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NAS PENSACOLA
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LETTER REGARDING EXPLANATION OF SIGNIFICANT DIFFERENCE OPERABLE UNIT 1 (OU1) SITE 1 NAS PENSACOLA FL
6/25/2012
U S EPA REGION IV

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, S.W.
ATLANTA, GEORGIA 30303

June 25, 2012

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4SF/FFB

Ms. Patty M. Whittemore
Remedial Project Manager
SOUTHNAVFACENGCOM
NAS Jacksonville Building 103
Jacksonville, FL 32212

Re: EPA's review of the Draft Explanation of Significant Difference (ESD) for OU1, Site 1

Dear Ms, Whittemore:

The United States Environmental Protection Agency has received and reviewed the above referenced document. While EPA generally agrees with the concept of using the wetland to reduce iron concentrations, EPA requires proper administrative documentation of remedy changes, clear feasibility analyses, suitable design/operation consideration, and investigation of the potential for mitigation of the lost wetland.

For example, one particular concern is that the Explanation of Significant Difference (ESD) is not the correct documentation to use when preparing a fundamental change to a remedy. EPA considers a fundamental change a decision that changes the primary treatment method and decreases the cost. The reduction of costs in removing the iron treatment system and relying on the wetland to treat the contaminants of concern fundamentally changes the OU 1 remedy and; consequently, triggers the need for an amendment to the Record of Decision (ROD).

Please find enclosed comments to the ESD. These comments should be used to guide a revised schedule to supplement the feasibility study to verify the validity of the wetland use as a treatment system, revise the Proposed Plan, ensure public comment, and amend the ROD. Please contact me with any questions or concerns at 404-562-8510 or woolheater.tim@epa.gov.

Sincerely,

Timothy R. Woolheater
Senior Remedial Project Manager
Federal Facilities Branch

CC: Mr. David Grabka, FDEP

**TECHNICAL REVIEW OF THE
DRAFT EXPLANATION OF SIGNIFICANT DIFFERENCE (ESD)
OPERABLE UNIT 1 - SITE 1
MARCH 2012**

**NAVAL AIR STATION PENSACOLA
ESCAMBIA COUNTY, PENSACOLA, FLORIDA**

1. Documentation of Post Record of Decision Changes

In the *Introduction and Statement of Purpose,* the Navy states that "while the remedy modifications are considered significant because they involve the elimination of a prior component of the selected remedy and the associated Remedial Action Objective (RAO), they do not fundamentally alter the overall cleanup approach documented in the OU 1 ROD." The RAO required that the iron be removed prior to discharge into surface waters of Wetland 3. The Navy now understands that this cannot be accomplished cost effectively (if at all) and is requesting that EPA approve the use of Wetland 3 as a passive treatment system.

EPA's remedy decision guidance clearly states that should the primary treatment method change and this change result in a decrease in cost that the change is considered a fundamental change to the remedy. Fundamental changes to a ROD require a ROD amendment and not an ESD as prepared by the Navy. The Navy is requesting that an active treatment system be turned off resulting in sole dependence on passive treatment by the existing wetland that was to be protected in the original remedy. These changes will likely result in a decrease in remedy costs. The Navy is also requesting that the RAO with regard to protection of surface water in Wetland #3 be modified. Changing from active to passive systems, no longer protecting an asset, changing the point of compliance, all with a decrease in cost is considered a fundamental change.

Since fundamental changes are being proposed, the Navy should consider supplementing the feasibility study to address these comments, prepare a revised Proposed Plan, plan for a public comment period, and subsequently amend the Record of Decision.

2. Basis for the Document, Optimization Study, Wetland 3 Risk and Treatment:

It is suggested in this section that there is no risk to human health and the environment from the current levels of iron that are discharging to Wetland 3. There are, however, visible signs that the environment is being affected by the iron flocculent that the Navy even recognized as affecting the data quality for surface water. In the Optimization Study, high iron concentration data is considered to be an outlier for the surface water sampling results. The accumulation of iron in the wetland sediments is clearly visible in the photographs provided in the Optimization Study. Iron oxide accumulation is detrimental to plant growth and impairs macro-invertebrate communities needed for a healthy aquatic food chain.

Furthermore, as written, it appears that the toxicity tests were performed as part of Optimization Study (2008). The Navy concluded that there is no ecological risk from Wetland 3 based on toxicity tests performed in 1997; however, this was not the case. Adverse effects on growth were found in the surface water with *Pimephales promelas* (fathead minnow) and in sediment with *Chironomus tentans* from Wetland 3. These effects are clearly identified in the ecological risk assessment tech memo. In addition, the toxicity tests were performed in 1997 and may not represent current conditions.

The document does mention that there was no stressed vegetation indicated in the field; however, the report does not give an indication as to whether continued iron deposition might begin to cause an issue with vegetation in the future. On page 3 of the ESD, the first paragraph of the second column describes that vegetation are not stressed based on the ROD, which was signed in 1998, and confirmed by the ITRC in a document dated 2003. These assessments were completed both 9 and 14 years ago. EPA recommends that the vegetation be re-evaluated to ensure the plants are not stressed, and the paragraph revised for any final documents.

The Optimization Study has not demonstrated that Wetland 3 is capable of reducing iron in support of the RAO. It has also not addressed any of the potential ARARs for wetlands that may be triggered due to the use of an existing wetland as a treatment system. If Wetland 3 will not be remediated as part of the OU 16 FS (i.e., the proposal to remove it from the OU 16 FS) and allowed to serve as a treatment unit for OU 1, then the Navy must consider the requirements outlined in the 40 CFR Part 230 Preamble (73 FR 70, 19594, 19669) dated Thursday, April 10, 2008, which indicates that compensatory mitigation involves “actions taken to offset unavoidable adverse impacts to wetlands, streams and other aquatic resources authorized by Clean Water Act.

In addition, the Navy should consider that if treatment occurs in this wetland (which could also be considered a land-based unit), RCRA Online No. 12660 (June 1, 1986) indicates that those units that are closed with wastes remaining in place, as opposed to those that are “clean closed,” are required to provide post-closure facility care and monitoring after closure. Generally, where treatment and storage units are dismantled and removed and other contaminated materials (including soils) are removed or decontaminated, the owner/operator is not required to perform post-closure care (i.e., so called “clean closure”). However, where waste remains on-site after closure, post-closure care is generally required. The Navy should consider whether Wetland 3 should be remediated once treatment within Wetland 3 is no longer required or if iron saturation rates prevent effective treatment within the Wetland.

If the use of Wetland 3 is to be used as a passive treatment system, then it is possible that a CWA Section 402 permit might be required, especially discharging water that contains constituents that exceed State's water quality criteria. Both Wetlands 3 and 4D are jurisdictional waters of the United States; however, if Wetland 3 is converted into a treatment system, a permit might be required. If additional measures are taken, for example, aerators and controlling water release from Wetland 3, then a permit may also be needed. If Wetland 3 is filled in any way, then a CWA Section 404 permit may be required or, minimally, meet the substantive requirements.

3. Background Calculations:

EPA has a concern regarding the newly proposed background levels that are identified in the ESD to interpret iron concentrations in surface water at Wetland 3. The procedure for re-calculating the background iron concentrations is not transparent since the four sample data set and the procedure used to calculate the new background concentrations was not provided. According to the ESD, the original background iron concentration for fresh and estuarine wetlands at Naval Air Station (NAS) Pensacola was established as 2,360 μg/L and 1,352 μg/L, respectively. However the ESD states that these background values were revised for iron based on the Navy's guidance document *Procedural Guidance for Statistically Analyzing Environmental Background Data* dated September 1998.

It is unclear if the revised background values, set at two times the average concentrations of the four-sample data set, were approved by FDEP and EPA since the new freshwater wetland background thresholds of 4,720 μg/L and the new estuarine wetland background threshold of 5,862 μg/L are over twice the background levels used to interpret the results during the Final OU 16 RI. The screening level and refinement level ecological risk analysis for surface water and sediment and the surface water levels at that time exceed the background as well as FDEP surface water quality criteria. Consequently, the Final OU 16 RI inappropriately removed iron as a final contaminant of concern (COC) based solely on the results of the fathead minnow toxicity test. The concern that iron was removed as a final COC in surface water was discussed during the meeting on March 27 and 28, 2012.

Establishing a clear picture of the actual site conditions in one location rather than spread across three or four reports may facilitate review of background information as well as current site conditions. Data to support current conditions and trends does not appear to be clearly presented in the Optimization Study. Addressing the background, risk, and current sediment and water column conditions in separate reports is not convincing and adding to the confusion of the best path for this site. It may also be necessary to collect additional information if the background data set is considered insufficient.

4. Appropriate Monitoring

The ESD indicates that the Navy has moved surface water sample location 01SW01, which has been historically used as a monitoring point for iron (this location is referred to as 01W01 in the Optimization Report with associated results presented in Table 2-5, Wetland 3 Surface Water Data) to approximately 250 feet south of the previous location and a new surface water monitoring location, 01SW03, has been established in Wetland 4D. Further, monitoring on an annual basis at a new monitoring location was implemented because surface water iron concentrations in Wetland 4D are reportedly less than or nearly equal to the new estuarine wetland background threshold of 5,862 μg/L. The Navy established the new location in Wetland 4D because it receives water from the southwestern side of Wetland 3 and from Wetlands 4A- 4B-4C at the southeastern side of Wetland 4D. The new location represents surface water quality in Wetland 4D prior to where it drains to Bayou Grande through a drainage culvert near the northern corner of the wetland. However, no justification for this as an appropriate assessment point has been provided. The point-of-compliance location, represented by 01SW03, is approximately midway between the mixing point of the two water sources and the drainage culvert. However, this monitoring point does not support the proposed revised remedy of iron treatment occurring in Wetland 3. The most appropriate point of compliance would appear to be the end of the culvert that discharges from Wetland 3 into Wetland 4D. Monitoring for treatment purposes should also be more frequent than on an annual basis.

5. <u>RAO applicability</u>

The Optimization Study further concludes that preventing the discharge of OU 1 groundwater to Wetland 3 is not required for protection of human health and the environment, although the surface water RAO (prevention of further contamination of surface water in Wetland 3) is included in the ROD. It would be EPA's position that this RAO is still applicable and should be applied to water discharging from Wetland 3 instead of excluding this RAO altogether as a requirement.

According to the Optimization Study, the Focused Feasibility Study Addendum, NAS Pensacola Site 1, Naval Air Station Pensacola, Florida dated June 1997 (EnSafe 1997) determined that treatment of groundwater would be required to prevent iron contaminated groundwater from discharging into Wetland 3. This would appear to support the need to continue to treat groundwater just within Wetland 3 instead of before it enters Wetland 3, since the Interceptor Trench System (ITS) is not capable of capturing all the iron contaminated groundwater prior to it reaching Wetland 3.

The Optimization Study proposes several recommendations but it is unclear why the Optimization Study proposes Recommendation 3, discontinuation of surface water monitoring within Wetland 3. Further, if iron treatment is speculated to be occurring within Wetland 3, design criteria would dictate that surface water in Wetland 3 continue to be monitored. Any treatment system should also monitor the sediments, as well.

6. <u>Risk Calculations</u>

Several concerns exist regarding the risk information presented in the Optimization Study. The Optimization Study states that the risk assessments specific to Wetland 3 indicates that the iron present in surface water does not result in unacceptable risk to either human or ecological representative receptors. The risk assessment in the Final OU 16 RI indicated that iron was retained as a surface water chemical of potential concern after screening and refinement following Phase II and Phase III data collection. However, after the Navy performed toxicity tests with fathead minnows that were interpreted to support that there were no unacceptable risks to forage fish communities, this sole line of evidence appears to have been used for the "no risk" determination. During a regulatory briefing meeting on March 27 and 28, 2012, EPA ecological technical support staff raised concerns regarding the interpretation of the toxicity test results. EPA is not convinced that iron in surface water poses no risk based on the exceedances of iron well above screening levels and reference levels during both Phase II and Phase III RI investigations and the fact that OU 1 discharges iron to Wetland 3 surface waters.

In addition, please confirm that iron (Fe) is the only COC in surface water in this wetland. There are a few in groundwater, like vinyl chloride and benzene and a few metals, but the ESD focuses solely on Fe. The landfill, which was open from the early 1950's to 1976 received waste such as transformer oil, wood soaked with plating solutions, pesticide rinsates as well as pesticide containers, and mercury. In addition, as was commonly practiced, these wastes were burned prior to burial, which could have converted some of the organic compounds into dioxins/furans and/or PAHs. Periodic monitoring for these potential issues may be in order considering the nature of landfills. For example, it is unclear if the toxicity observed (See Cmt 2) was due to Fe or some other metal or chemical. If a full scan analyses was not run on these samples used for toxicity tests, then accurate conclusions may not be made. It might be beneficial to run toxicity tests again to see if the Fe is causing toxicity, or if other metals/chemicals are causing the toxicity.

7. <u>Adequate Justification to Support the Use of Wetland 3 as a Treatment System.</u>

EPA may concur that iron concentrations in surface waters are being reduced in Wetland 3 and that Wetland 3 could potentially be used as a treatment system for iron in lieu of the ITS. This statement is conditional upon implementation of appropriate requirements to control, maintain, operate, and monitor the treatment of iron at Wetland 3. Further concerns exist that as a result of iron treatment, iron laden particulate has been deposited in Wetland 3. It is unclear if appropriate measures are in place to ensure continued treatment of iron and prevent the disturbance and migration of the iron laden sediments in Wetland 3. A summary of related parameters that need to be addressed to allow the continued treatment of iron are presented below.

The following list should be considered conditions to be assessed when performing iron treatment in a wetland environment. EPA's *Constructed Wetlands Treatment of Municipal Wastewater Process Design Manual*, EPA 625-R-99-010 dated September 2000 (EPA 2000) is the most comprehensive document. However, several additional references are cited at the end of this document were used to support the following key items to be considered specifically at Wetland 3 for iron treatment.

<u>Flow Data</u>: Wetland Sizing, Design, and Treatment Effectiveness for Coal Mine Drainage dated April 23-26, 1990 (Keplerwell 1990) states that "Accurate flow data is paramount in the determination of wetland treatment efficiency and ultimately sizing requirements, and should become a routine part of any wetland monitoring program." Keplerwell 1990 further states that simply looking at flow data may not be enough. Variations in flow require distinct wetland designs. For example, lesser flow/higher iron discharge could be treated more efficiently and with less treatment area than the higher flow/lower iron discharge regardless of equal loading values primarily because of the ease of manipulating smaller volumes of water.

Generally, Keplerwell 1990 indicates that as a general "rule-of-thumb," wetlands are capable of removing approximately 15 grams iron/day/m2 (gdm) of iron on an average annual basis. Accurate, seasonal baseline data tracking both quality and quantity is critical if any sizing criteria at all are to be employed. Keplerwell 1990 also recommends that maximum iron loads should be multiplied by a margin of safety (e.g., 25%) in the development of treatment wetlands.

Assessing the performance indices and design parameters of treatment wetlands for H+, Fe, and Mn retention published March 14, 1995 (Stark 1995) indicates that design parameters capable of enhancing iron treatment efficiency included broad shapes, non-channelized flow patterns, high plant diversity, a southern exposure, and low iron loads.

<u>Climate and Flow Impacts</u>: Constructed Wetlands: Passive Systems for Wastewater Treatment, Renee Lorion, Technology Status Report dated August 2001 (Lorion 2001) indicates that colder conditions slow the rate at which a wetland is capable of breaking down contaminants. Heavy flow of incoming water can overload the removal mechanisms in a wetland; similarly, a dry spell can damage plants and severely limit wetland function.

<u>System Type</u>: According to Lorion 2001, wetlands are constructed as either surface flow or subsurface flow systems. Surface flow systems [also referred to as free water surface (FWS) systems] require more land but generally are easier to design, construct, and maintain and consist of shallow basins with emergent and submergent wetland plants that tolerate saturated soil and aerobic conditions. In surface flow systems, water flows in one end of the basin, moves slowly through, and is released at the other end. At NAS, Wetland 3 is a surface flow system.

<u>Inlet/Outlet Structures</u>: EPA 2000 indicates in Section 4.6.2.3 that "Placement and type of inlet and outlet control structures are critical in FWS constructed wetlands to ensure treatment effectiveness and reliability. To effectively minimize short-circuiting in a FWS constructed wetland, two goals concerning cell inlet/outlet structures are critical: (1) uniform distribution of inflow across the entire width of the wetland inlet; and (2) uniform collection of effluent across the total wetland outlet width." Additionally, Section 6.2.1.5 indicates that the inlet and outlet structures help to prevent "dead zones" where exchange of water is poor, resulting in water detention times that can be much less than needed. Further, outlet structures help to control the operating depth as well as uniform flow through the wetland. Lastly, EPA recommends that debris screens may be placed in front of FWS wetland outlets. The emergent vegetation in the wetland will tend to drop leaves and storm events can uproot entire plants that float to the outlet structures. The screens will prevent the debris from clogging the downstream piping or treatment processes.

<u>Removal Mechanisms</u>: Lorion 2001 indicates that "heavy metals in a wetland system may be sorbed to wetland soil or sediment, or may be chelated or complexed with organic matter. Metals can precipitate out as sulfides and carbonates, or get taken up by plants. Compounds in sediment, such as iron oxides, show preference for certain metals. This behavior can affect how efficiently a metal is adsorbed in a wetland. A system that has

reached the limits of its adsorption capacity can exhibit a reduction in contaminant removal rates. After a system has reached its capacity for metal sorption, metal sulfide formation becomes the main method of metal removal. Sulfate-reducing bacteria oxidize organic matter and reduce sulfate to form hydrogen sulfide. Hydrogen sulfide reacts with metals to form metal sulfides, which precipitate. Compared to sediments, plants do not take up much metal, but they are involved in oxygenation and microbiological processes that contribute to the ability of the wetland to remove metals."

Metals Treatment Considerations: Lorion 2001 indicates, "a constructed wetland treating water that contains metals should be monitored for contaminant buildup." Lorion 2001 indicates that metal precipitates can build up in sediments causing the sediments to become nonpermeable. To address this, it may be necessary to dredge the contaminated substrate after it has reached saturation; or alcohol can be added to aerobic systems that utilize added bacteria which avoids contaminant buildup problems in the sediment. Iron Removal by a Passive System Treating Alkaline Coal Mine Drainage dated May 2008 (Hedin 2008) states that analyses of dissolved and particulate iron fractions indicated that iron removal was limited in the ponds by the rate of iron oxidation and in the wetland by the rate of particulate iron settling.

Treatment Verification: Lorion 2001 indicates "Testing effluent water from a wetland system is necessary, as the goal of the [system] is to remove contaminants." Lorion 2001 further states that water cannot be discharged into waterways if it does not meet standards. The facility should determine the requirements of treating the culvert as a point source under the NPDES program.

Operation and Maintenance: EPA 2000 indicates in Section 6.4 that the most critical items in which operations need to be assessed involve:

- Adjustment of water levels;
- Maintenance of flow uniformity (inlet and outlet structures);
- Management of vegetation;
- Odor control;
- Control of nuisance pests and insects; and
- Maintenance of berms and dikes.

Monitoring is further discussed in Section 6.5 of EPA 2000 and specifies that monitoring is essential in managing a wetland system. In addition to demonstration of treatment, inflow and outflow rates, water quality, water levels, and indicators of biological conditions should be regularly monitored and evaluated. Monitoring of biological conditions includes measurement of microbial populations and monitoring changes in water quality, percent cover of dominant plant species, and benthic macroinvertebrate and fish populations at representative stations. Over time, these data help the operator to predict potential problems and select appropriate corrective actions.

References:

A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Documents (EPA 540-R-98-031, OSWER 9200.1-23P), July 1999

Contaminated Sediment Remediation Guidance for Hazardous Waste Sites (EPA-540-R-05-012, OSWER 9355.0-85), December 2005

Wetland Sizing, Design, and Treatment Effectiveness for Coal Mine Drainage, Douglas A. Keplerwell, presented at the 1990 Mining and Reclamation Conference and Exhibition, Charleston, West Virginia, April 23-26, 1990. (Keplerwell 1990)

Assessing the performance indices and design parameters of treatment wetlands for H+, Fe, and Mn retention, Lloyd R. Stark, and Frederick M. Williams, published March 14, 1995. (Stark 1995)

Focused Feasibility Study Addendum, NAS Pensacola Site 1, Naval Air Station Pensacola, Pensacola, Florida, June 1997. (EnSafe 1997)

Procedural Guidance for Statistically Analyzing Environmental Background Data, prepared by SWDIV and EFA West of Naval Facilities Engineering Command, September 1998. (1998)

Constructed Wetlands Treatment of Municipal Wastewater Process Design Manual (EPA 625-R-99-010), September 2000. (EPA 2000)

Constructed Wetlands: Passive Systems for Wastewater Treatment, Renee Lorion, Technology Status Report prepared for the US EPA Technology Innovation Office under a National Network of Environmental Management Studies Fellowship, Completed August 2001. (Lorion 2001)

Iron Removal by a Passive System Treating Alkaline Coal Mine Drainage, Robert S. Hedin, Mine Water Environ, May 2008. (Hedin 2008)