detected at lower concentrations when the area was resampled, human exposure to lead is not a concern.</p> <p>The "hot spot" was originally established because of the high lead concentrations detected in two samples. Based on the lower lead concentrations detected during resampling, there may be no need to evaluate these two samples separately from other surface soil samples. In the current "hot spot" scenario, the estimated cancer risk for the "hot spot" is only slightly above FDEP's target range (<math>1 \times 10^{-6}</math>). If all the surface soil samples from Site 7 were evaluated together, cancer risk estimates would be even lower. (Because the results from resampling were not available until after the risk assessment was completed, risk estimates based on surface soil samples from the entire site were not evaluated.)</p> <p>Based on the lower lead concentrations, risks to small mammals and invertebrates are not expected from exposure to the lower concentrations of lead. The remaining risks to small mammals and invertebrates are minimal. The lower lead concentrations, level of confidence in the antimony benchmark, and lack of stressed vegetation reduce the concern about affects to plants at the site.</p>	
Subsurface Soil	<p><i>Human Health</i> Cancer risk estimates are less than <math>1 \times 10^{-6}</math> and noncancer risk estimates are less than 1.      None</p> <p><i>Ecological</i> Not evaluated - no exposure route      None</p>
<p><b>Conclusion:</b> No action is recommend for subsurface soil because human health risk estimates are acceptable.</p>	
Groundwater	<p><i>Human Health</i> Cancer risk estimates are less than <math>1 \times 10^{-6}</math>. Noncancer risk estimates are 2 for an adult and 4 for a child. The primary risk contributors are aluminum and iron.</p> <ul style="list-style-type: none"> <li>• Aluminum and iron found are at relatively high concentrations in groundwater throughout the facility.</li> <li>• It is not expected that past activities at Site 7 would contribute iron and aluminum to groundwater.</li> <li>• Exposure scenarios in this assessment are based on future residents consuming groundwater from a well installed at Site 7. However, because the site is close to the runway and designated for aviation use in the BRAC reuse plan, it is unlikely that residents will ever install wells at Site 7 and drink water</li> </ul>

**Table 1.**  
**Risk Assessment Results, Site 7**  
**NAS Cecil Field**

Risk Assessment Results	Observations
	from the surficial aquifer.
	<ul style="list-style-type: none"> <li>• Noncancer HIs are within the same order of magnitude as the target value.</li> </ul>
<p><i>Ecological</i>            Not Evaluated - no exposure route</p>	<p>None</p>
<p><b>Conclusion:</b> Iron and aluminum concentrations are likely the result of local groundwater chemistry. Based on probable source of these inorganics, the future use of the site, and the low HIs, no action is recommended for groundwater.</p>	

**Notes:**

BRAC - Base Realignment and Closure  
 DCE - dichloroethene  
 EPA - U.S. Environmental Protection Agency  
 ER-L - effects range - low  
 ER-M - effects range - median  
 FDEP - Florida Department of Environmental Protection

LEL - low effects level  
 NOAA - National Oceanographic and Atmospheric Administration  
 OME - Ontario Ministry of the Environment  
 PCB - polychlorinated biphenyls  
 TPH - total petroleum hydrocarbons

Suter, Glen W., 1993. "Ecological Risk Assessment"; Lewis Publishers, Chelsea, Michigan.

**Table 2.**  
**Risk Assessment Results, Site 8**  
**NAS Cecil Field**

Risk Assessment Results	Observations
<p>Surface Soil</p> <p><i>Human Health</i>            Cancer risk estimates are less than <math>1 \times 10^{-6}</math> and noncancer risk estimates are less than 1.</p> <p><i>Ecological</i>            Risks to small mammals are not expected. Reduced lettuce seed germination and earthworm growth were observed in laboratory-based toxicity tests indicating possible risks to plants and invertebrates.</p>	<p>None</p> <ul style="list-style-type: none"> <li>• Although the lettuce seed test is a standard toxicity test, the results are sometimes difficult to interpret and don't correlate with other toxicity results.</li> <li>• Earthworm growth rates varied less than 20 percent between the samples included in the test. This indicates that the reduced growth observed during the study may not be biologically relevant (Suter, 1993).</li> <li>• There was only one sample out of 13 where both reduced seed germination and reduced earthworm growth were observed.</li> <li>• Regression analyses comparing the concentrations of TPH, lead, or di-n-butylphthalate to the results of the toxicity tests show no correlation between chemical concentrations and the test results.</li> <li>• The sample that had the lowest earthworm growth was CF-8-SS23. This sample location is across the drainage ditch and well away from the main area of Site 8, and had lower chemical concentrations than other samples at Site 8.</li> </ul>

**Conclusion:** No action is recommended for surface soil based on estimated risks to humans.

Because of the low variability in the earthworm growth test, the lack of agreement between earthworm and lettuce-seed toxicity test results, and lack of correlation between chemical concentrations and toxicity test results, adverse affects to plants and invertebrates are not expected. Therefore, no action is recommended based on the results of the ecological assessment.

<p>Subsurface Soil</p> <p><i>Human Health</i>            Human health cancer risk estimates are less than <math>1 \times 10^{-6}</math> and noncancer risk estimates are less than 1.</p> <p><i>Ecological</i>            Not evaluated - no exposure route</p>	<p>None</p> <p>None</p>
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**Table 2.**  
**Risk Assessment Results, Site 8**  
**NAS Cecil Field**

Risk Assessment Results	Observations
<p><b>Conclusion:</b> No action is recommend for subsurface soil because human health risk estimates are acceptable.</p>	
<p>Groundwater</p> <p><i>Human Health</i>            The cancer risk estimate is <math>7 \times 10^{-5}</math> based on ingestion of groundwater by future residents. The primary contributor to the cancer risk is 1,1-DCE. Noncancer risk estimates are less than 1.</p> <p><i>Ecological</i>            Based on a comparison of groundwater concentrations to surface water benchmarks, it is possible that aquatic organisms and plants exposed to aluminum may be adversely affected.</p>	<ul style="list-style-type: none"> <li>• The exposure point concentration used for 1,1-DCE in this assessment was 7.2 ug/l, which is only slightly higher than the MCL and Florida Guidance Concentration of 7 ug/l.</li> <li>• Groundwater and surface water data indicate that 1,1-DCE is not migrating off site. Based on the distribution of 1,1-DCE, it is likely that most, if not all, of it is discharging to the drainage ditch; however, 1,1-DCE was not detected in surface water and sediment samples.</li> <li>• The results of tests conducted by Dr. Chappelles, indicate that Site 8 is an excellent natural bioreactor for chlorinated hydrocarbons. Significantly lower concentrations of 1,1-DCE downgradient may indicate that natural attenuation is in progress.</li> <li>• Exposure scenarios in this assessment are based on future residents consuming groundwater from a well installed at Site 8. However, because the site is close to the runway and designated for aviation use in the BRAC reuse plan, it is unlikely that residents will ever install wells at Site 8 and drink water from the surficial aquifer.</li> </ul> <ul style="list-style-type: none"> <li>• The surface water benchmark for aluminum is protective of aquatic organisms that live in cold-water habitats. It is unlikely that these organisms would be present at Site 8 and likely that they are more sensitive to aluminum concentrations than organisms at Site 8.</li> <li>• Aluminum is known to be relatively high in groundwater throughout the facility.</li> <li>• It is not expected that past activities at Site 8 would contribute aluminum to groundwater.</li> </ul>
<p><b>Conclusion:</b> Because 1,1-DCE is not migrating off site and the future use of Site 8 is designated as industrial, humans are not expected to be exposed to 1,1-DCE in groundwater. Therefore, no action is recommended based on human health.</p>	
<p>Because the probable source of aluminum in groundwater is natural and the toxicity benchmark may be conservative for warm-water</p>	

**Table 2.**  
**Risk Assessment Results, Site 8**  
**NAS Cecil Field**

Risk Assessment Results	Observations
systems, no action for groundwater is recommended based on the ecological assessment.	
<p>Surface Water</p> <p><i>Human Health</i>            Cancer risk estimates are less than <math>1 \times 10^{-6}</math> and noncancer risk estimates are less than 1.</p> <p><i>Ecological</i>            Based on a comparison of surface water concentrations to benchmarks, it is possible that aquatic organism exposed risk to aluminum (at sample location CF-8-SW) may be adversely affected.</p>	<p>None</p> <ul style="list-style-type: none"> <li>• The surface water benchmark for aluminum is protective of aquatic organisms that live in cold-water habitats. It is unlikely that these organisms would be present at Site 8 and likely that they are more sensitive to aluminum concentrations than organisms at Site 8.</li> <li>• The aluminum concentrations detected in CF-8-SW may be attributed to groundwater, which is discharging to surface water in this area. Aluminum is known to be relatively high in groundwater throughout the facility.</li> </ul>
<p><b>Conclusion:</b> No action is recommended for surface water because human health risk estimates are acceptable.</p> <p>Because the probable source of aluminum in surface water is natural and the toxicity benchmark may be conservative for warm-water systems, no action for surface water is recommended based on the ecological assessment.</p>	
<p>Sediment</p> <p><i>Human Health</i>            Cancer risk estimates are less than <math>1 \times 10^{-6}</math> and noncancer risk estimates are less than 1.</p> <p><i>Ecological</i>            Risks to wildlife are not expected. It is possible that aquatic organisms may be adversely affected. PCB concentrations are greater than some of the selected benchmarks for aquatic organisms. Also, regression analyses indicate there may be a correlation between TPH concentrations and reduced amphipod growth and survival rates observed in toxicity tests.</p>	<p>None</p> <ul style="list-style-type: none"> <li>• PCB concentrations were compared to four criteria in the ecological risk assessment; the concentrations exceed the NOAA ER-L and the OME LEL but are well below the NOAA ER-M and the EPA Sediment Quality Guidelines.</li> <li>• The maximum PCB concentration is only 39 ug/kg.</li> <li>• The maximum TPH concentration is only 85 mg/kg.</li> </ul>

**Table 2.**  
**Risk Assessment Results, Site 8**  
**NAS Cecil Field**

Risk Assessment Results	Observations
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**Conclusion:** Based on human health risk estimates, no action is recommended.

No action is recommended for sediment based on the ecological assessment because: (1) the PCB concentrations detected in sediment are low and less than EPA Sediment Quality Guidelines; (2) although there is a statistical relationship between TPH concentrations and toxicity test results, it is questionable whether the relatively low TPH concentrations are responsible for the reduced amphipod growth and survival.

Notes:

Closure      LEL - low effects level

DCE - dichloroethene

EPA - U.S. Environmental Protection Agency

ER-L - effects range - low

ER-M - effects range - median

FDEP - Florida Department of Environmental Protection

BRAC - Base Realignment and

NOAA - National Oceanographic and Atmospheric Administration

OME - Ontario Ministry of the Environment

PCB - polychlorinated biphenyls

TPH - total petroleum hydrocarbons

Suter, Glen W., 1993. "Ecological Risk Assessment"; Lewis Publishers, Chelsea, Michigan.