Palmer
Hough/DC/USEPA/US
04/06/2009 03:55 PM

To Jefferson.Ryscavage@usace.army.mil, joseph.schroedel@usace.army.mil, Sam_Hamilton@fws.gov, roy.crabtree@noaa.gov,
cc Stan Meiburg/R4/USEPA/US@EPA, Jim Giattina/R4/USEPA/US@EPA, Tom Welborn/R4/USEPA/US@EPA, Jennifer
bcc

Subject EPA concerns regarding proposed Clean Water Act section 404 permit for PCS Phosphates

To:

Mr. Sam Hamilton
Regional Director
US Fish and Wildlife Service, Southeast Region

Dr. Roy Crabtree, Ph.D.
Regional Administrator
NOAA Fisheries, Southeast Region

Brigadier General Joseph Schroedel
Commander
US Army Corps of Engineers
South Atlantic Division

Colonel Jefferson Ryscavage
District Engineer
US Army Corps of Engineers
Wilmington District

Secretary Dee A. Freeman
North Carolina Department of Environment
and Natural Resources

Ms. Coleen Sullins, Director
Division of Water Quality
North Carolina Department of Environment
and Natural Resources

On behalf of Mr. Michael H. Shapiro, the acting US Environmental Protection Agency Assistant Administrator for Water, I would like to share with you a request that EPA transmitted to the Assistant Secretary of the Army - Civil Works (ASA) today. EPA is formally requesting the ASA's review of the Wilmington District's decision to issue a Department of the Army permit for expansion of the PCS Phosphate operation in Beaufort County, NC.

If you have any questions regarding this request, please free to contact me.

Thank you, Palmer Hough

Elevation of Proposal CWA Section 404 Permit PCS.pdf

PCS Elevation to Army_Detailed Comments.pdf

Palmer F. Hough
US Environmental Protection Agency

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Washington, DC 20460

"Schafale, Michael" <michael.schafale@ncdenr.gov>

04/06/2009 05:01 PM

To Rebecca Fox/R4/USEPA/US@EPA

cc

bcc

Subject FW: PCS Phosphate Bonnerton Hardwoods

History: This message has been forwarded.

-----Original Message-----
From: Mike Schafale [mailto:michael.schafale@ncmail.net]
Sent: Tuesday, August 26, 2008 2:01 PM
To: Walker, William T SAW
Subject: Re: PCS Phosphate Bonnerton Hardwoods

Hi Tom,

Sorry, I've been away. Answers below. I hope this is in time to help.

Walker, William T SAW wrote:
>
> Mike,
>
> I am trying to gather more info. for the Bonnerton site SNHA
> designation and am hoping you can/will help me with a few things.
>
> 1. According to the Site Survey Report Form and map you supplied
> following your 2005 visits, the Bonnerton site was approximately 203
> ac. (194 primary and 8.9 secondary). According to the January 2008
> publication "Nonriverine wet Hardwood Forests in North Carolina,
> Status and Trends", the Bonnerton site is 198 acres. The information
> supplied by EPA indicates that another 69 acres (45 primary and 24
> secondary) have been added to the site. Could you confirm for me that
> the SNHA is now 271 acres and if so, give some indication of why the
> additional acreage was added after the January 2008 report?
>
I'm sorry this seems like such a moving target. We use whatever information we come up with to update our understanding of things. Since the 2005 report, I've had another visit to the site and have gained access to new aerial photography. There are also two different numbers involved here -- the acreage of the significant natural heritage area (SNHA) and the acreage of Nonriverine Wet Hardwood Forest community. These two aren't the same because the SNHA also contains the headwater stream in the southeast part and the scarp face with its seeps and uplands on the west. It also contains secondary areas that are included in the SNHA as connectors but aren't otherwise in good condition, so you may have seen different acreage figures for primary and secondary SNHA.

I can't remember the details of how and when things have changed. But my most recent visit showed me a new patch of Nonriverine Wet Hardwood Forest, which I added to the SNHA, along with a secondary area to connect it to the other primary areas. I also tweaked the boundaries of the SNHA elsewhere based on aerial photos. Then I mapped the natural natural communities in the SNHA as polygons, and recorded them in our community database. So, the way things stand in our database right now is: the Nonriverine Wet Hardwood Forest community is 198 acres. The SNHA is 271.65 acres, of which 238.85 acres are primary.

And, to make things more complicated, I now have access to 2006 digital aerial photography, which I didn't have when I made the last corrections. And on it, I can see that a portion of the southeastern primary area has recently been clearcut. So, I need to fix the SNHA boundary and community boundary to account for that, but haven't had time to do so yet. That will change both numbers yet again, giving slightly lower acreage figures than the above.

> 2. I am still a bit confused regarding the designation process for
> national significance. I think I understand the State significance
> designation to mean that the site is one of the 5 best examples of its
> type in your database. What other states/databases are involved in the
> national ranking process and how is the designation vetted and approved?
>
> I would assume your database has a fairly comprehensive coverage and
> somewhat complete list of all sites in NC (I saw on your website that
> inventories of 80+ counties are either underway or completed). I have
> tried to find information from other states. I could not find that any
> other state had specifically identified Nonriverine Wet Hardwood
> Forest as a community type however, will admit my search was not
> exhaustive. I could not find much available info for NHP in South
> Carolina or Georgia. I did find, I believe, some potential equivalents
> (similar soils, similar species composition) in Virginia and possibly
> Maryland. Based on information from the Virginia NHP website it
> appears that the *Nonriverine wet Hardwood Forest* of NC would
> correspond to the *Non-Riverine Saturated Forests *of VA.* *It did not
> appear that VA had conducted quite as comprehensive a search for this
> community type. From the Maryland NHP website, it appeared that the
> closest match would be the *Liquidambar Styraciflua - (Acer Rubrum)
> Seasonally Flooded Forest Alliance* but I was not able to find much
> info. regarding status and trends. Also, I'm guessing that due to
> differences in climate and geology, one wouldn't really expect to find
> a truly "similar" community in Maryland or further north (?). Would
> these or any other areas be considered equivalent to the Nonriverine
> wet Hardwood Forest and if so, would known occurrences of these forest
> types be included in the national ranking process?
>
Our nationally significant sites are those that we think contain the best examples in the nation (or world really) for one of the elements, in this case Nonriverine Wet Hardwood Forest. It can definitely be harder to distinguish nationally significant sites from state significant, with more limited knowledge of what is going on in other states. In this case, the National Vegetation Classification community that corresponds to our Nonriverine Wet Hardwood Forest ranges from North Carolina only through southeastern Virginia, with most of its occurrences in northeastern North Carolina (north of the Neuse River). Virginia has studied the communities in similar sites north of there, on the eastern shore, and concluded they are a different community type. Virginia has not looked for them as thoroughly as we have, but they have looked for them. When I talked to the ecologist at the Virginia Natural Heritage Program, he indicated that they didn't have any examples known that were both as extensive and as mature as our best examples. Given that we have more than 80% of the global range of the community type, we probably have all of the 5 best examples. But I have been conservative in my analysis and only identified 4 for now. That fact that the Bonnerton site was not discovered in the county inventory and only was found later makes me a bit cautious, but we're running out of places where examples this large could be hiding.

Anyway, at present, national significance designations, like state, are

a product of our program's analysis, and are vetted internally by our ongoing analysis, database maintenance, and biennial site significance review process. Other states don't necessarily rate sites using the same concepts, or even rate them at all, so it isn't possible to vet these conclusions with them. But my aerial photo review, analysis, and discussions with Virginia make me more confident about this one than most others.

> 3. In a July 9, 2008 e-mail you sent to John Dorney, you indicate that
> the Bonnerton site became nationally significant after other known
> Hardwood Wetland sites were degraded. Were these sites in NC? How were
> these sites degraded? Is there potential for recovery of these sites
> such that they will regain their previous status?

There are a large number of sites that have been lost since we started tracking this community type, so it's hard to list them all. One of the most striking losses was the Merritt Hardwoods site in southeastern Pamlico County, which had over 1000 acres of Nonriverine Wet Hardwood Forest into the 1990s. There was another site around 1000 acres in Pamlico County in the 1980s. Though not in one place, over 1000 acres were lost in Currituck County in the 1980s and 1990s, and comparable acreages in several other counties. I didn't track the final fate of these areas closely. Limited acreage was developed or cleared for cultivation. I think most of the acreage was converted to pine plantation. A significant minority was "merely" clearcut and left to regenerate in weedy hardwood or mixed forests. There is possibly some potential for spontaneous recovery in the latter, if any appreciable number of oak seedlings were left. But, given the generation time of trees, such recovery would be measured in centuries. I think it is safe to say none will regain their previous composition, let alone maturity, within our lifetimes, a time in which the remaining mature examples could grow into magnificent old-growth examples if left alone. I have not seen any example that was clearcut and regenerated in anything recognizable as this community type, though parts of the Bonnerton site show that "high grading" can leave enough of the community for reasonable recovery.

It isn't out of the question that these communities could be successfully restored with active effort. I haven't seen it done successfully. Restoration is likely to be most successful on sites where the community occurred until recently, and where it was destroyed by logging but not by mechanical site preparation or clearing. Restoration areas adjacent to existing examples, even if small, are likely to be more successful in that there is a seed source for the smaller plants and animals that aren't deliberately planted. With appropriate planting and sufficient tending, you should be able to establish the appropriate trees. But of course nothing but time can bring maturity or the uneven-aged structure to newly planted restoration sites. And nothing at all can bring the historical continuity that gives one confidence that the most of the smaller organisms are present.

> Thanks
>
> Tom
>

--
Michael P. Schafale
Ecologist
North Carolina Natural Heritage Program
Office of Planning and Conservation, Department of Environment and Natural

Resources

1601 Mail Service Center
Raleigh, NC 27699-1601

919-715-8689

michael.schafale@ncmail.net

"Schafale, Michael" <michael.schafale@ncdenr.gov>

04/07/2009 10:16 AM

To Rebecca Fox/R4/USEPA/US@EPA

cc

bcc

Subject RE: PCS question

That is true. Its high significance comes from the community itself, as one of the best examples of a type that has become rare. I don't know that it plays any more role in the aquatic ecosystem than any other of the uncommon, naturally-vegetated areas of the watershed. It presumably does supply water by sheet flow to the headwater stream.

-----Original Message-----
From: Fox.Rebecca@epamail.epa.gov [mailto:Fox.Rebecca@epamail.epa.gov]
Sent: Tuesday, April 07, 2009 9:47 AM
To: Schafale, Michael
Subject: RE: PCS question

Mike,

Thanks for sending the email and your clarification on the Bonnerton SNHAs. This is very helpful. One further question -- in the draft ROD the COE characterizes this area this way... it is their understanding that "...NCNHP has designated this site as a SNHA not because of any special value or importance to the aquatic ecosystem, but because it is a terrestrial community that has become increasingly rare in NC". Do you agree with that characterization? Thanks again! b

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov

"Schafale, Michael" <michael.schafale@ncdenr.gov>

04/06/2009 04:28 PM

To Rebecca Fox/R4/USEPA/US@EPA

cc

Subject RE: PCS question

Do you need to see my email to him? You referenced the date, so I thought you had it. But, it's public information, so it seems like I

ought to send it to you if you need it. It was in response to a message from him, which seemed to be based on material he got from John Dorney.

-----Original Message-----
From: Fox.Rebecca@epamail.epa.gov [mailto:Fox.Rebecca@epamail.epa.gov]
Sent: Monday, April 06, 2009 4:25 PM
To: Schafale, Michael
Subject: RE: PCS question

Do you remember if that email discussed the 3 primary areas, especially the northwestern less mature WHF area? Just deciding how to phrase my response. Thanks! b

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov

"Schafale, Michael" <michael.schafale@ncdenr.gov>

04/06/2009 04:19 PM

To: Rebecca Fox/R4/USEPA/US@EPA

cc:

Subject: RE: PCS question

That is the only message I sent to William Walker, and it looks like the only time he emailed me. He did call me and we talked on the phone in April or May of 2008. I can't remember much detail on what we talked about, though it was about this site and the significance of Nonriverine Wet Hardwood Forest. He called me on my cell phone in the field, so I think we couldn't have talked about specific acreages, as I wouldn't have remembered them.

-----Original Message-----
From: Fox.Rebecca@epamail.epa.gov [mailto:Fox.Rebecca@epamail.epa.gov]
Sent: Monday, April 06, 2009 4:11 PM
To: Schafale, Michael
Subject: RE: PCS question

Thanks Mike!

Your characterization below fits precisely with my understanding of this

area. I will be responding to the COE's discussion of the SNHA in the draft ROD and was just wondering if you remember if in your August message or if you had any other correspondence with them where you laid out the information of the SNHA as is discussed in your message below? Thanks again for all your help with this project! bf

Becky Fox
Wetland Regulatory Section
USEPA
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Email: fox.rebecca@epa.gov

"Schafale, Michael" <michael.schafale@ncdenr.gov>

04/06/2009 03:42 PM

To: Rebecca Fox/R4/USEPA/US@EPA

cc:

Subject: RE: PCS question

Hi Becky,

That's not what I meant to convey in my August message to William Walker. The SNHA has 3 separate primary areas. All have forest mature enough to be highly significant. The northwestern area is the least mature of the three, but it is still mature and highly significant. The secondary areas of the SNHA are younger forests or forests of altered composition. They are included to function as connectors of the primary areas rather than being significant in themselves.

The southwestern primary area has a seepage community on the scarp face, which is not Nonriverine Wet Hardwood Forest. It is not a headwater stream though. The headwater stream is in the southeastern primary area. The northwestern primary area, as far as I know based on the one visit that you were also on, is all Nonriverine Wet Hardwood Forest. I brought up these communities in my August message to explain the discrepancy in acreage between the SNHA and the Nonriverine Wet Hardwood Forest community. They are both wetlands too, but as I understand it, are not proposed to be mined.

I'm not clear what the 73 acres refers to. , I did add acreage to the SNHA after our visit in November 2007: roughly 45 acres for the northwestern primary area and 24 acres for a secondary area to connect it to the other primary areas. That is close to 73 acres but not quite.

-----Original Message-----

From: Fox.Rebecca@epamail.epa.gov [mailto:Fox.Rebecca@epamail.epa.gov]
Sent: Monday, April 06, 2009 3:12 PM
To: Schafale, Michael
Subject: Fw: PCS question

Hi Mike,

As you may have heard, EPA is elevating to the Assistant Secretary of the Army (Civil Works) the COE's permit decision for PCS. One of the things we are asking for is full protection of the SNHA including the north west more recently disturbed area. In reading through the COE's draft Record of ecision an email correspondence from you is cited and I wanted to check o see if the context is correct. The topic is the additional 73 es that was added to the original SNHA and the COE states that y ay that the additional acreage is a headwater stream on the face of t Suffolk Scarp to the west of the Bonnerton Tract and other areas that ar luded as "connectors but aren't otherwise in good condition". s my understanding that the scarp area was in the original sout rea that will be protected by the DWQ 401 and that the 73 acres es approximately 45 acres of the less mature wet hardwood fore the connecting area between this area and the more mature rea t outh. The discussion citing you in the ROD does not menti the l ure WHF. Just wanted to check to see if this is an ac e char zation of your communication with them. The cite w om 8-26-08. Thanks Mike, Becky

Becky
on
bec

Palmer
Hough/DC/USEPA/US
04/07/2009 05:29 PM

To tjregan@potashcorp.com, rsmith@pcsphosphate.com, jfurness@pcsphosphate.com, ghouse@brookspierce.com, liebesman@hklaw.com
cc Stan Meiburg/R4/USEPA/US@EPA, Jim Giattina/R4/USEPA/US@EPA, Tom Welborn/R4/USEPA/US@EPA, Jennifer
bcc
Subject EPA concerns regarding proposed Clean Water Act section 404 permit for PCS Phosphate

History: This message has been forwarded.

To:

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President, PCS Phosphate and PCS Nitrogen
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Saskatoon, SK Canada S7K783

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PCS Phosphate
1530 NC Highway 306 South
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2000 Renaissance Plaza
230 North Elm Street
Greensboro, NC 27420

Lawrence R. Liebesman
Holland and Knight
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Suite 100
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On behalf of Mr. Michael H. Shapiro, the acting US Environmental Protection Agency Assistant Administrator for Water, I would like to share with you a request that EPA transmitted to the Assistant Secretary of the Army - Civil Works (ASA) yesterday. EPA is formally requesting the ASA's review of the Wilmington District's decision to issue a Department of the Army permit for expansion of the PCS Phosphate operation in Beaufort County, NC.

If you have any questions regarding this request, please free to contact me.

Thank you, Palmer Hough

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Rebecca Fox /R4/USEPA/US
04/08/2009 02:39 PM

To riverkeeper@ptrf.org
cc
bcc
Subject Fw: EPA concerns regarding proposed Clean Water Act section 404 permit for PCS Phosphate

Hi Heather,

Here is the package we sent out. We had to wait until we had sent to PCS before sharing. Will send letter from Tom Regan later. bf

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov
---- Forwarded by Rebecca Fox/R4/USEPA/US on 04/08/2009 02:30 PM ----

On behalf of Mr. Michael H. Shapiro, the acting US Environmental Protection Agency Assistant Administrator for Water, I would like to share with you a request that EPA transmitted to the Assistant Secretary of the Army - Civil Works (ASA) yesterday. EPA is formally requesting the ASA's review of the Wilmington District's decision to issue a Department of the Army permit for expansion of the PCS Phosphate operation in Beaufort County, NC.

If you have any questions regarding this request, please free to contact me.

Thank you, Palmer Hough


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PCS Elevation to Army_Detailed Comments.pdf

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 3 - 2009

OFFICE OF
WATER

The Honorable John Paul Woodley, Jr.
Assistant Secretary of the Army (Civil Works)
108 Army Pentagon
Room 3E446
Washington, DC 20310-0108

Dear Secretary Woodley:

In accordance with the provisions of the 1992 Memorandum of Agreement (MOA) between the U.S. Environmental Protection Agency (EPA) and the Department of the Army under Section 404(q) of the Clean Water Act (CWA), I am requesting your review of a decision by Colonel Jefferson M. Ryscavage, U.S. Army Corps of Engineers (the Corps), Wilmington District (the District), to issue a Section 404 permit to the Potash Corporation of Saskatchewan Phosphate Division (PCS or the Applicant) to expand an existing phosphate mining operation (Action ID: AID 200110096) in Beaufort County, North Carolina (NC). The 15,100 acre project area is located adjacent to the Pamlico River which is part of the nationally significant Albemarle Pamlico Estuary Complex. The project area contains 6,293 acres of wetlands and 115,843 linear feet of streams that support the Albemarle Pamlico Estuary and collectively constitute aquatic resources of national importance (ARNI). The proposed mine advance involves mining and mining related activities within approximately 11,454 acres, resulting in direct adverse impacts to approximately 3,953 acres of wetlands and 25,727 linear feet of streams. In addition to our concerns regarding the magnitude of the project's adverse impacts to the site's important aquatic resources, we believe there is compelling evidence that additional avoidance, minimization, and compensation are practicable under the CWA Section 404(b)(1) Guidelines (Guidelines). After a thorough review of the available information, I have determined this case warrants elevation to you in accordance with the criteria under Part IV of the MOA, Elevation of Individual Permit Decisions.

This referral meets the criteria in Part IV of the 1992 EPA/Army Section 404(q) MOA. EPA finds that the proposed discharge of fill material into waters of the United States and associated direct and indirect impacts will result in substantial and unacceptable impacts to an aquatic resource of national importance. I want to emphasize, however, our conclusions regarding the current mining proposal do not mean EPA is opposed to additional mining at the site. We believe that a modified mining proposal consistent with the regulations and the CWA could proceed and I am interested in working with you and the mining company to identify an acceptable alternative. However, we do not believe, as currently proposed, the permit complies with the requirements of the Guidelines.

Substantial and Unacceptable Impacts to an ARNI

The 15,100 acre project area is composed of three tracts identified as the NCPC, Bonnerton and South of NC Highway 33 (S33) tracts. There are wetlands on all three tracts that perform important ecological functions that support the Albemarle Pamlico Estuary such as temporary storage of surface water, nutrient cycling, organic carbon export, pollutant filtering/removal, and maintenance of biologically diverse plant and animal habitat. Similarly, there are streams on all three tracts that perform important ecological functions that support the Albemarle Pamlico Estuary such as the transport of water, nutrients and sediment downstream, pollutant processing and removal, and maintenance of biologically diverse plant and animal habitat. We recognize that not all of the approximately 3,953 acres of wetlands and 25,727 linear feet of streams that would be impacted by the proposed project perform all of these respective functions to the same degree (because of their position in the landscape and/or their level of prior disturbance); however, the loss of this entire suite of wetland and stream functions on this scale raises serious ecological concerns.

The proposed permit would represent the single largest wetland impact ever authorized under the CWA in NC and would result in a significant loss of wetlands, streams and other waters of the United States within the nationally significant Albemarle Pamlico Estuary Complex. EPA is particularly concerned with the proposed project's:

- Direct impacts to a 271 acre nonriverine hardwood wetland forest on the Bonnerton tract that has been designated as a Nationally Significant Natural Heritage Area by the NC Natural Heritage Program, and
- Indirect impacts to the site's ten tidal creeks, four of which have been designated as Primary Nursery Areas by the NC Wildlife Resources Commission, associated with the 70 percent reduction in the drainage basins for these creeks.

Nationally Significant Natural Heritage Area: The NC Natural Heritage Program designates areas in the state which it has determined to be important for conservation of the state's biodiversity as Significant Natural Heritage Areas. These areas can be classified as significant by the Natural Heritage Program at the county, regional, state or national level. The fact that the Bonnerton tract's Significant Natural Heritage Area has been classified as nationally significant means the Natural Heritage Program has determined it to be one of the five best examples of this community type in the Nation. This wet hardwood forest community type found on the Bonnerton tract is considered to be among the most threatened and endangered of NC's natural communities. The proposed project would directly impact approximately 97 acres of this ecologically valuable and rare wetland system and would allow mining through the middle of the Significant Natural Heritage Area, bisecting it into two separate and smaller pieces, an eastern and a western piece. This large reduction in size and the fragmentation of the Significant Natural Heritage Area into two separate pieces would undermine some of the key ecological characteristics which make it ecologically valuable and "nationally significant." Although the NC Division of Water Quality's (NCDWQ) CWA Section 401 Water Quality Certification requires the mined out area between the eastern and

western pieces to be restored after mining, we believe it will be extremely difficult, based on the current state of the science, to restore this area to its prior condition after mining and this will have a significant detrimental impact to the integrity of this rare and threatened biological community.

Tidal Creeks/Primary Nursery Areas: EPA also has strong concerns with the proposed project's indirect impacts to the project area's ten tidal creeks, four of which have been classified by the NC Wildlife Resource Commission as Primary Nursery Areas. Although the proposed project would not directly impact the perennial reaches of the four Primary Nursery Areas, the headwater drainages of the project site's tidal creeks (including those designated as Primary Nursery Areas) would be reduced by approximately 70 percent. Our concerns regarding the proposed drainage basin reductions are amplified on the NCPC tract since its watersheds have already lost approximately 1,268 acres of wetlands as part of the Applicant's existing mining permit issued by the District in 1997.

Eliminating the headwater streams and wetlands and significantly reducing the drainage areas of the project site's Primary Nursery Areas and other tidal creeks would:

- Reduce flow from ground water and increase variability in surface water flows to the tidal creeks, thereby increasing the frequency and magnitude of short-term salinity fluctuations;
- Reduce filtration of nutrients and other contaminants previously accomplished by the site's streams and wetlands, increasing sedimentation and turbidity in tidal creeks;
- Reduce productivity of native fish and shellfish in the downstream estuary by disrupting the estuarine food web (caused by a reduction of organic materials critical for biological activity in the surface water drainage); and
- Shift downstream estuarine productivity from the benthic community which is dominated by sensitive submerged aquatic vegetation and benthic invertebrate species to tolerant phytoplankton species. This would exacerbate ongoing environmental stress and create an open niche for problematic invasive plant and animal species to colonize and degrade the estuary.

We believe the disruption of these processes and functions in the drainage basin will significantly impact the site's tidal creeks and impair the ability of these systems to function as Primary Nursery Areas.

In summary, EPA believes the impacts to ecological functions at the scale associated with this project, as described above, would cause or contribute to significant degradation [40 CFR 230.10(c)] of the Nation's waters.

Alternatives Analysis

A key provision of the Guidelines requires evaluation of practicable alternatives which satisfy the project's primary purpose. The Guidelines provide that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem" [40

CFR 230.10(a)]. An alternative is practicable if "it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." [40 CFR 230.10(a)(2)].

The proposed project's Final Environmental Impact Statement (FEIS) evaluated eleven alternative mining alignments and a "No-Action" alternative. During the review process, EPA Region 4 has consistently expressed concerns regarding the economic analysis conducted in support of the District's alternatives review. The Guidelines also require selection of the least environmentally damaging practicable alternative (LEDPA). I understand, however, the "LEDPA" identified by the District in the FEIS has since been replaced with a less-damaging alternative required by the NCDWQ's CWA Section 401 Water Quality Certification. Our review indicates that the new "LEDPA" may still not be the least damaging alternative, as required by the Guidelines.

Minimizing and Compensating for Adverse Impacts

The Guidelines require that adverse environmental impacts associated with the proposed discharge of fill material to waters of the United States first be avoided to the maximum extent practicable and then minimized to the extent appropriate and practicable. For unavoidable impacts which remain, compensatory mitigation is required to offset wetland and other aquatic resource losses. In addition to the need to further avoid impacts to the site's high value aquatic resources, we also believe that additional measures can be taken to minimize the impact of the mining project on avoided aquatic resources by improving the quality of the reclamation area (i.e., re-using top soil and re-vegetating with target plant species). Further, we recommend that all avoided aquatic resources be provided permanent protection from future mining with appropriate binding real estate instruments such as conservation easements.

We also have concerns regarding the adequacy of the proposed compensatory mitigation to offset authorized impacts to mature forested wetlands. In light of the very unique and rare qualities of the Nationally Significant Natural Heritage Area, it is not clear that its attributes could be replaced by compensatory mitigation, raising concerns regarding significant degradation [40 CFR 230.10(c)]. Additionally, for impacts to other mature forested wetlands, not located in the Nationally Significant Natural Heritage Area, we continue to have concerns that the proposed compensatory mitigation will not adequately offset impacts to these systems. Even if proposed efforts to replace mature forested wetlands with immature restored or created wetlands are successful, the replacement wetlands will not provide the same level of physical, chemical, and biological processes and functions as the impacted forested wetland systems for a very long time (e.g., 60 to 80 years). The current plan requires 2:1 compensation ratios for these impacts. We continue to believe that compensation ratios of 3:1 would better address the temporal losses associated with the replacement of this wetland type.

EPA/FWS/NMFS Recommended Alternative

Although the formal permit elevation process was initiated with the District's February 24, 2009, Notice of Intent (NOI) letter, EPA has continued to coordinate with

the District and the Applicant in an effort to resolve our concerns regarding the proposed project. To this end, on March 24, 2009, representatives from EPA, the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) met with the District and the Applicant to discuss our continued concerns with the proposed project. At that meeting EPA and the Services presented a potential alternative plan for mining the site that would address the concerns raised by the agencies by avoiding and minimizing impacts to the aquatic ecosystem, consistent with the Guidelines. The EPA/FWS/NMFS proposal would provide:

- Additional avoidance designed to reduce the direct and indirect impacts of the mining project on the site's Nationally Significant Natural Heritage Area as well as the site's tidal creeks, including those identified as Primary Nursery Areas;
- Measures to ensure that avoided aquatic resources are provided permanent protections from future mining with appropriate binding real estate instruments such as conservation easements;
- Measures to be taken to minimize the impact of the mining project on avoided aquatic resources by improving the quality of the reclamation areas (i.e., re-using top soil and re-vegetating with target plant species); and
- Measures to be taken to improve the monitoring and adaptive management of both the mining and mitigation sites.

EPA believes that this alternative, if practicable, would also address the primary concerns of those who are challenging the NCDWQ's CWA Section 401 certification of the project, and threatening potential litigation. The Applicant expressed a desire to review the new alternative and noted that its evaluation could take a month or longer. We believe that we cannot conclude that this alternative proposal, or a modified version of it, is not practicable until we have heard back from the Applicant.

Conclusions and Recommendations

In summary, we believe that the permit, as proposed, would fail to comply with the Guidelines for the following reasons:

1. There are less environmentally damaging practicable alternatives that meet the project purpose [40 CFR 230.10(a)];
2. The project's direct and indirect impacts to high value wetland and stream systems including areas designated as Nationally Significant Natural Heritage Areas and Primary Nursery Areas would cause or contribute to significant degradation of the Nation's waters [40 CFR 230.10(c)]; and
3. All appropriate and practicable steps have not been taken to minimize and compensate for the project's adverse impacts to waters of the United States [40 CFR 230.10(d)].

I request, therefore, that your office coordinate with the District to: 1) in coordination with the Applicant, withdraw the NOI letter and initiate further analysis of the new proposed alternative to determine whether such alternative, or a modification of it, would be practicable, and thus the "LEDPA"; **or** 2) revise the proposed permit consistent with the following: a) revise its alternatives analysis for the proposed project to

address inconsistencies that bias identification of the LEDPA, b) in development of the LEDPA, avoid direct impacts to the Nationally Significant Natural Heritage Area and indirect impacts to the site's tidal creeks, including those identified as Primary Nursery Areas, to the maximum extent practicable, c) incorporate all appropriate and practicable measures to minimize the impact of the mining project on avoided aquatic resources by improving the quality of the reclamation areas (i.e., re-using top soil and re-vegetating with target plant species), d) ensure that all avoided aquatic resources are provided permanent protection from future mining with the appropriate binding real estate instruments such as conservation easements, e) revise the compensatory mitigation plan to effectively offset impacts to mature forested wetlands and f) include measures to ensure effective monitoring and adaptive management of both the mining and mitigation sites.

EPA has attempted to reach resolution of our concerns with the District and the Applicant. We believe your support for continuation of these discussions would provide the opportunity for successful resolution, and obviate the need to complete this elevation. I appreciate your personal attention to this important matter.

My request for your review of the District's permit decision is based on information provided to EPA in the District's NOI letter. I am concerned that we continue to receive a significant amount of new information regarding the project from the District even as recently as this afternoon. We look forward to working with you in the context of this elevation to consider this new information.

Should you have any questions or concerns regarding this matter, please contact me or have your staff contact Palmer Hough of my staff at (202) 566-1374.

Sincerely,

Michael H. Shapiro
Acting Assistant Administrator

Enclosure

Cc: Colonel Jefferson M. Ryscavage, U.S. Army Corps of Engineers, Vicksburg District
Brigadier General Joseph Schroedel, South Atlantic Division, U.S. Army Corps of Engineers
Sam Hamilton, U.S. Fish and Wildlife Service
Dee Freeman, NC Department of Environment and Natural Resources
Coleen H. Sullins, NC Department of Environment and Natural Resources, Division of Water Quality
A. Stanley Meiburg, EPA
James D. Giattina, EPA

Enclosure

Detailed Comments on Proposed
PCS Phosphate Mine Expansion
Section 404 Permit

I. Introduction

This referral meets the criteria in Part IV of the 1992 EPA/Army Section 404(q) Memorandum of Agreement (1992 MOA). EPA finds that the proposed discharge would result in substantial and unacceptable impacts to waters of the United States, including wetlands, in the Albemarle Pamlico River estuary system, aquatic resources of national importance (ARNI). On February 24, 2009, the District Engineer for the U.S. Army Corps of Engineers Wilmington District (the Corps) issued a Notice of Intent to issue a Clean Water Act (CWA) Section 404 permit to the Potash Corporation of Saskatchewan Phosphate Division (PCS or the Applicant) to expand an existing phosphate mining operation (Action ID: AID 200110096). Pursuant to the Corps' authority under CWA Section 404, this permit would authorize the discharge of dredged and fill material to waters of the United States associated with a mine advance into the approximately 15,100 acre project area surrounding PCS's current mining operation adjacent to the Pamlico River, north of Aurora, Beaufort County, North Carolina (NC).

The proposed mine advance will involve mining and mining related activities within approximately 11,454 acres, resulting in direct adverse impacts to approximately 3,953 acres of wetlands and 25,727 linear feet of stream. The mining and mining related impacts would take place in three tracts identified as the NCPC, Bonnerton and South of NC Highway 33 (S33) tracts (see Figure 1).

EPA is very concerned with the magnitude of the direct and indirect impacts to wetlands and other waters which support the nationally significant Albemarle Pamlico Estuary System. Of particular concern are portions of a nonriverine wetland hardwood forest that have been designated as a Nationally Significant Natural Heritage Area by the NC Natural Heritage Program and would be directly impacted by the proposed project. The project would also result in the loss of approximately 70 percent of the watersheds of the project area streams which drain to estuaries of the Pamlico River resulting in indirect impacts to these important estuary systems. EPA also has specific concerns regarding the proposed project's indirect impacts to these estuary systems, four of which have been designated as Primary Nursery Areas by the NC Wildlife Resources Commission.

Based on EPA's review of the economic analysis included in the project's Final Environmental Impact Statement (FEIS), we continue to believe that there are less environmentally damaging practicable alternatives for mining the project site that would avoid and minimize impacts to important wetland and stream resources. In addition to the need to further avoid impacts to the site's high value aquatic resources, we also believe that additional measures can be taken to minimize the impact of the mining project on avoided aquatic resources by improving the quality of the reclamation area (i.e., re-using top soil and re-vegetating with target plant species). Further, all avoided aquatic resources should be provided permanent protection from future

Figure 1 illustrates the PCS project boundary. Mining and mining related impacts would take place in three tracts identified as the NCPC, Bonnerton and South of NC Highway 33 (S33) tracts.

mining with appropriate binding real estate instruments such as conservation easements. We also have concerns regarding the adequacy of the proposed compensatory mitigation to offset authorized impacts to mature forested wetlands. Finally, we believe that additional measures are necessary to improve the monitoring and adaptive management of both the mining and mitigation sites.

Based on our review of the proposed project, we believe it fails to comply with the Section 404(b)(1) Guidelines (the Guidelines) for the following reasons:

1. There are less environmentally damaging practicable alternatives that meet the project purpose [40 CFR 230.10(a)];
2. The project's direct and indirect impacts to high value wetland and stream systems including areas designated as Nationally Significant Natural Heritage Areas and Primary Nursery Areas would cause or contribute to significant degradation of the Nation's waters [40 CFR 230.10(c)]; and
3. All appropriate and practicable steps have not been taken to minimize and compensate for the project's adverse impacts to waters of the United States [40 CFR 230.10(d)].

II. Project History

In August 1997, the Corps issued PCS a permit to impact approximately 1,268 acres of wetlands in order to mine phosphate next to its phosphate processing plant on the Hickory Point peninsula adjacent to the Pamlico River and South Creek in Beaufort County, NC. On November 2, 2000, PCS applied for a permit from the Corps to continue its phosphate mining operation into a 3,608-acre tract, known as the NCPC tract, situated east of PCS's current mining operation. The Corps issued a public notice describing this application on October 4, 2001. The requested authorization would impact 2,408 acres of wetlands and other waters of the United States, including wetlands that were "avoided" as part of the 1997 permit negotiations because of their high ecological value. In response to this pubic notice, EPA submitted comment letters on October 25, 2001 and November 20, 2001, pursuant to paragraphs 3(a) and (b) of Part IV of the 1992 MOA, stating that we determined that the project, as proposed, will result in substantial and unacceptable impacts to aquatic resources of national importance. We also stressed the need to avoid and minimize impacts to these valuable aquatic resources and highlighted the need to explore less environmentally damaging alternatives for mining the project site.

Based on the comments received in response to the October 2001 public notice, the Corps prepared an Environmental Impact Statement (EIS) and established an interdisciplinary team (Review Team).[1] The Review Team's role was to identify major issues to be addressed in the EIS and assist with the identification of potentially less environmentally damaging alternatives. EPA was an active participant in the Review Team which met over twenty times during the development of the project's EIS.

On October 20, 2006, the Corps released the Draft EIS (DEIS) and, via public notice, requested comments on both the DEIS as well as the proposed action. The DEIS examined mining impacts

[1] The Review Team was comprised of representatives from state and federal regulatory and commenting agencies, environmental advocacy groups, the Applicant and the Applicant's consultant, CZR Incorporated.

on the NCPC Tract and two additional sites known as the Bonnerton tract (2,806 acres) and the S33 tract (8,686 acres). Nine alternative mining alignments and a "No-Action" alternative were identified for further study in the DEIS. The Applicant's Preferred alternative (AP) was to mine solely on the NCPC tract. An additional Expanded Applicant-Preferred alternative (EAP) proposed mining on all three tracts (NCPC, Bonnerton, and S33) and was also considered practicable by PCS.

Following release of the DEIS, EPA provided a memorandum and two formal comment letters to the Corps. EPA's January 17, 2007 memorandum, prepared by Dr. Adam Daigneault, an EPA economist, provided recommendations for improving the presentation of the DEIS's economic analysis. EPA's February 9, 2007, letter from its National Environmental Policy Act (NEPA) Program Office provided additional comments regarding the DEIS's economic analysis and raised additional concerns regarding the adequacy of the DEIS. Specifically, EPA identified significant environmental concerns that were the basis for rating the AP alternative as "EO-2, Environmental Objections, Insufficient Information". The focus of EPA's concern was that, of all the alternatives considered, the AP and the EAP alternative were the most environmentally damaging. The AP alternative would impact approximately 2,408 acres of wetlands and 38,558 linear feet of stream on the NCPC tract, and the EAP alternative would impact approximately 5,667 acres of wetlands and 89,150 linear feet of stream across all three tracts (see Table 1). EPA further concluded that the economic modeling conducted by PCS to determine the fiscal viability of each of the nine mining alternatives failed to demonstrate why the less environmentally damaging Alternatives SCR and SJA were not feasible. EPA's February 9 and March 6, 2007, letters from its Region 4 Water Management Division reiterated concerns regarding the proposed project's direct and indirect adverse impacts on wetlands and other aquatic resources of national importance, the need to avoid and minimize these impacts and the availability of less environmentally damaging alternatives.

Table 1: Wetland and stream impacts for the ten alternatives evaluated in the DEIS

Alternative	*Total Area*	*Total Wetlands*	*Wetlands Impacted*	*% Wetlands Impacted*	*Total Streams*	*Streams Impacted*	*% Streams Impacted*
	acres	acres	acres	%	linear feet	linear feet	%
AP	3412	2500	2408*	96%	55528	38558	69%
EAPA	13961	6404	5667*	88%	115843	89150	77%
EAPB	13961	6404	5667*	88%	115843	89150	77%
No Action	5745	1691	0	0%	43209	0	0%
S33AP	7743	1691	1130	67%	43209	33486	77%
DL1B	9033	6404	2285	36%	115843	13854	12%
SCRA	10659	6404	3506	55%	115843	14360	12%
SCRB	10659	6404	3506	55%	115843	14360	12%
SJAA	12891	6404	5031	79%	115843	2508	2%
SJAB	12891	6404	5031	79%	115843	2508	2%

During the DEIS comment period, the Applicant proposed changes regarding how the cost of mine development activities are averaged, specifically the cost of mine relocation to S33 which is located south of NC Highway 33. The Applicant argued that this change was necessary to facilitate comparison of alternatives to the Applicant's original request for a 15 year mining plan in the NCPC tract (AP alternative) which is located, along with the Bonnerton tract, north of NC Highway 33. After evaluating the PCS proposal, the Corps incorporated the Applicant's

argument into the alternatives analysis identifying only those alternatives that provide at least 15 years of mining in the two tracts north of Highway 33 (i.e., NCPC and Bonnerton) as practicable. Then the Corps developed an additional alternative (Alternative L), fully contained within the project boundary, which provides 15 years of mining north of Highway 33. PCS, on its own initiative, submitted a separate additional alternative (Alternative M). Alternatives L and M were evaluated in a Supplemental DEIS (SDEIS) filed on November 16, 2007. The Corps' stated intent for this document was neither to respond to comments received on the DEIS nor to correct any information presented in the DEIS. Hence, the Corps did not address EPA's earlier concerns and requests for additional information, intending instead to address these issues in the FEIS.

On December 28, 2007, EPA provided comments in response to the SDEIS. We reiterated our concerns regarding the proposed project's adverse impacts to aquatic resources of national importance. Consistent with our rating of the AP alternative in the DEIS, EPA rated Alternative L as "EO-2, Environmental Objections, Insufficient Information" because of the magnitude of impacts on wetland resources. We also raised significant concerns regarding the Corps' decision to change a key aspect of the DEIS's economic analysis, specifically introduction of the criterion that only those alternatives that provide at least 15 years of mining in the two tracts north of Highway 33 (i.e., NCPC and Bonnerton) are practicable. This change creates inconsistencies in the FEIS's economic analysis that bias it in favor of the more extractive and environmentally damaging alternatives, by eliminating numerous alternatives in the SDEIS that had been determined to be practicable in the DEIS, alternatives that are much less environmentally damaging than the proposed project.

EPA believes the modification made to the economic analysis in the SDEIS was not appropriate and that the alternatives excluded from the SDEIS were indeed practicable. In an effort to illustrate this point, EPA requested that our National Center for Environmental Economics review the economic analysis included in the SDEIS. EPA's review of the economic analysis included in the SDEIS (discussed below) concluded that there are less environmentally damaging practicable alternatives to the proposed project. EPA met with the Corps on numerous occasions to share the results of its review and discuss our concerns regarding the modifications to the economic analysis in the SDEIS.

The project's FEIS was published on May 23, 2008. The FEIS identified Alterative L, which was introduced in the SDEIS, as the Applicant's proposal. Alternative L would impact approximately 4,115 acres of wetlands and 29,288 linear feet of stream. Although the FEIS acknowledges EPA's concerns with the changes that were made to the economic analysis in the SDEIS, the analysis was nevertheless carried forward in the FEIS.

On July 23, 2008, EPA provided comments on the FEIS. In this letter, we reiterate our continued concerns regarding the project's direct and indirect impacts to aquatic resources of national importance and the continued need to avoid and minimize impacts to these high value aquatic resources. EPA concluded that the proposed project "would have significant and long-term, direct and cumulative impacts to biocommunities in various waters of the United States which support the nationally significant Albemarle Pamlico Estuary System." The letter notes EPA's continued belief that, based on our review of the economic analysis included in the FEIS,

that there are less environmentally damaging practicable alternatives for mining the project site. EPA indicated that our remaining concerns regarding the project could be successfully resolved with greater evaluation of Alternative S33 and further modifications to Alternative L.

On January 15, 2009, the North Carolina Division of Water Quality (NCDWQ) issued its CWA Section 401 Water Quality Certification. In doing so it concluded that additional steps needed to be taken to avoid and minimize impacts to high value aquatic resources at the project site. NCDWQ did not issue its certification for Alternative L. Among a number of changes, it required additional avoidance of impacts to high value aquatic resources; specifically it protected a portion of the site's Nationally Significant Natural Heritage Area from mining and required that this avoided area be protected by a conservation easement. The project certified by NCDWQ, identified as Modified Alternative L, would impact approximately 3,953 acres of wetlands and 25,727 linear feet of stream. Thus, although the FEIS concludes that Alternative L is the least environmentally damaging practicable alternative (LEDPA), NCDWQ's certification of a project that further reduces aquatic resource impacts demonstrates that less environmentally damaging practicable alternatives to the project proposed in the FEIS (Alternative L) in fact exist. Although the NCDWQ's Modified Alternative L includes some additional measures designed to avoid and minimize impacts to important aquatic resources, we continue to believe that additional measures are necessary and practicable. Finally, on March 12, 2009, four environmental groups filed a petition challenging NCDWQ's certification citing, among other concerns, that the certification, which allows impacts to nearly 4,000 acres of wetlands, would result in violations of state water quality standards.

On February 24, 2009, the Corps sent EPA a Notice of Intent to issue a CWA Section 404 permit to PCS for the project certified by NCDWQ, Modified Alternative L. On March 17, 2009, EPA notified the Corps that, pursuant to Part IV, paragraph 3(d)(2) of the 1992 MOA, it was requesting review of the proposed permit by the Acting Assistant Administrator of EPA's Office of Water, and recommending that he request review of the permit by the Assistant Secretary of the Army for Civil Works.

Although the formal permit elevation process was initiated with the Corps' February 24, 2009, letter, EPA has continued to coordinate with the Corps and the Applicant in an effort to resolve our concerns regarding the proposed project. To this end, on March 24, 2009, representatives from EPA, the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) met with the Corps and the Applicant to discuss our continued concerns with the proposed project. At that meeting, EPA, FWS and NMFS presented a potential alternative plan for mining the site that would address the concerns raised by the agencies by avoiding and minimizing impacts to the aquatic ecosystem, consistent with the Guidelines. EPA, FWS and NMFS also noted that we had consulted with the environmental groups who are challenging the NCDWQ's CWA Section 401 certification of the project and had attempted to address many of the environmental groups' concerns in the alternative put forward at the March 24, 2009, meeting.

As discussed in more detail below, the EPA/FWS/NMFS proposal would provide:

- Additional avoidance designed to reduce the direct and indirect impacts of the mining project on the site's Nationally Significant Natural Heritage Area as well as the site's tidal creeks, including those identified as Primary Nursery Areas;
- Measures to ensure that avoided aquatic resources are provided permanent protection from future mining with appropriate binding real estate instruments such as conservation easements;
- Measures to be taken to minimize the impact of the mining project on avoided aquatic resources by improving the quality of the reclamation areas (i.e., re-using top soil and re-vegetating with target plant species); and
- Measures to be taken to improve the monitoring and adaptive management of both the mining and mitigation sites.

During the March 24, 2009, meeting, the Applicant requested more details regarding the agencies' proposal so that it could conduct a more thorough evaluation. The agencies agreed to provide the Corps and the Applicant with the Geographic Information System (GIS) coverages for the proposed new mining boundaries on the NCPC and Bonnerton tracts (the mining boundary on the South of 33 tract remained the same as Modified Alternative L). EPA/FWS/NMFS also agreed to provide additional language describing the proposed reclamation provisions and monitoring provisions presented at the meeting. This information was provided to the Corps and the Applicant on March 30, 2009. The Applicant expressed a desire to review the new alternative and noted that its evaluation could take a month or longer. We believe that we cannot conclude that this alternative proposal, or a modified version of it, is not practicable until we have heard back from the Applicant.

While we remain hopeful that there are opportunities to resolve our concerns with the proposal, discussions with the Corps and the Applicant have not yielded such a result. As we continue to have outstanding concerns, the timeframes outlined in our 1992 MOA dictate that we must share these concerns with the Assistant Secretary of the Army for Civil Works by April 6, 2009.

III. Aquatic Resources of National Importance

The 15,100 acre project area is located adjacent to the Pamlico River which is part of the nationally significant Albemarle Pamlico Estuary Complex (see Figure 2). The project area contains 6,293 acres of wetlands and 115,843 linear feet of streams that support the Albemarle Pamlico Estuary and collectively constitute aquatic resources of national importance (ARNI). The Albemarle Pamlico Estuary Complex is the largest lagoonal estuary and second largest estuarine complex in the United States and is itself an ARNI. The fringe marshes, creeks, and beds of submerged aquatic vegetation in the Albemarle Pamlico Estuary Complex provide essential nursery habitat for most commercial and recreational fish and shellfish in the North Carolina coastal area (Street et al., 2005) and important habitat for waterfowl[2], shorebirds and other migratory birds. The importance of wetlands to coastal fish is not unique to North Carolina. Over 95 percent of the finfish and shellfish species commercially harvested in the United States are wetland-dependent (Feierabend and Zelazny, 1987). More than 70 percent of

[2] See FWS waterfowl survey website: http://www.fws.gov/birddata/databases/mwi/mwidb.html

the commercially or recreationally valuable fish species of the Atlantic seaboard rely on the Albemarle-Pamlico system for some portion of their life cycle and more than 90 percent of the fish caught in NC depend on the estuary as a nursery habitat.[3] Further, the Albemarle-Pamlico Estuary Complex was designated as estuaries of "national significance" in 1987 and joined EPA's National Estuary Program. Since 2002, EPA has awarded over $7.7 million to the Albemarle-Pamlico National Estuary Program (APNEP) for wetlands, streams and shellfish area restoration projects, watershed assessment and mapping, and a multitude of other projects. In addition, during 2003-2008, the APNEP used its annual funding from EPA to secure an additional $84 million in leveraged resources from both public and private funders. The resources have been used to help address the priority problems facing the Albemarle-Pamlico Estuary.

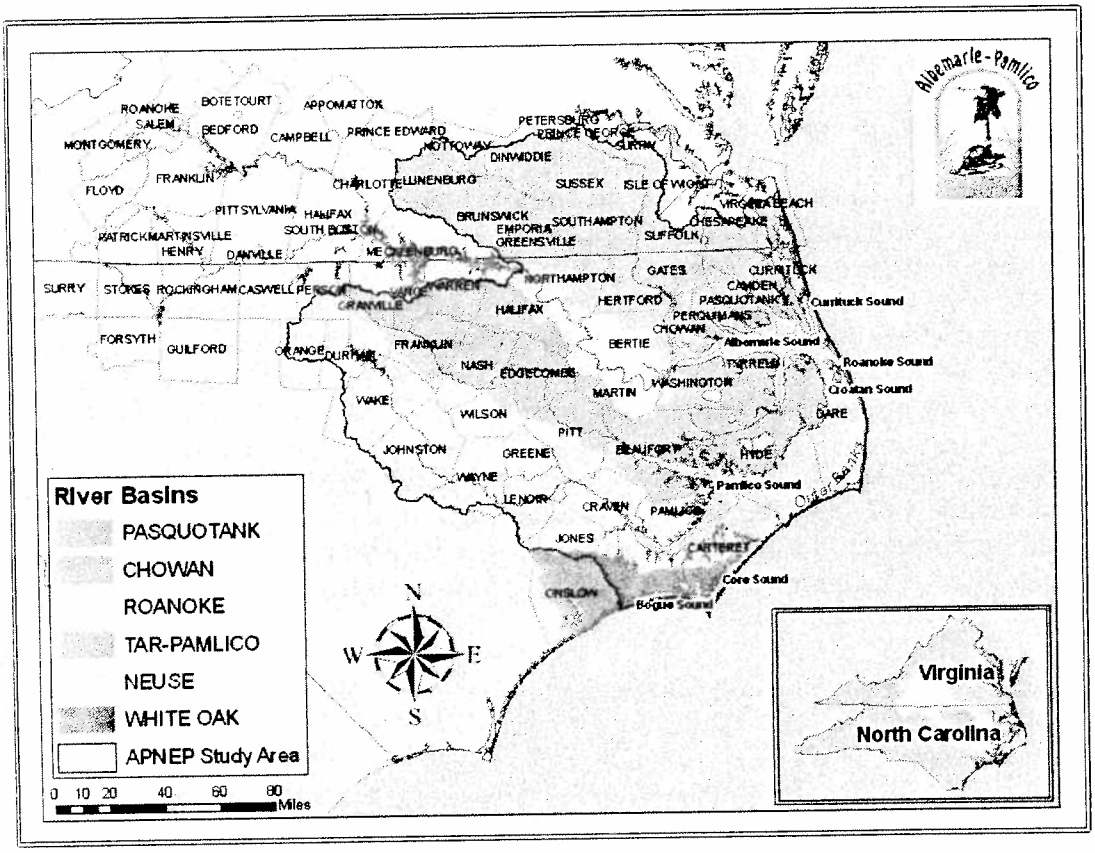

Figure 2 illustrates the boundary of the Albemarle-Pamlico National Estuary Program. The Albemarle-Pamlico estuarine system was designated as estuaries of national significance in 1987 and joined EPA's National Estuary Program.

As discussed earlier, the project site consists of three distinct tracts, NCPC, Bonnerton and S33. The NCPC tract is adjacent to the Pamlico River and South Creek. Seventy-one percent of this tract is designated as wetlands and it contains eight tidal creeks, including three inland Primary

[3] See Association of National Estuary Programs website: http://www.nationalestuaries.org/publications/factcards/albemarle.htm

Nursery Areas (Tooley Creek, Jacobs Creek, and Jacks Creek). The Bonnerton tract is adjacent to the Pamlico River, Durham Creek, and Porter Creek. Seventy-six percent of this tract is designated as wetlands and it contains the headwater drainage to one tidal creek designated as an inland Primary Nursery Area (Porter Creek). The Bonnerton tract also contains an approximately 271 acre nonriverine hardwood forested wetland that has been designated as a Nationally Significant Natural Heritage Area. The S33 tract is farther inland than either the NCPC or Bonnerton tracts and contains the headwaters of three creeks that drain into South Creek, one of which is a tidal creek. Approximately 20 percent of the S33 tract is delineated as wetland.

The Bonnerton and NCPC tracts include tidally influenced forested wetlands, creeks and salt marsh designated as Essential Fish Habitat (EFH) by the South Atlantic Fishery Management Council and Mid-Atlantic Fishery Management Council for federally managed fishery species. A subset of the areas designated as EFH is recognized by the NC Wildlife Resource Commission as inland Primary Nursery Areas and this state designation also makes these areas federally designated Habitat Area of Particular Concern (HAPC), the subset of EFH that warrants the highest protection under the Magnuson-Stevens Fishery Conservation and Management Act. The Primary Nursery Areas within the project area are Tooley Creek, Jacobs Creek, Jacks Creek and Porter Creek.

The FEIS classifies the site's wetlands into ten categories: brackish marsh complex, bottomland hardwood forest, herbaceous assemblage, shrub-scrub assemblage, hardwood forest, mixed pine-hardwood forest, pine forest, pocosin-bay forest, sand ridge forest, and pine plantation. All of the site's wetlands perform important ecological functions that support the Albemarle Pamlico Estuary such as temporary storage of surface water, nutrient cycling, organic carbon export, pollutant filtering/removal, and maintenance of biologically diverse plant and animal habitat. The FEIS classifies the site's stream resources into intermittent streams, perennial streams and pubic trust areas (i.e., navigable/canoeable creeks in coastal counties). All of the site's stream resources perform important ecological functions that support the Albemarle Pamlico Estuary such as the transport of water, nutrients and sediment downstream, pollutant processing and removal, and maintenance of biologically diverse plant and animal habitat. Of particular ecological importance are the wetland areas on the Bonnerton tract designated as a Nationally Significant Natural Heritage Area and the tidal creeks on the NCPC and Bonnerton tracts, four of which have been identified as Primary Nursery Areas.

Nationally Significant Natural Heritage Area

The Bonnerton tract contains an approximately 271 acre wetland area that has been designated by the NC Natural Heritage Program as a Nationally Significant Natural Heritage Area. The Natural Heritage Program designates areas in the state which it has determined to be important for conservation of the state's biodiversity as Significant Natural Heritage Areas. These areas can be classified as significant by the Natural Heritage Program at the county, regional, state or national level. The fact that the Bonnerton tract's Significant Natural Heritage Area has been classified as nationally significant means the Natural Heritage Program has determined it to be one of the five best examples of this community type in the nation. The 271 acre nonriverine

Wet Hardwood Forest (WHF) community type found on the Bonnerton tract is considered to be among the most threatened and endangered of NC's natural communities.

Nonriverine WHF communities are dominated by some of the same trees as wetland bottomland hardwood forests, and especially by several oak species, including swamp chestnut oak (*Quercus michauxii*), laurel oak (*Quercus laurifolia*), cherrybark oak (*Quercus pagoda*) and water oak (*Quercus nigra*). The nonriverine WHF is habitat for many species, including black bear (*Ursus americanus*) and wild turkey (*Meleagris gallopavo*) . The multi-layered structure characteristic of mature WHFs supports high densities and diversities of neotropical migrant birds such as wood thrush (*Hylocichla mustelina*), Swainson's warbler (*Limnothlypsis swainsonii*), worm-eating warbler (*Helmitheros vermivorus*), prothonotary warbler (*Protonotaria citrea*), hooded warbler (*Wilsonia citrina*) and white-breasted nuthatch (*Sitta pusilla*)

Some of the indicators of quality in a WHF are canopy maturity, canopy age structure, extent, and connection to other natural communities. Historically nonriverine WHFs naturally occurred in large patches and it is believed that some aspects of their ecosystem function are dependent on this large extent. The Natural Heritage Program also finds that the rate of loss of this community type is greater than all other community types in the state.

Tidal Creeks/Primary Nursery Areas

There are ten tidal creeks on the project site: Jacks Creek, Jacobs Creek, Drinkwater Creek, Tooley Creek, Huddy Gut, Huddles Cut, Sibyl Creek, Whitehurst Creek, Porter Creek, and Bailey Creek. All ten of these tidal creeks perform similarly critical biological support functions and have thus been a focus of concern throughout our review of the proposed project. Four of these tidal creeks (Jacks Creek, Jacobs Creek, Tooley Creek and Porter Creek) have been specifically designated as Primary Nursery Areas by the NC Wildlife Resources Commission. Primary Nursery Areas are defined as those areas inhabited by the embryonic, larval or juvenile life stages of marine or estuarine fish or crustacean species due to favorable physical, chemical or biological factors. The purpose of inland Primary Nursery Areas are to establish and protect those fragile inland waters which support embryonic, larval or juvenile populations of these species. The critical input to and function of Primary Nursery Areas are not contained just within the public trust waters but also includes the headwater drainages. Wetlands that surround or serve as headwaters for estuarine creeks are essential for the creeks to serve as Primary Nursery Areas.

Estuarine waters occur along three sides of the proposed mining site and support a wide range of fishery resources, including commercially or recreationally important species such as striped bass (*Morone saxatilis*), American shad (*Alosa sapidissima*), Atlantic herring (*Clupea harengus*), summer flounder (*Paralichthys dentatus*), red drum (*Sciaenops ocellatus*), blue crab (*Callinectes sapidus)*, shrimp *(Pennaeidae)* and oysters (*Crassostrea virginica)*. The estuary also provides important habitat for anadromous fish, including the endangered shortnose sturgeon (*Acipenser breviorostrum*). Nursery areas located in the creeks and embayments of the estuarine system, such as those found on the project site, are important to over 75 species of fish and shellfish.[4]

[4] See Association of National Estuary Programs website: http://www.nationalestuaries.org/publications/factcards/albemarle.htm

IV. Substantial and Unacceptable Impacts

40 CFR 230.10(c): Significant Degradation

EPA believes that compliance with requirements of Section 230.10(c) of the Guidelines has not been demonstrated. Section 230.10(c) requires that no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of waters of the United States. The Guidelines explicitly require evaluation of all direct, secondary, (i.e., indirect), and cumulative impacts reasonably associated with the proposed discharge in determining compliance with Section 230.10(c). In accordance with the Guidelines, determining significant degradation requires specific consideration of effects on such functions and values as wildlife habitat, aquatic system diversity, stability and productivity, recreation, aesthetic and economic values.

Of the 15,100 acre project area, the proposed mine advance would impact approximately 11,454 total acres and result in direct impacts to approximately 3,953 acres of wetlands, 19 acres of open waters and 25,727 linear feet of streams. This would represent the single largest wetland impact ever authorized under the Clean Water Act in NC and would result in a significant loss of wetlands, streams and other waters of the United States within the nationally significant Albemarle Pamlico Estuary Complex.

As previously noted, all of the site's wetlands perform important ecological functions that support the Albemarle Pamlico Estuary such as temporary storage of surface water, nutrient cycling, organic carbon export, pollutant filtering/removal, and maintenance of biologically diverse plant and animal habitat. Also as previously noted, all of the site's stream resources perform important ecological functions that support the Albemarle Pamlico Estuary such as the transport of water, nutrients and sediment downstream, pollutant processing and removal, and maintenance of biologically diverse plant and animal habitat. We recognize that not all of the approximately 3,953 acres of wetlands and 25,727 linear feet of streams that would be impacted by the proposed project perform all of these respective functions to the same degree (because of their position in the landscape and/or their level of prior disturbance), however, the complete loss of this entire suite of wetland and stream functions on this scale raises serious ecological concerns.

The habitat functions provided by wetlands and streams that would be lost are particularly important in light of the ecological and economic value of the Albemarle Pamlico Estuary's commercial and recreational fishery/shellfish resources. Also, the state has designated the entire Tar-Pamlico River Basin as Nutrient Sensitive Waters because of problems associated with excessive levels of nutrients in the river such as harmful algal blooms, low oxygen levels, increased fish kills, and other symptoms of stress and diseases in the aquatic biota. The state developed a strategy to reduce nutrient inputs from around the basin to the estuary that is yielding improvements to water quality. Nonetheless, we are very concerned that loss of the water quality enhancement functions provided by the approximately 3,953 acres of wetlands and 25,727 linear feet of streams that would be completely eliminated by the proposed project could

exacerbate existing water quality problems in the Tar-Pamlico River and hamper the state's ongoing efforts to improve the river's water quality.

Direct Impacts to Nationally Significant Natural Heritage Area

EPA is concerned with the proposed project's direct impacts to the wetland area on the Bonnerton tract that has been designated by the NC Natural Heritage Program as a Nationally Significant Natural Heritage Area. As previously noted, the 271 acre nonriverine WHF found on the Bonnerton tract is an extremely unique and rare community type, one that has experienced a rate of loss higher than all other community types in the state. The fact that the Bonnerton tract's Significant Natural Heritage Area has been classified as nationally significant means the Natural Heritage Program has determined it to be one of the five best examples of this community type in the Nation.

As previously noted, some of the indicators of quality in a nonriverine WHF are canopy maturity, canopy age structure, extent, and connection to other natural communities. Historically, nonriverine WHFs naturally occurred in large patches and it is believed that some aspects of their ecosystem function are dependent on this large extent. The proposed project would directly impact approximately 97 acres[5] of this ecologically valuable and rare wetland system and would allow mining through the middle of the 271 acre area, bisecting it into two separate and smaller pieces, an eastern and a western piece. This large reduction in size and the fragmentation of the tract into two separate pieces would undermine some of the key ecological characteristics which make it ecologically valuable and "nationally significant." Although the NCDWQ's CWA Section 401 Water Quality Certification requires the mined out area between the eastern and western pieces to be restored after mining, we believe it will be extremely difficult, based on the current state of the science, to restore this area to its prior condition after mining and this will have a significant detrimental impact to the integrity of this rare and threatened biological community. In addition to reducing the size of the area and fragmenting it into two pieces, the large scale disturbances associated with allowing phosphate mining through the middle of the area (land clearing, groundwater extraction, pit excavation, road and support infrastructure construction, etc.) will further lower the ecological value of the remaining eastern and western pieces of the area.

Given the unique and valuable nature of this nationally significant resource, it is EPA's determination that the direct impacts of mining the 271 acre Significant Natural Heritage Area on the Bonnerton tract does not comply with Subparts C-F of the Guidelines, specifically Subpart C – Impacts on physical characteristics of the aquatic ecosystem, Subpart D – Impacts on the biological characteristic of the aquatic ecosystem, Subpart E – Impacts to special aquatic sites and Subpart F – Effects on human use characteristics (SNHA designation).

Indirect Impacts to Tidal Creeks/Primary Nursery Areas

EPA is also concerned with the proposed project's indirect impacts to the project area's ten tidal creeks, four of which have been classified by the NC Wildlife Resource Commission as Primary Nursery Areas. Although the proposed project would not directly impact the perennial reaches

[5] Based on the February 24, 2009, Notice of Intent letter from the Wilmington District Corps, page 6.

of the four Primary Nursery Areas, the headwater drainages of the project site's tidal creeks, including those designated as Primary Nursery Areas, would be reduced by approximately 70 percent. Our concerns regarding the proposed drainage basin reductions are amplified on the NCPC tract since its watersheds have already lost approximately 1,268 acres of wetlands as part of the Applicant's 1997 mining permit.

Eliminating the headwater streams and wetlands and significantly reducing the drainage areas of the project site's Primary Nursery Areas and other tidal creeks would:

- Reduce flow from ground water and increase variability in surface water flows to the tidal creeks, thereby increasing the frequency and magnitude of short-term salinity fluctuations;
- Reduce filtration of nutrients and other contaminants previously accomplished by the site's streams and wetlands, increasing sedimentation and turbidity in tidal creeks;
- Reduce productivity of native fish and shellfish in the downstream estuary by disrupting the estuarine food web (caused by a reduction of organic materials critical for biological activity in the surface water drainage); and
- Shift downstream estuarine productivity from the benthic community which is dominated by sensitive submerged aquatic vegetation and benthic invertebrate species to tolerant phytoplankton species. This would exacerbate ongoing environmental stress and create an open niche for problematic invasive plant and animal species to colonize and degrade the estuary.

We believe the disruption of these processes and functions in the drainage basin will significantly impact the site's tidal creeks and impair the ability of these systems to function as Primary Nursery Areas.

Estuarine animals exist in a community assemblage and the influence of a factor, such as salinity, on one species may be extended either directly or indirectly to affect other species. The cumulative effects of even small changes in an estuary may have a total systemic effect on the marine resources and the economic activities that depend on them. We believe the potential effect of Drainage Basin Reduction (DBR) on the production of marine fisheries resources is significant.

Besides its effect on fish production, DBR will likely result in increased sedimentation and turbidity, which are significant contributors to declines in populations of aquatic organisms. The direct effects of sedimentation and turbidity at various trophic levels are mortality, reduced physiologic functions and avoidance. Sedimentation can clog the gills of fish, reducing respiratory abilities. This stress may reduce tolerance levels to disease and toxicants and to changes in dissolved oxygen concentrations and salinity, compromising the health of local fisheries resources. Decreases in primary production are associated with increases in sedimentation and turbidity and produce negative cumulative effects through depleted food availability to zooplankton, insects, freshwater mollusks and fish. Decreases in available food at various trophic levels also results in depressed rates of growth, reproduction and recruitment. These effects lead to alterations in community density, diversity and structure.

Mining will directly affect the rate at which water is routed through the watershed. DBR will reduce contiguous sheet flow and as the mine expansion progresses there is an ever increasing

trend of diverting surface water drainage which once promoted estuarine productivity into National Pollutant Discharge Elimination System (NPDES) channels, pipes and outfalls. This redirection of surface flows contributes to estuarine degradation because it removes natural watershed drainage patterns that 1) promote infiltration and trapping of sediments and other pollutants, and 2) provide a beneficial diffuse source of water to the estuary and subsequently decreases the buffering capacity of the system. These changes will likely increase the amount of sediment, nutrients and toxics entering the system. Nitrogen and phosphorus can accelerate eutrophication resulting in algal blooms, reduced water clarity, shifts in algal and fish populations and fish kills. Currently South Creek, which is stressed with water quality problems including algal blooms and increases in suspended solids, is designated as a Nutrient Sensitive Water (NSW) by the state, as is the entire Tar-Pamlico River Basin. We believe the reduction of the South Creek's buffering capacity associated with the large scale removal of wetlands and streams from the watersheds draining to the creek will likely exacerbate its existing water quality problems by removing the system's nutrient uptake capability. Hypoxic conditions caused by excess nutrients can result in reduced commercial and recreational fisheries production.

EPA believes the proposed mining operations will negatively impact estuarine trophic structure through disruption of substrate inputs crucial to primary producers; reduction of energy sources that fuel estuarine productivity; and degradation of the nutrient sequestration capacity of the estuarine system. Estuary productivity is dependent on the complex interactions among the various components of the aquatic food web; with epiphytes (attached to wetland macrophytes) and submerged aquatic vegetation (SAV) forming the foundation of the estuarine food web. SAV populations have recently declined by as much as 50 percent, possibly because of anthropogenic impacts. As a result, detritus supplied by wetland macrophytes has become more important as an epiphytic substrate. While phytoplankton are also important for productivity, the role of wetland plants and SAV detritus is of greater importance to the overall stability of shallow aquatic food webs. It is our belief that the proposed mining operations will negatively impact both types of epiphytic substrates.

Also of importance to estuarine food webs is the gradual and episodic release of Dissolved Organic Matter (DOM) from the contributing basins and wetlands immediately adjacent to the Albemarle Pamlico Estuary Complex. This energy source fuels bacterial communities that, through mineralization, provide inorganic nitrogen, phosphorous and carbon, supporting productivity. In addition, DOM supported bacteria are an important component of the "microbial loop." This part of aquatic food web links DOM (of autochthonous and/or allochthonous origin) to higher trophic levels, via bacteria-protist-metazoan-zooplankton interactions. The impacts associated with the proposed project would decrease the quantity and quality of allochthonous DOM supplied to the estuary because of the close proximity of PCS's proposed mining operations.

Most of the drainage basin wetlands that would be subjected to impacts are wet forests, including bottomland hardwood forests. These areas are subjected to repeated periods of inundation and desiccation. This is important from a biogeochemical perspective as it allows for the accumulation of particulate organic matter and its subsequent processing (dissolution and mineralization). This leads to episodic exports of dissolved organic materials to the estuary. Wetlands impacted by the proposed project also retain nutrient loads carried by high flow events, which are later sequestered into forest biomass. Wet forests are also important for denitrification

and these areas also provide refugia and nursery habitat for aquatic organisms during high flow periods.

The Applicant provided a December 2007 report prepared for PCS by Entrix, on *Potential Effects of Watershed Reduction on Tidal Creeks – An Assessment.* EPA believes that, while the report clarifies currently known characteristics of the South Creek tributaries, it does not support the conclusion that current and future DBRs from mining activities would have no significant effect on downstream ecosystems. Data collected by NC Wildlife Resource Commission in November 2006 to determine species present in Jacks, Jacobs and South Creeks does not support that fish production originates from downstream estuarine environments. The Applicant's report does not address freshwater species nor did it establish a connection between biota and previous mining impacts in the area including watershed reduction and ground water draw down. The report used "baseline" data for Jacks Creek collected after the watershed had already been reduced by almost 20 percent. Small reductions in watershed area may have large biotic impacts and, therefore, it is problematic using these data as a baseline to determine DBR impacts. The Applicant's report also makes a troubling extrapolation that since past smaller DBRs did not adversely impact the tidal creeks, the much larger DBRs associated with the proposed project (i.e., 70 to 80 percent DBRs) also would not adversely impact the tidal creeks. However, data do not exist to draw this conclusion.

The Entrix report and the Corps' February 24, 2009, Notice of Intent letter both present the success of the PA II man-made marsh on the PCS project area to hypothesize that the DBRs will not cause significant loss of habitat value and nursery functions of the tidal creeks. The West (2000) study evaluating PA II is frequently cited in these discussions and is used by the Entrix report to argue broad scale functional equivalency of PA II to local tidal creeks. EPA does not believe it is valid to use the West study to make these inferences. The study's objective was to assess how well PA II could provide suitable habitat for fish, benthic and plant species and not to evaluate the effects of DBR on these populations. The data were collected from the lower reaches of the stream channel and did not fully assess the upper channel's biota. These results support the potential for species repopulation in the lower reaches of the creeks but do not support the proposition that DBR will not impact the upper channel's biota. The report does not provide data on the functional equivalence of factors, such as stream substrate, biogeochemical processes, wetland plants, etc. and in fact, there was no evidence of accretion of natural sediment structure (woody detrital covering, large peat component, etc) or organic carbon in the 10 years of the study. EPA believes the data presented do not overcome the large body of scientific information showing that mining through the headwaters of estuarine streams and their riverine habitat will have a significant negative impact on the functioning and structure of the creeks impacted by the proposed mining activities. There is, however, a large amount of scientific data supporting the importance of headwater streams and wetlands on downstream water quality (Meyer and Wallace, 2001; Gomi *et al.*, 2002; Alexander *et al.*, 2007; Meyer *et al.*, 2007; and Wipfli *et al.*, 2007).

Summary of Impacts

In summary, the proposed project would eliminate critical ecological functions provided by approximately 3,953 acres of wetlands and 25,727 linear feet of streams within the nationally

significant Albemarle Pamlico Estuary. Wetland functions include temporary storage of surface water, nutrient cycling, organic carbon export, pollutant filtering/removal, and maintenance of biologically diverse plant and animal habitat. Stream functions include transport of water, nutrients and sediment downstream, pollutant processing and removal, and maintenance of biologically diverse plant and animal habitat. Of particular concern are the proposed projects:

- Direct impacts to portions of a nonriverine hardwood wetland forest that has been designated as a Nationally Significant Natural Heritage Area by the NC Natural Heritage Program, and
- Indirect impacts to the site's tidal creeks, four of which have been designated as Primary Nursery Areas by the NC Wildlife Resources Commission, associated with the 70 percent reduction in the drainage basins for these creeks.

EPA believes that impacts to these ecological functions at the scale associated with this project would cause or contribute to significant degradation [40 CFR 230.10(c)] of the Nation's waters. Further, as discussed below, we do not believe the proposed compensatory mitigation would reduce these adverse impacts to an acceptable level.

V. Alternatives Analysis

40 CFR 230.10(a): Alternatives Analysis

A key provision of the Guidelines is the practicable alternatives test which provides that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem" [40 CFR 230.10(a)]. An alternative is practicable if "it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."[6] [40 CFR 230.10(a)(2)].

The FEIS evaluated eleven alternative mining alignments and a "No-Action" alternative. A central component of the FEIS's alternatives analysis was the evaluation of each alternative to determine if it was practicable in light of its costs. Though the Guidelines do not consider cost in terms of economics, here, the evaluation looked at the alternatives in terms of their economic viability. Throughout our review of the DEIS, SDEIS, and FEIS, EPA has consistently cited concerns regarding the economic analysis. The concerns became heightened after aspects of the economic analysis were modified in the SDEIS and FEIS, changes that we believe inappropriately bias the economic analysis in favor of more extractive and more environmentally damaging mining alternatives and effectively obscure identification of the least environmentally damaging practicable alternative (LEPDA) as required by the Guidelines.

FEIS Economic Analysis

Our primary concern with the FEIS's economic analysis is its inconsistent treatment of the practicability of mining the southern portion of the S33 tract. The development of the long-term

[6] The CWA Section 404(b)(1) Guidelines use the term "basic purpose" and "overall project purposes" interchangeably. For a detailed discussion of this issue see EPA's Final Determination Pursuant to Section 404(c) of the CWA Concerning the Two Forks Water Supply Impoundments, Jefferson and Douglas Counties, Colorado.

alternatives that have been evaluated in the DEIS, SDEIS, and FEIS relied on an assumption that mining in the southern portion of S33 would become practicable while the FEIS's economic analysis relies on a contradictory assumption regarding those same mining costs. Although not currently practicable from a cost standpoint, mining the southern portion of S33 was included in the mine alternatives evaluated in the FEIS because mining these areas would become practicable. Specifically, the FEIS states that "[t]he applicant has also indicated that it believes the market will eventually become favorable; a reasonable position based on [U.S. Geological Survey] USGS information regarding the rate of depletion of domestic production capacity and the applicant's future shift to higher margin products. The Corps has determined that it is therefore appropriate to include this area [the lower portion of S33] in the evaluation" (FEIS at 2-26). Similarly, the FEIS states that the Applicant has indicated that while it does not find the cost associated with mining the southern portions of S33 practicable now, "it expects they will become practicable at some point in the future" (FEIS at 2-29). Thus, mining alternatives that include mining in the southern portion of S33 were included for evaluation throughout the EIS process based on the expectation affirmed by the Applicant, agreed to by the Corps, and supported by USGS information that changes in market conditions and product shifts would make mining these areas practicable.

Perplexingly, the FEIS reverses this fundamental assumption for the alternatives when it eliminates all alternatives that provide less than 15 years of mining in the NCPC and Bonnerton tracts, leaving only the AP, EAP, SJAA, M and L alternatives for consideration. To be practicable, the FEIS states that an alternative must "provide the applicant with the certainty of practicable costs for at least 15 years" (FEIS at 2-29). According to the FEIS, the SCRA, SCRB and SJAB alternatives do not experience "high cost" (presumably this means impracticable costs) "until at or after 15 years" (FEIS at 2-30). If the assumption, discussed above, that the southern portions of S33 will become practicable were consistently applied, there would be no basis for the determination that these alternatives are impracticable since they all provide at least 15 years of practicable mining costs. However, the FEIS rejects these alternatives when it concludes that "SCRA, SCRB and SJAB are not practicable due to the required commitment to the higher mining costs within the initial 10-12 years of the plan without the expectation of fully recovering these development costs" (FEIS at 2-30). This determination contradicts the fundamental assumption used to include the southern portion of S33 in each of the mining alternatives. The southern portion of S33 was included specifically because the Applicant, the Corps and USGS expect that those predicted higher costs will be practicable in the future and the Applicant will fully recover the development costs associated with opening S33 to mining. EPA believes it is inappropriate that the FEIS assumes that mining S33 is practicable for the proposed alternatives yet this same assumption does not apply to its economic analysis.

Practicable Alternatives

EPA was very concerned when these inconsistencies first appeared in the SDEIS. EPA stated that such inconsistencies were not appropriate and that the alternatives excluded from the SDEIS were indeed practicable. In an effort to illustrate this point, EPA requested that our National Center for Environmental Economics review the economic analysis included in the SDEIS. EPA met with the Corps on numerous occasions to share the results of its review and discuss our concerns regarding the modifications to the economic analysis in the SDEIS. Despite these

efforts, no substantive changes were made to the economic analysis included in the FEIS. EPA's review of the economic analysis included in the SDEIS and the FEIS concludes that there are less environmentally damaging practicable alternatives to the proposed project (See Appendix 1).

EPA's review of the FEIS's cost practicability analysis used expected cost and value data from the FEIS to calculate the expected profit per year for every year of every alternative. EPA then calculated the Net Present Value (NPV) of the stream of annual profits for each alternative. This allows for the comparison of projects of differing lengths in equal terms (current year dollars). An alternative with a positive NPV will add positive value to the Applicant if undertaken and therefore demonstrates at least a minimum level of cost practicability.

A NPV analysis assumes that a dollar in the future is worth less than a dollar today due to the time value of money and investment risk (among other things). The amount that the value of a future dollar is discounted is given by the discount rate. The NPV of an alternative is the value of the stream of future profits in today's dollars.

$$NPV = \sum_{t}^{T} \frac{profit_t}{(1+r)^t}$$

where t (t=1 .... T) indexes the years of an alternative and r is the discount rate. Following White House Office of Management and Budget (OMB) guidance we have used a 3% and 7% discount rate

Our NPV analysis utilized the:

- 1991 to 2007 USGS adjusted price per ton estimates from Table 2-7 on page 6-12 of Volume 1 of the FEIS
- Cost per ton estimates for each year for each alternative from Table 2-6 on page 6-11 of the FEIS
- Expected tons extracted from each alternative for each year from the tables in Appendix D of the FEIS.

As the first step in the NPV procedure, a time trend was regressed on 1991 to 2007 USGS adjusted price per ton estimates to predict expected future prices per ton for the next 50+ years. Next, estimated cost per ton for each alternative for each year was subtracted from the estimated expected price per ton to give expected profit per ton per year for each alternative (i.e., price per ton - cost per ton = profit per ton). Then, expected profit per ton per year for each alternative was multiplied by the number of expected tons mined per year for each alternative to get total expected profit per year for each alternative (i.e., profit per ton * number of tons per year = total annual expected profits). Finally, using both a 3% and 7% discount rate, annual total profits for each year for each alternative are discounted back to their 2008 value. The NPV of each alternative is then the sum of its discounted annual total profits.

The results of the NPV analysis, presented in Table 2, highlight that contrary to the conclusions drawn in the FEIS, many of the alternatives evaluated in the FEIS are indeed economically viable and should not have been eliminated from further consideration. According to the FEIS,

an alternative is reasonable if it provides "the applicant with the certainty of practicable costs for at least 15 years" (FEIS at 2-29). Assuming this criterion is appropriate for use in a practicability determination made under the Guidelines, only the "No Action" and the S33AP and DL1B alternatives should have been eliminated from further consideration since they are the only three alternatives that do not provide at least 15 years of economically viable mining. If the 15 year criterion is not relevant for purposes of evaluating alternatives under the Guidelines and is not used, even the S33AP and DL1B options have a positive net present value and would be a better use of the land for the Applicant than letting it remain unused.

A number of the alternatives that are economically viable, based on the NPV analysis, involve far fewer impacts to aquatic resources than the FEIS's Alternative L or the proposed project (Modified Alternative L). EPA finds that the inconsistencies in the FEIS's economic analysis coupled with the results of the NPV evaluation strongly indicate that the proposed project is not the least environmentally damaging practicable alternative.

Table 2. Net Present Value evaluation for the twelve alternatives evaluated in the FEIS

PCS Phosphate Mine Economics Evaluation			
NET PRESENT VALUE OF EACH ALTERNATIVE			
Mine Alternatives	3% Discount Rate	7% Discount Rate	# Years of Profitable Mining
AP	$364,300,909.71	$277,903,276.63	15
EAPA	$524,097,625.97	$352,411,515.70	35
EAPB	$480,656,851.35	$328,416,387.22	27
SCRA	$322,546,488.93	$253,026,944.10	19
SCRB	$293,339,783.09	$231,303,419.79	15
ALT L	$358,954,836.17	$271,764,925.74	23
ALT M	$445,195,180.08	$321,454,432.72	26
SJAA	$346,132,934.40	$266,988,898.53	23
SJAB	$353,940,971.53	$247,989,896.39	20
S33AP	$121,250,674.62	$122,320,107.39	12
No Action	($15,417,603.86)	$7,000,403.73	5
DL1B	$211,886,850.05	$154,818,541.01	10

VI. Minimizing and Compensating for Adverse Impacts

40 CFR 230.10(d): Minimizing and Compensating for Adverse Impacts

The Guidelines require that adverse environmental impacts associated with the proposed discharge of fill material to waters of the United States first be avoided to the maximum extent practicable and then minimized to the extent appropriate and practicable. For unavoidable impacts which remain, compensatory mitigation is required to offset wetland and other aquatic resource losses. EPA and other agencies, most notably the FWS, have recommended additional measures that should be taken to minimize the impact of the mining project on avoided aquatic resources by improving the quality of the reclamation area.

EPA recommends that a topsoil cover be added to the reclaimed areas utilizing, to the extent appropriate and practicable, the topsoil removed prior to site mining. Reuse of on-site topsoil

takes advantage of the soil structure, organic matter, nutrients, and seed sources available in that material (i.e., the A Horizon) which is removed as mining operations advance. According to FWS, there is support for such an approach in the published literature (Farmer and Blue, 1978; Schuman and Power, 1981) and addition of topsoil to phosphate reclamation sites in Florida has yielded better environmental results than traditional methods. Adding approximately one foot of topsoil on average (no less than six inches) would allow the site to recover at a greatly accelerated pace in contrast to not having topsoil and would make the reclaimed area suitable for a broader array of tree species. While EPA recognizes that adequate amounts of topsoil will likely not be available to re-cover the entire reclamation area because of losses during removal and site preparation, reasonable targets for the percent of the reclamation site amended with topsoil should be established.

EPA also recommend that upland portions of the reclamation area be replanted, to the extent appropriate and practicable, in longleaf pine (*Pinus palustris)* and wetland areas be replanted in bald cypress *(Taxodium distichum)* and/or Atlantic white cedar *(Chamaecyparis thyoides)* if Atlantic white cedar is shown to do well on the reclamation sites. All three of these species will grow on low fertility sites and longleaf pine and bald cypress are long lived species that despite slow growth rates can be expected to live long enough to eventually establish moderate stand coverage even on sterile sites. These species will also produce decay resistant litter that over the very long term will rebuild soil. All of these species provide wildlife habitat and all occur naturally in monotypic stands. Reasonable targets for the percent of the reclamation site replanted with these species should be established. It should be noted that these improvements would be in addition to the already agreed-upon 3-foot site cap needed to address the cadmium risk assessment recommendations. Finally, we recommend that all avoided aquatic resources be provided permanent protection from future mining with appropriate binding real estate instruments such as conservation easements.

EPA appreciates the work that the Applicant has put into the proposed compensatory mitigation plan and the steps taken to address concerns raised by EPA during the review of the DEIS, SDEIS and FEIS. However, we continue to have a number of concerns regarding the compensatory mitigation and whether it can effectively offset the proposed impacts. We have previously described our concerns regarding the project's direct impacts to the Nationally Significant Natural Heritage Area. As previously noted, this area was designated by the NC Natural Heritage Program as "nationally significant" which means that it is one of the five best examples of this community type in the nation. In light of the very unique and rare qualities of this area, it is not clear that its attributes could be replaced by compensatory mitigation, raising concerns regarding significant degradation [40 CFR 230.10(c)].

Additionally, for impacts to other mature forested wetlands, not located in the Nationally Significant Natural Heritage Area, we continue to have concerns that the proposed compensatory mitigation will not adequately offset impacts to these systems. Plant communities drive many physical, chemical, and biological processes within wetlands such as 1) sedimentation, and, because of adsorption, nutrient retention; 2) transpiration through hydrological demand; 3) nutrient (inorganic nitrogen and phosphorous) cycling; 4) denitrification, by providing the soil conditions for the appropriate microbial communities; and 5) flood mitigation because mature communities are stable sources of hydraulic roughness. Even if proposed efforts to replace mature forested wetlands with immature restored or created wetlands are successful, the

replacement wetlands will not provide the same level of physical, chemical, and biological processes and functions as the impacted forested wetland systems for a very long time (e.g., 60 to 80 years). Offsets for impacts to mature forested wetlands through the proposed compensatory mitigation are not adequate to maintain wetland functions within the watershed. The current plan requires 2:1 compensation ratios for these impacts. EPA believes that impacts to mature forested wetlands should be offset at compensation ratios of 3:1 to better address the temporal losses associated with the replacement of this wetland type.

VII. EPA/FWS/NMFS Recommended Alternative

Although the formal permit elevation process was initiated with the Corps' February 24, 2009, letter, EPA has continued to coordinate with the Corps and the Applicant in an effort to resolve our concerns regarding the proposed project. To this end, on March 24, 2009, representatives from EPA, FWS and NMFS met with the Corps and the Applicant to discuss our continued concerns with the proposed project. At that meeting, EPA, FWS and NMFS presented a potential alternative plan for mining the site that would address the concerns raised by the agencies by avoiding and minimizing impacts to the aquatic ecosystem, consistent with the Guidelines.

Key Components of the EPA/FWS/NMFS Alternative

The EPA/FWS/NMFS proposal includes four key components:

1) Additional Aquatic Resource Avoidance: The alternative reduces impacts to wetlands from the approximately 3,953 acres of impacts associated with the proposed project down to approximately 2,787 acres of impacts.[7] As previously discussed, EPA has significant concerns regarding the proposed project's direct and indirect adverse impacts to the site's high value aquatic resources, specifically the site's Nationally Significant Natural Heritage Area as well as the site's estuaries, including those identified as Primary Nursery Areas. The additional avoidance was designed to reduce the project's direct and indirect impacts to these resources down to an acceptable level and avoid causing or contributing to significant degradation [40 CFR 230.10(c)]. It should be noted that this alternative which would allow impacts to approximately 2,787 acres of wetlands continues to be extraordinarily large, and would represent the single largest wetland fill authorized to date in the state of NC, amplifying the need to pay very close attention to the execution, monitoring and adaptive management of the project's compensatory mitigation so that the Nation's waters are not significantly degraded.

2) Protection of Avoided Aquatic Resources: The alternative provides permanent protection from mining to the site's avoided areas through the use of appropriate binding real estate instruments such as conservation easements. We are open to discussion regarding compensatory mitigation credit for the permanent protection of these avoided areas. We also note that many of the aquatic resource areas avoided under this alternative provide restoration and enhancement opportunities. We are open to discuss the Applicant's

[7] This alternative would also involve approximately 7.4 acres of impacts to other waters of the United States.

recommendations regarding the appropriate level of compensation credit for the preservation, enhancement, and/or restoration of avoided aquatic resources.

3) Improvements to Site Reclamation: The alternative includes additional measures, consistent with 40 CFR 230.10(d), to minimize the impact of the mining project on avoided aquatic resources by improving the quality of the reclamation areas. Specifically, these measures include the reuse of topsoil from mined areas to re-cover reclaimed areas to the extent appropriate and practicable and the replanting of reclaimed areas with target tree species (longleaf pine, bald cypress and/or Atlantic white cedar) that are expected to improve soil quality and habitat over the long-term (see also Section VI).

4) Improvements to Monitoring and Adaptive Management Plan: The alternative includes additional measures to improve the monitoring and adaptive management of both the mining and mitigation sites. While the footprint of the mining alternative does not extend into the Primary Nursery Areas, we are concerned that the extensive mining of wetlands and streams that serve as the headwaters of these creeks may impair the function of these Primary Nursery Areas. Accordingly, a monitoring program coupled with an adaptive management process is proposed to gauge the impacts to the Primary Nursery Areas from the mining so that appropriate adjustments can be made to mine operations. The monitoring provisions also require the establishment of an independent panel of scientists and engineers to annually evaluate whether direct and indirect impacts from mining and benefits from the compensatory mitigation are in accordance with expectations at the time of permitting.

Development of the EPA/FWS/NMFS Alternative

In the development of this alternative, we assumed that pursuant to evaluation of alternatives under the Guidelines, the basic project purpose, in this instance, is to continue mining at the Applicant's existing mining operation. Practicable alternatives are those which could meet this basic purpose and are available and capable of being done after taking into consideration cost, existing technology, and logistics.

The FEIS argues that 15 years represents an adequate planning horizon for this phosphate mining project and that an alternative is reasonable if it provides "the applicant with the certainty of practicable costs for at least 15 years" (FEIS at 2-29). From the standpoint of logistics, it would seem appropriate to limit the evaluation of alternatives pursuant to the Guidelines to those which provide at least 15 years of economically viable mining. Based on EPA's NPV analysis (see Table 2), the AP, EAPA, EAPB, SCRA, SCRB, ALT L, ALT M, SJAA, and SJAB alternatives would be considered practicable. Of these the SCRA and SCRB alternatives, which involve the same level of aquatic resource impacts, would be considered the least environmentally damaging practicable alternatives.

EPA/FWS/NMFS, however, continue to be concerned that the level of impacts associated with the SCRA and SCRB alternatives would allow an unacceptable level of 1) direct impacts to the site's Nationally Significant Natural Heritage Area and 2) indirect impacts to the site's tidal

creeks, including those identified as Primary Nursery Areas. Thus, the agencies developed a mining alternative, within the boundaries of the existing array of alternatives evaluated in the FEIS, that attempts to maximize protection of these ecologically valuable areas while continuing to ensure 15 years of economically viable mining. While we do not have precise economic data for the mining boundary proposed, since it was not specifically evaluated in the FEIS, our proposed boundary was developed based on comparing it to the economic data generated for those alternative mine plans that involved both greater and lesser mining impacts on each of the three tracts. Based on our best professional judgment, we estimate that our proposed alternative maximizes protections for high value aquatic resources, to a greater extent than either the SCRA or SCRB alternatives, while continuing to provide at least 15 years of economically viable mining, making it the apparent LEDPA.

GIS coverages illustrating our proposed mining boundaries for the NCPC and Bonnerton tracts have been provided to the Corps and the Applicant so that a detailed economic analysis can be developed. Our alternative does not alter the proposed mining boundary on the S33 tract; it continues to be the boundary associated with the Modified L Alternative.

EPA believes that this alternative, if practicable, would also address the primary concerns of those who are challenging the NCDWQ's CWA Section 401 certification of the project, and threatening litigation. The Applicant expressed a desire to review the new alternative and noted that its evaluation could take a month or longer. We believe that we cannot conclude that this alternative proposal, or a modified version of it, is not practicable until we have heard back from the Applicant.

VIII. Conclusions and Recommendations

In summary, we believe that the permit, as proposed, would fail to comply with the Guidelines for the following reasons:

1. There are less environmentally damaging practicable alternatives that meet the project purpose [40 CFR 230.10(a)];
2. The project's direct and indirect impacts to high value wetland and stream systems including areas designated as Nationally Significant Natural Heritage Areas and Primary Nursery Areas would cause or contribute to significant degradation of the Nation's waters [40 CFR 230.10(c)]; and
3. All appropriate and practicable steps have not been taken to minimize and compensate for the project's adverse impacts to waters of the United States [40 CFR 230.10(d)].

Therefore, EPA requests that the ASA (Civil Works) direct the Wilmington District to do the following: 1) in coordination with the Applicant, withdraw the NOI letter and initiate further analysis of the new proposed alternative to determine whether such alternative or a modification of it, would be practicable, and thus the "LEDPA"; **or** 2) revise the proposed permit consistent with the following: a) revise its alternatives analysis for the proposed project to address inconsistencies that bias identification of the LEDPA, b) in development of the LEDPA, avoid direct impacts to the Nationally Significant Natural Heritage Area and indirect impacts to the site's tidal creeks, including those identified as Primary Nursery Areas, to the maximum extent

practicable, c) incorporate all appropriate and practicable measures to minimize the impact of the mining project on avoided aquatic resources by improving the quality of the reclamation areas (i.e., re-using top soil and re-vegetating with target plant species), d) ensure that all avoided aquatic resources are provided permanent protection from future mining with the appropriate binding real estate instruments such as conservation easements, e) revise the compensatory mitigation plan to effectively offset impacts to mature forested wetlands and f) include measures to ensure effective monitoring and adaptive management of both the mining and mitigation sites.

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Appendix 1: EPA's Analysis of the FEIS Economic Evaluation

This appendix contains three sections. The first briefly details the U.S. Environmental Protection Agency's (EPA) primary concerns with the U.S. Army Corps of Engineers, Wilmington District's (the Corps) Economic Evaluation included in the Final Environmental Impact Statement (FEIS) for the proposed Section 404 permit to the Potash Corporation of Saskatchewan Phosphate Division (PCS or the Applicant) to expand an existing phosphate mining operation (Action ID: AID 200110096) in Beaufort County, NC. It should be noted that the Preamble (Federal Register Vol. 45 No. 249, page 85339, dated December 24, 1980) for the Clean Water Act (CWA) Section 404(b)(1) Guidelines (the Guidelines) addresses the issue of cost and economics. The Preamble makes it clear that the cost factor for purposes of practicability is in terms of what is reasonable in light of overall scope/cost of the proposed project and that it is not to be construed as an economics factor which would consider such matters as the applicant's financial standing, or investment, or market share. However, matters such as economic viability may be considered in the question of whether or not the project is available and logistically practicable. The second section describes the alternative evaluation method suggested by EPA and its results. The final section addresses the Corps' comments regarding EPA's method from its February 24, 2009, Notice of Intent (NOI) letter.

I. Concerns Regarding the Corps' FEIS Economic Evaluation

The FEIS evaluated eleven alternative mining alignments and a "No-Action" alternative. A central component of the FEIS's alternatives analysis was the evaluation of each alternative to determine if it was reasonable and feasible in light of its costs (i.e., economically viable). One of EPA's primary concerns regarding the Corps' FEIS Economic Evaluation is that the Corps intends to decide economic viability based solely on cost estimates without any consideration of the revenues the operation will bring in while incurring the costs. EPA does not contest the validity of the cost estimates produced by the Marston Cost Model (in fact all cost estimates used in the analysis done by EPA come directly from the Marston Cost Model), however consideration of expected costs without considering the accompanying expected revenue provides limited information on economic viability. For example, one cannot make any judgment on economic viability if all we know is that costs of an alternative is $1,000,000. However, we can make an informed decision if we compare the expected costs to expected revenues (i.e., revenues of less than $1,000,000 would mean the project is clearly not economically viable while revenues greater than $1,000,000 would suggest the project at least passes an initial hurdle of practicability under the Guidelines). EPA agrees with the Corps' assessment that "no or negative cash flow" is not practicable (FEIS Section 2.7.4. pg 2-22). The expected level of costs that would cause the applicant to break even would effectively set the upper cost bound for economic viability (i.e., the highest level of costs a firm could potentially endure).

As is pointed out numerous times in the FEIS, phosphate prices are determined by the (global and national) market and not influenced by the applicant's production levels. Comparing costs (which the applicant can control) to expected prices (which the firm does not control) simply adds context to the cost numbers and allows for better decision making.

A second major issue with the FEIS Economics Evaluation concerns the Corps' use of a 15 year time frame for alternative evaluation. If a project is expected to last longer than 15 years, then the entire length of the project should be included in the evaluation. No convincing reason has yet been given as to why a 37 year permit should be awarded based on evaluation of only the first 15 years of a potential project. Calculating the net present value (NPV) of each alternatives stream of future profits allows the equal comparison of different length alternatives. Evaluating only the first 15 years of a 15+ year project ignores the effects of those later years and weights the decision criteria in favor of those alternatives with the most profitable early years. In many cases, potential alternatives include higher cost mining areas in later years where they are not subject to evaluation. Their inclusion as part of the alternatives clearly signals that mining those areas is in the applicant's plans and therefore should be evaluated as part of the value of the alternative.

It is also important to note that the cost estimates presented in the FEIS do not account for any impacts the alternatives may have on recreational opportunities (hunting, fishing, bird watching, hiking, etc), unique cultural and environmental resources, and other environmental quality issues (like water quality). Degradation or loss of these types of resources has real effects on peoples' well being that have been estimated extensively in the economic literature. These losses may be partially or fully offset by mitigation undertaken, but they (as well as accounting production costs) should be considered and quantified when possible when evaluating alternatives.

II. Explanation of EPA's Analysis

The most straight forward and theoretically correct way to evaluate the economic viability of multiple alternatives of different lengths is to compare the discounted NPV of each alternative's stream of expected profits. By calculating the NPV of each alternative it is possible to compare the total value of each project in equal terms (current year dollars). An alternative with a positive NPV will add positive value to the applicant's company if undertaken and therefore demonstrates at least a minimum level of economic viability. EPA's review of the FEIS's Economic Evaluation uses expected cost and value data from the FEIS to calculate both the total NPV and the expected profit per year for every year of every alternative.

NPV analysis works by discounting future profits or losses back to the current (or any assumed baseline) year value and then summing the discounted years values to get the total current value. Discounting assumes that a dollar in the future is worth less than a

dollar today due to the time value of money and investment risk (among other things). The amount that the value of a future dollar is discounted is given by the discount rate.

Each step used in calculating the NPV of alternatives is described below.

1. Using 1991 to 2007 USGS adjusted price per ton estimates from Table 2-7 on page 6-12 of Volume 1 of the FEIS (and reproduced on pages 8 and 9 of this appendix), future value per ton is predicted using an ordinary least squares regression.

Table A1: Predicted Adjusted Price Per Ton

	Year	Intercept
Coefficient Estimate	-0.0063	27.90081
Standard error	0.12767	1.308226

The fitted line predicts that prices will be relatively constant in the future (declining less than one cent per year). The estimated price intercept and year slope term are then used to predict the adjusted price per ton out into the future for the years the alternatives are assumed to be in operation. The estimate is likely conservative based on the recent increases in prices. The predictions assume that sales from this operation do not affect the overall market price. A graphic depiction of the historic prices and fitted line is given in Figure A1.

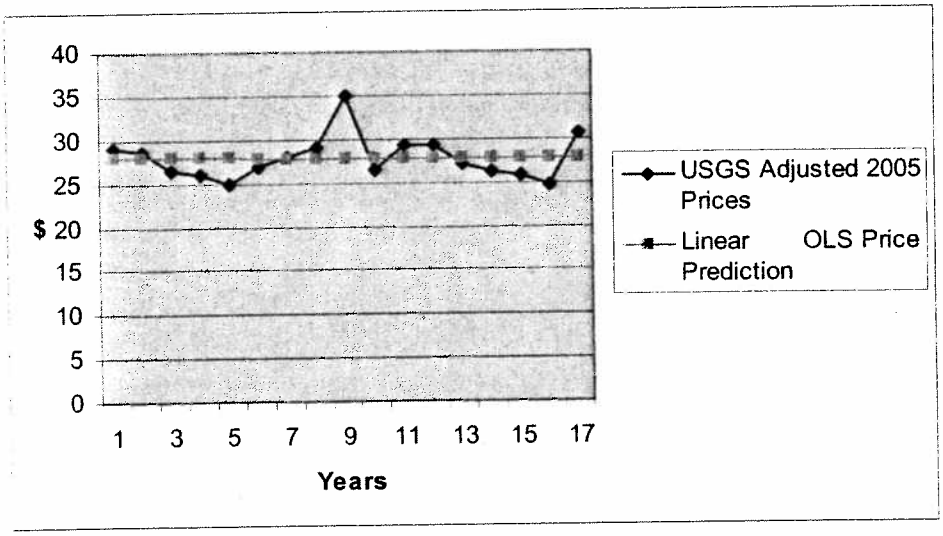


Figure A1: Historic and Predicted USGS Adjusted Prices

2. Next, the profit per ton per year for each alternative is computed. Cost per ton estimates for each year for each alternative from Table 2-6 on page 6-11 of the FEIS (and reproduced on pages 11 and 12 of this appendix) are subtracted from the value per ton per year estimates (from step 1) to get estimates of the profit per ton per year for each year for all alternatives. (Price per ton – cost per ton = profit per ton). Profit

per ton results for all years for all alternatives are presented on pages 15 and 16 of this appendix.

3. Then, total profit per year for each alternative is computed. Estimates of expected concentrated tons extracted from each alternative for each year from the tables in Appendix D of the FEIS (and reproduced on pages 13 and 14 of this appendix) are multiplied by the corresponding profit per concentrated ton for each year for each alternative (from step 2) to get estimates of total profit per year for each year for each alternative. (Profit per ton in a year * number of tons extracted in that year = total profit that year). Profit per year estimates for each alternative are presented on pages 17 and 18 of this appendix. The profit per year estimates for each alterative can also be used to understand the timing of annual profits for each alternative.

4. The net present value of the stream of annual profits over the life of each alternative is then calculated for each option. NPV is calculated

$$NPV = \sum_{t}^{T} \frac{profit_t}{(1+r)^t}$$

where t (t=1 .... T) indexes the years of an alternative, $profit_t$ is profit in year t (from step 3), and r is the discount rate. Following White House Office of Management and Budget (OMB) guidance we have used both a 3% and 7% discount rate. The NPV results are presented in Table A2.

Table A2. Net Present Value evaluation for the twelve alternatives evaluated in the FEIS

PCS Phosphate Mine Economics Evaluation			
NET PRESENT VALUE OF EACH ALTERNATIVE			
Mine Alternatives	3% Discount Rate	7% Discount Rate	# Years of Profitable Mining
AP	$364,300,909.71	$277,903,276.63	15
EAPA	$524,097,625.97	$352,411,515.70	35
EAPB	$480,656,851.35	$328,416,387.22	27
SCRA	$322,546,488.93	$253,026,944.10	19
SCRB	$293,339,783.09	$231,303,419.79	15
ALT L	$358,954,836.17	$271,764,925.74	23
ALT M	$445,195,180.08	$321,454,432.72	26
SJAA	$346,132,934.40	$266,988,898.53	23
SJAB	$353,940,971.53	$247,989,896.39	20
S33AP	$121,250,674.62	$122,320,107.39	12
No Action	($15,417,603.86)	$7,000,403.73	5
DL1B	$211,886,850.05	$154,818,541.01	10

The results of the NPV analysis, presented in Table A2, highlight that contrary to the conclusions drawn in the FEIS, many of the alternatives evaluated in the FEIS are indeed economically viable and should not have been eliminated from further consideration.

According to the FEIS, an alternative is reasonable if it provides "the applicant with the certainty of practicable costs for at least 15 years" (FEIS 2-29). Assuming this criterion is appropriate for use in determining whether an alternative is available and logistically practicable under the Guidelines, only the "No Action" and the S33AP and DL1B alternatives should have been eliminated from further consideration since they are the only three alternatives that do not provide at least 15 years of economically viable mining. If the 15 year criterion is not relevant for purposes of evaluating alternatives under the Guidelines and is not used, even the S33AP and DL1B options have a positive net present value and would be a better use of the land for the applicant than letting it remain unused. Discounted annual profit estimates for each alternative are presented on pages 20 through 23 of this appendix.

A number of the alternatives that are economically viable, based on the NPV analysis, involve far fewer impacts to aquatic resources than the FEIS's Alternative L or the proposed project (Modified Alternative L). EPA finds that the inconsistencies in the FEIS's economic analysis coupled with the results of the NPV evaluation strongly indicate that the proposed project is not the least environmentally damaging practicable alternative.

In order to check the sensitivity of results to the price estimate, the NPV of all alternatives was also calculated assuming both a 10% increase and decrease in predicted prices every year.[1] When predicted prices are assumed to decrease by 10% every year the S33AP, DL1B, and No Action alternatives do have negative NPV's, however all the other remaining alternatives do have positive NPV's signaling that even with depressed prices and profits a number of alternatives with fewer impacts to aquatic resources than the FEIS's Alternative L are still economically viable. If prices are assumed to increase 10% over predicted prices for all years then all alternatives have positive NPV's. The sensitivity results are presented below in Table A3.

[1] The 1991 to 2007 USGS adjusted price data used to estimate future prices had a standard deviation of roughly $2.50 or 10% of the sample's mean value.

Table A3. Net Present Value Sensativity to Price Estimation Analysis

PCS Phosphate Mine Economics Evaluation				
NET PRESENT VALUE OF EACH ALTERNATIVE				
	10% Decrease in Mean Predicted USGS Prices		10% Increase in Mean Predicted USGS Prices	
Mine Alternatives	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
AP	$199,692,806	$152,096,957	$528,909,013	$403,709,596
EAPA	$172,703,927	$161,903,126	$875,491,325	$542,919,905
EAPB	$129,263,152	$137,907,998	$832,050,551	$518,924,777
SCRA	$41,554,309	$78,150,857	$603,538,668	$427,903,032
SCRB	$12,347,604	$56,427,332	$574,331,963	$406,179,507
ALT L	$53,061,028	$90,235,035	$664,848,644	$453,294,816
ALT M	$125,184,502	$136,707,141	$765,205,858	$506,201,725
SJAA	$11,528,380	$79,332,534	$680,737,489	$454,645,263
SJAB	$19,334,672	$60,332,773	$688,547,271	$435,647,019
S33AP	($119,099,609)	($38,885,328)	$361,600,958	$283,525,543
No Action	($173,111,811)	($114,811,873)	$142,276,603	$128,812,681
DL1B	($148,326,103)	($10,593,356)	$572,099,803	$320,230,438

III. Responses to the Corps NOI letter:

- **The Corps**: "The Corps has also concluded that comparison of these cost estimates to an independently generated industry estimate of product value (the USGS value) is the most appropriate gauge available for determining cost practicability."

  Response: EPA analysis does compare the Marston Cost model estimates to USGS value estimates. Costs are predicted by the Marston Model and historic USGS estimates are used to extrapolate future values. EPA analysis then looks at the difference between expected costs and revenues to give a measure of economic viability. To our knowledge, the Corps and/or Applicant's analysis have never directly compared costs to product value.

- **The Corps**: "Finally, the Corps has determined that alternatives that give the applicant approximately 15 years of operation within the less costly Tracts (NCPC and Bonnerton) are practicable while alternatives that would require mining within the S33 Tract within the initial approximately 15 years are not practicable."

  Response: It is still unclear (and unjustified) why the Corps has determined that a 15 year time frame should be used in aspects of the decision making. EPA's NPV analysis demonstrates that a number of alternatives that do not provide 15 years of operation in NCPC and Bonnerton and require mining within S33 are economically viable and practicable, including SCRA and SCRB. Further, if a project is expected to last longer than 15 years, then the entire length of the

project should be included in the evaluation. For all mining alternatives except AP, SCRB, S33AP and DL1B, roughly the first 20 years have positive expected profits. In the case of S33AP the first 12 years have positive expected profits and in the case of the DL1B the first 10 years have positive profits. Net present value methods allow comparison of projects of different lengths in equal terms (current year dollars) and therefore would allow full evaluation of alternatives.

- **The Corps**: "The NPV arguments presented to the USACE were largely cash flow analyses (i.e., sales less cost) and should not be confused with final income statements or profits."

  Response: Sales price less cost (on a per unit basis or in terms of totals) equals profit. EPA only used terms like sales minus costs because the Corps was resistant to the word profit. Further, two sentences later the Corps states: "Using this total NPV for each alternative suggests that practically all of the alternatives can yield profitable results over the period of the life of the mine." This sentence seems to admit/agree that the NPV analysis looks at profitability which contradicts the Corps' earlier statement.

- **The Corps**: "The problem with this approach is that it obviously does not allow consideration of costs on an annual basis. In this case we are considering a private enterprise, costs extended over very long periods of time, and costs which fluctuate substantially over the years. Regardless of the analysis used, it is clear that while many years of mining are likely to be profitable under most of the alternatives, there are also many consecutive years in which mining is likely not to be cost effective."

  Response: One of the strengths of the EPA approach is that is does allow consideration of costs on a yearly basis. Annual costs, expected revenues, and profits are all calculated as part of the analysis. The summed value of annual discounted profit estimates (the NPV) gives an overall value of an alternative, but simply looking at the discounted yearly estimates (before summing) shows how costs and revenues are fluctuating each year.

  The timing and sequence of profits is something that should be considered in evaluation options. As stated earlier, the first 15 to 20 years of all mining alternatives except the S33AP and DL1B have positive profits (S33AP has positive profits for the first 12 and DL1B has positive profits for the first 10 years).

PREDICTED VALUE PER TON: (USGS adjusted price per ton estimates from Table 2-7 on page 6-12 of Volume 1 of the FEIS)**:**

YEAR	USGS Adjusted 2005 Prices	Renumbered Years	Linear OLS Price Prediction
1991	29.16	1	27.8945098
1992	28.56	2	27.88821078
1993	26.49	3	27.88191176
1994	26.03	4	27.87561275
1995	24.83	5	27.86931373
1996	26.91	6	27.86301471
1997	28.08	7	27.85671569
1998	29.02	8	27.85041667
1999	34.91	9	27.84411765
2000	26.38	10	27.83781863
2001	29.24	11	27.83151961
2002	29.21	12	27.82522059
2003	27.16	13	27.81892157
2004	26.26	14	27.81262255
2005	25.88	15	27.80632353
2006	24.6	16	27.80002451
2007	30.63	17	27.79372549
2008		18	27.78742647
2009		19	27.78112745
2010		20	27.77482843
2011		21	27.76852941
2012		22	27.76223039
2013		23	27.75593137
2014		24	27.74963235
2015		25	27.74333333
2016		26	27.73703431
2017		27	27.73073529
2018		28	27.72443627
2019		29	27.71813725
2020		30	27.71183824
2021		31	27.70553922
2022		32	27.6992402
2023		33	27.69294118
2024		34	27.68664216
2025		35	27.68034314
2026		36	27.67404412
2027		37	27.6677451
2028		38	27.66144608
2029		39	27.65514706
2030		40	27.64884804
2031		41	27.64254902
2032		42	27.63625
2033		43	27.62995098
2034		44	27.62365196

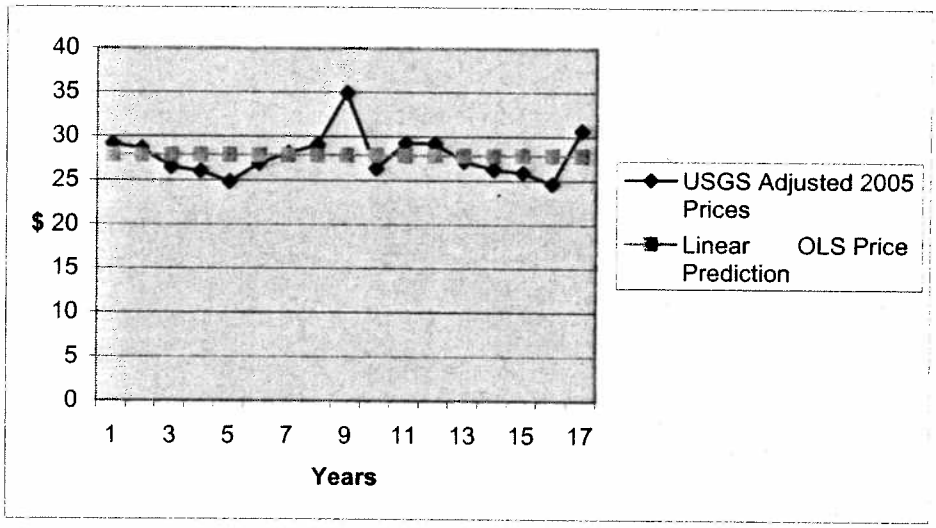
2035	45	27.61735294
2036	46	27.61105392
2037	47	27.6047549
2038	48	27.59845588
2039	49	27.59215686
2040	50	27.58585784
2041	51	27.57955882
2042	52	27.5732598
2043	53	27.56696078
2044	54	27.56066176
2045	55	27.55436275
2046	56	27.54806373
2047	57	27.54176471
2048	58	27.53546569
2049	59	27.52916667
2050	60	27.52286765
2051	61	27.51656863
2052	62	27.51026961
2053	63	27.50397059
2054	64	27.49767157
2055	65	27.49137255
2056	66	27.48507353
2057	67	27.47877451
2058	68	27.47247549
2059	69	27.46617647
2060	70	27.45987745
2061	71	27.45357843
2062	72	27.44727941
2063	73	27.44098039
2064	74	27.43468137
2065	75	27.42838235

OLS REGRESSION RESULTS: (Using USGS adjusted 2005 prices and Year from Predicted value per ton pages)

Linear

	Year	Intercept
Coefficient Estimate	-0.0063	27.90081
Standard error	0.12767	1.308226
	0.000162	2.578804
	0.002434	15
	0.016188	99.75342

*** Based on the data from 1991 through 2007, I have used a simple trend to predict future USGS Adjusted Prices into the future through the year 2065. These are likely conservative estimates since the recent phosphate prices seem to be rising.**



PREDICTED COST PER TON: (from Table 2-6 on page 6-11 of the FEIS)

YEAR	AP	EAPA	EAPB	SCRA	SCRB	ALT L	ALT M	SJAA
1	19.83	19.83	19.83	22.11	22.11	22.11	20.78	21.97
2	22.06	22.06	22.06	21.53	21.53	21.53	20.83	22.75
3	22.58	22.58	22.58	22.15	22.15	22.15	21.18	22.79
4	22.44	22.44	22.44	23.7	23.7	23.7	22.84	23.93
5	21.42	21.42	21.42	20.73	20.73	20.73	23.03	21.89
6	22.65	22.65	22.65	21.32	21.32	21.32	20.96	21.86
7	21.95	21.95	21.95	22.12	22.03	22.23	21.46	21.95
8	22	22	22	22.75	22.86	22.28	21.3	21.79
9	22.07	22.07	22.07	21.86	22.02	21.14	20.88	20.69
10	20.98	20.98	20.98	22.86	22	21.88	21.81	21.75
11	20.83	20.83	20.83	24.65	22.28	23.22	20.96	22.28
12	20.94	20.94	20.94	24.78	24.31	26.25	22.57	23.63
13	21	21	21	22.28	23.71	24.71	21.29	24.32
14	21.17	21.43	21.39	22.65	23.5	23.43	22.2	25.17
15	21.96	21.67	21.37	22.46	26.99	23.72	23.83	24.35
16		22.67	23.43	24.36	30.32	23.13	26.13	22.57
17		21.66	22.18	23.3	27.06	22.8	25.07	23.42
18		22.4	22.33	23.16	27.45	22.69	22.96	22.58
19		22.17	22.96	25.04	28.58	23.8	23.73	22.59
20		24.85	23.79	29.25	28.85	24.96	23.16	24.48
21		24.37	23.3	29.09	29.1	23.61	22.82	23.51
22		24.28	23.46	27.65	29.15	23.25	22.63	23.75
23		22.6	24.98	27.85	28.13	27.44	23.91	23.76
24		24.06	27.4	28.9	29.51	29.62	24.94	28.75
25		22.3	27.36	28.39	28.19	27.52	23.46	27.82
26		22.64	26.81	28.71	29.29	27.78	24.01	27.73
27		23.06	26.75	29.85	29.44	26.14	27.82	27.41
28		24.09	28.91	29.09	26.94	30.34	29.28	29.76
29		23.77	29.48	28.04	23.98	29.2	27.59	29.46
30		23.19	28.61	29.32	24.18	28.63	27.63	28.78
31		24.53	28.32	28.86	25.03	30.21	26.51	30.58
32		26.41	28.28	31.38	26.9	29.47	30.68	30.02
33		27.25	29.31			28.88	28.88	28.98
34		26.18	28.55			28.2	28.91	27.67
35		26.79	29.91			29.35	30.48	29.37
36		27.63	28.96			28.46	28.83	29.51
37		28.77	28.1			30.43	28.92	31.04
38		30.05	28.97				28.12	28.68
39		28.5	29.51				29.31	28.91
40		28.52	29.04				28.64	27.6
41		28.33	24.53				30.92	29.3
42		29.88	23.37					29.44
43		28.45	23.58					30.97
44		30.13	23.74					28.61
45		28.23	23.59					
46		28.62	24.63					
47		28.8	24.94					
48		30.49	23.67					
49		28.72	23.33					
50								

YEAR	SJAB	S33AP	No Action	DL1B
1	21.97	22.02	23.63	22.62
2	22.75	22.21	23.43	22.02
3	22.79	22.11	23.83	22.23
4	23.93	23.87	26.8	22.91
5	21.89	23.24	27.67	22.07
6	21.86	22.5	29.22	22.56
7	21.95	23.98	28.18	23.41
8	21.79	25.98	29.87	24
9	20.6	26.96	30.16	23.25
10	22.21	26.63	29.36	27.47
11	22.29	26.78	29.36	29.58
12	23.25	27.2	29.45	28.24
13	23.42	28.62	31.3	27.7
14	23.17	29.67	32.96	28.64
15	23.63	28.82	35.15	27.95
16	25.01	29.41		30.05
17	28.04	27.88		29.27
18	27.36	29.78		28.11
19	27.65	28.32		28.81
20	27.02	30.81		29.09
21	29.22	28.17		29.17
22	29.28	28.5		29.62
23	29	28.89		25.47
24	31.49	30.44		24.6
25	28.73	29.08		23.84
26	28.9			25.37
27	27.84			25.47
28	30.04			
29	29.13			
30	30.46			
31	26.77			
32	23.93			
33	24.37			
34	24.25			
35	24.65			
36	25.81			
37	24.01			
38	23.77			
39	23.87			
40	23.75			
41	24.15			
42	25.31			
43	23.51			
44	23.27			
45				
46				
47				
48				
49				
50				

EXTRACTED CONCENTRATE TONS PER YEAR: (from the tables in Appendix D of the FEIS)

YEAR	AP	EAPA	EAPB	SCRA	SCRB	ALT L	ALT M	SJAA
1	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
2	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
3	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
4	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
5	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
6	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
7	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
8	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
9	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
10	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
11	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
12	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
13	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
14	5000000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
15	4431000	5000000	5000000	5000000	5000000	5000000	5000000	5000000
16		5000000	5000000	5000000	5000000	5000000	5000000	5000000
17		5000000	5000000	5000000	5000000	5000000	5000000	5000000
18		5000000	5000000	5000000	5000000	5000000	5000000	5000000
19		5000000	5000000	5000000	5000000	5000000	5000000	5000000
20		5000000	5000000	5000000	5000000	5000000	5000000	5000000
21		5000000	5000000	5000000	5000000	5000000	5000000	5000000
22		5000000	5000000	5000000	5000000	5000000	5000000	5000000
23		5000000	5000000	5000000	5000000	5000000	5000000	5000000
24		5000000	5000000	5000000	5000000	5000000	5000000	5000000
25		5000000	5000000	5000000	5000000	5000000	5000000	5000000
26		5000000	5000000	5000000	5000000	5000000	5000000	5000000
27		5000000	5000000	5000000	5000000	5000000	5000000	5000000
28		5000000	5000000	5000000	5000000	5000000	5000000	5000000
29		5000000	5000000	5000000	5000000	5000000	5000000	5000000
30		5000000	5000000	5000000	5000000	5000000	5000000	5000000
31		5000000	5000000	5000000	5000000	5000000	5000000	5000000
32		5000000	5000000	3649000	3649000	5000000	5000000	5000000
33		5000000	5000000			5000000	5000000	5000000
34		5000000	5000000			5000000	5000000	5000000
35		5000000	5000000			5000000	5000000	5000000
36		5000000	5000000			5000000	5000000	5000000
37		5000000	5000000			3846000	5000000	5000000
38		5000000	5000000				5000000	5000000
39		5000000	5000000				5000000	5000000
40		5000000	5000000				5000000	5000000
41		5000000	5000000				2902000	5000000
42		5000000	5000000					5000000
43		5000000	5000000					4923000
44		5000000	5000000					3626000
45		5000000	5000000					
46		5000000	5000000					
47		5000000	5000000					
48		5000000	5000000					
49		2754000	2754000					
50								

YEAR	SJAB	S33AP	No Action	DL1B
1	5000000	5000000	5000000	5000000
2	5000000	5000000	5000000	5000000
3	5000000	5000000	5000000	5000000
4	5000000	5000000	5000000	5000000
5	5000000	5000000	5000000	5000000
6	5000000	5000000	5000000	5000000
7	5000000	5000000	5000000	5000000
8	5000000	5000000	5000000	5000000
9	5000000	5000000	5000000	5000000
10	5000000	5000000	5000000	5000000
11	5000000	5000000	5000000	5000000
12	5000000	5000000	5000000	5000000
13	5000000	5000000	4578000	5000000
14	5000000	5000000	3648000	5000000
15	5000000	5000000	2383000	5000000
16	5000000	5000000		5000000
17	5000000	5000000		5000000
18	5000000	5000000		5000000
19	5000000	5000000		5000000
20	5000000	5000000		5000000
21	5000000	5000000		5000000
22	5000000	5000000		5000000
23	5000000	5000000		5000000
24	5000000	5000000		5000000
25	5000000	4236000		5000000
26	5000000			5000000
27	5000000			3236000
28	5000000			
29	5000000			
30	5000000			
31	5000000			
32	5000000			
33	5000000			
34	5000000			
35	5000000			
36	5000000			
37	5000000			
38	5000000			
39	5000000			
40	5000000			
41	5000000			
42	5000000			
43	5000000			
44	3549000			
45				
46				
47				
48				
49				
50				

Total Tons Removed	
AP	74431000
EAPA	242754000
EAPB	242754000
SCRA	158649000
SCRB	158649000
ALT L	183846000
ALT M	202902000
SJAA	218549000
SJAB	218549000
S33AP	124236000
No Action	70609000
DL1B	133236000

PROFIT PER TON: (Expected Price Per Ton – Predicted Cost Per Ton for every year for every alternative)

YEAR	AP	EAPA	EAPB	SCRA	SCRB	ALT L	ALT M
1	7.957426	7.957426	7.957426	5.677426	5.677426	5.677426	7.007426
2	5.721127	5.721127	5.721127	6.251127	6.251127	6.251127	6.951127
3	5.194828	5.194828	5.194828	5.624828	5.624828	5.624828	6.594828
4	5.328529	5.328529	5.328529	4.068529	4.068529	4.068529	4.928529
5	6.34223	6.34223	6.34223	7.03223	7.03223	7.03223	4.73223
6	5.105931	5.105931	5.105931	6.435931	6.435931	6.435931	6.795931
7	5.799632	5.799632	5.799632	5.629632	5.719632	5.519632	6.289632
8	5.743333	5.743333	5.743333	4.993333	4.883333	5.463333	6.443333
9	5.667034	5.667034	5.667034	5.877034	5.717034	6.597034	6.857034
10	6.750735	6.750735	6.750735	4.870735	5.730735	5.850735	5.920735
11	6.894436	6.894436	6.894436	3.074436	5.444436	4.504436	6.764436
12	6.778137	6.778137	6.778137	2.938137	3.408137	1.468137	5.148137
13	6.711838	6.711838	6.711838	5.431838	4.001838	3.001838	6.421838
14	6.535539	6.275539	6.315539	5.055539	4.205539	4.275539	5.505539
15	5.73924	6.02924	6.32924	5.23924	0.70924	3.97924	3.86924
16		5.022941	4.262941	3.332941	-2.62706	4.562941	1.562941
17		6.026642	5.506642	4.386642	0.626642	4.886642	2.616642
18		5.280343	5.350343	4.520343	0.230343	4.990343	4.720343
19		5.504044	4.714044	2.634044	-0.90596	3.874044	3.944044
20		2.817745	3.877745	-1.58225	-1.18225	2.707745	4.507745
21		3.291446	4.361446	-1.42855	-1.43855	4.051446	4.841446
22		3.375147	4.195147	0.005147	-1.49485	4.405147	5.025147
23		5.048848	2.668848	-0.20115	-0.48115	0.208848	3.738848
24		3.582549	0.242549	-1.25745	-1.86745	-1.97745	2.702549
25		5.33625	0.27625	-0.75375	-0.55375	0.11625	4.17625
26		4.989951	0.819951	-1.08005	-1.66005	-0.15005	3.619951
27		4.563652	0.873652	-2.22635	-1.81635	1.483652	-0.19635
28		3.527353	-1.29265	-1.47265	0.677353	-2.72265	-1.66265
29		3.841054	-1.86895	-0.42895	3.631054	-1.58895	0.021054
30		4.414755	-1.00525	-1.71525	3.424755	-1.02525	-0.02525
31		3.068456	-0.72154	-1.26154	2.568456	-2.61154	1.088456
32		1.182157	-0.68784	-3.78784	0.692157	-1.87784	-3.08784
33		0.335858	-1.72414			-1.29414	-1.29414
34		1.399559	-0.97044			-0.62044	-1.33044
35		0.78326	-2.33674			-1.77674	-2.90674
36		-0.06304	-1.39304			-0.89304	-1.26304
37		-1.20934	-0.53934			-2.86934	-1.35934
38		-2.49564	-1.41564				-0.56564
39		-0.95194	-1.96194				-1.76194
40		-0.97824	-1.49824				-1.09824
41		-0.79453	3.005466				-3.38453
42		-2.35083	4.159167				
43		-0.92713	3.942868				
44		-2.61343	3.776569				
45		-0.71973	3.92027				
46		-1.11603	2.873971				
47		-1.30233	2.557672				
48		-2.99863	3.821373				
49		-1.23493	4.155074				
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YEAR	SJAA	SJAB	S33AP	No Action	DL1B
1	5.817426	5.817426	5.767426	4.157426	5.167426
2	5.031127	5.031127	5.571127	4.351127	5.761127
3	4.984828	4.984828	5.664828	3.944828	5.544828
4	3.838529	3.838529	3.898529	0.968529	4.858529
5	5.87223	5.87223	4.52223	0.09223	5.69223
6	5.895931	5.895931	5.255931	-1.46407	5.195931
7	5.799632	5.799632	3.769632	-0.43037	4.339632
8	5.953333	5.953333	1.763333	-2.12667	3.743333
9	7.047034	7.137034	0.777034	-2.42297	4.487034
10	5.980735	5.520735	1.100735	-1.62926	0.260735
11	5.444436	5.434436	0.944436	-1.63556	-1.85556
12	4.088137	4.468137	0.518137	-1.73186	-0.52186
13	3.391838	4.291838	-0.90816	-3.58816	0.011838
14	2.535539	4.535539	-1.96446	-5.25446	-0.93446
15	3.34924	4.06924	-1.12076	-7.45076	-0.25076
16	5.122941	2.682941	-1.71706		-2.35706
17	4.266642	-0.35336	-0.19336		-1.58336
18	5.100343	0.320343	-2.09966		-0.42966
19	5.084044	0.024044	-0.64596		-1.13596
20	3.187745	0.647745	-3.14225		-1.42225
21	4.151446	-1.55855	-0.50855		-1.50855
22	3.905147	-1.62485	-0.84485		-1.96485
23	3.888848	-1.35115	-1.24115		2.178848
24	-1.10745	-3.84745	-2.79745		3.042549
25	-0.18375	-1.09375	-1.44375		3.79625
26	-0.10005	-1.27005			2.259951
27	0.213652	-0.21635			2.153652
28	-2.14265	-2.42265			
29	-1.84895	-1.51895			
30	-1.17525	-2.85525			
31	-2.98154	0.828456			
32	-2.42784	3.662157			
33	-1.39414	3.215858			
34	-0.09044	3.329559			
35	-1.79674	2.92326			
36	-1.94304	1.756961			
37	-3.47934	3.550662			
38	-1.12564	3.784363			
39	-1.36194	3.678064			
40	-0.05824	3.791765			
41	-1.76453	3.385466			
42	-1.91083	2.219167			
43	-3.44713	4.012868			
44	-1.09343	4.246569			
45					
46					
47					
48					
49					
50					

PROFIT PER YEAR: (Profit Per Ton multiplied by Extracted Concentrate Tons Per Year for every year for every alternative)

YEAR	AP	EAPA	EAPB	SCRA	SCRB	ALT L
1	39787132.35	39787132.35	39787132.35	28387132.35	28387132.35	28387132.35
2	28605637.25	28605637.25	28605637.25	31255637.25	31255637.25	31255637.25
3	25974142.16	25974142.16	25974142.16	28124142.16	28124142.16	28124142.16
4	26642647.06	26642647.06	26642647.06	20342647.06	20342647.06	20342647.06
5	31711151.96	31711151.96	31711151.96	35161151.96	35161151.96	35161151.96
6	25529656.86	25529656.86	25529656.86	32179656.86	32179656.86	32179656.86
7	28998161.76	28998161.76	28998161.76	28148161.76	28598161.76	27598161.76
8	28716666.67	28716666.67	28716666.67	24966666.67	24416666.67	27316666.67
9	28335171.57	28335171.57	28335171.57	29385171.57	28585171.57	32985171.57
10	33753676.47	33753676.47	33753676.47	24353676.47	28653676.47	29253676.47
11	34472181.37	34472181.37	34472181.37	15372181.37	27222181.37	22522181.37
12	33890686.27	33890686.27	33890686.27	14690686.27	17040686.27	7340686.27
13	33559191.18	33559191.18	33559191.18	27159191.18	20009191.18	15009191.18
14	32677696.08	31377696.08	31577696.08	25277696.08	21027696.08	21377696.08
15	25430573.31	30146200.98	31646200.98	26196200.98	3546200.98	19896200.98
16		25114705.88	21314705.88	16664705.88	-13135294.12	22814705.88
17		30133210.78	27533210.78	21933210.78	3133210.78	24433210.78
18		26401715.69	26751715.69	22601715.69	1151715.69	24951715.69
19		27520220.59	23570220.59	13170220.59	-4529779.41	19370220.59
20		14088725.49	19388725.49	-7911274.51	-5911274.51	13538725.49
21		16457230.39	21807230.39	-7142769.61	-7192769.61	20257230.39
22		16875735.29	20975735.29	25735.29	-7474264.71	22025735.29
23		25244240.20	13344240.20	-1005759.80	-2405759.80	1044240.20
24		17912745.10	1212745.10	-6287254.90	-9337254.90	-9887254.90
25		26681250.00	1381250.00	-3768750.00	-2768750.00	581250.00
26		24949754.90	4099754.90	-5400245.10	-8300245.10	-750245.10
27		22818259.80	4368259.80	-11131740.20	-9081740.20	7418259.80
28		17636764.71	-6463235.29	-7363235.29	3386764.71	-13613235.29
29		19205269.61	-9344730.39	-2144730.39	18155269.61	-7944730.39
30		22073774.51	-5026225.49	-8576225.49	17123774.51	-5126225.49
31		15342279.41	-3607720.59	-6307720.59	12842279.41	-13057720.59
32		5910784.31	-3439215.69	-13821839.61	2525680.39	-9389215.69
33		1679289.22	-8620710.78			-6470710.78
34		6997794.12	-4852205.88			-3102205.88
35		3916299.02	-11683700.98			-8883700.98
36		-315196.08	-6965196.08			-4465196.08
37		-6046691.18	-2696691.18			-11035474.85
38		-12478186.27	-7078186.27			
39		-4759681.37	-9809681.37			
40		-4891176.47	-7491176.47			
41		-3972671.57	15027328.43			
42		-11754166.67	20795833.33			
43		-4635661.76	19714338.24			
44		-13067156.86	18882843.14			
45		-3598651.96	19601348.04			
46		-5580147.06	14369852.94			
47		-6511642.16	12788357.84			
48		-14993137.25	19106862.75			
49		-3400987.50	11443072.50			
50						

YEAR	ALT M	SJAA	SJAB	S33AP	No Action	DL1B
1	35037132.35	29087132.35	29087132.35	28837132.35	20787132.35	25837132.35
2	34755637.25	25155637.25	25155637.25	27855637.25	21755637.25	28805637.25
3	32974142.16	24924142.16	24924142.16	28324142.16	19724142.16	27724142.16
4	24642647.06	19192647.06	19192647.06	19492647.06	4842647.06	24292647.06
5	23661151.96	29361151.96	29361151.96	22611151.96	461151.96	28461151.96
6	33979656.86	29479656.86	29479656.86	26279656.86	-7320343.14	25979656.86
7	31448161.76	28998161.76	28998161.76	18848161.76	-2151838.24	21698161.76
8	32216666.67	29766666.67	29766666.67	8816666.67	-10633333.33	18716666.67
9	34285171.57	35235171.57	35685171.57	3885171.57	-12114828.43	22435171.57
10	29603676.47	29903676.47	27603676.47	5503676.47	-8146323.53	1303676.47
11	33822181.37	27222181.37	27172181.37	4722181.37	-8177818.63	-9277818.63
12	25740686.27	20440686.27	22340686.27	2590686.27	-8659313.73	-2609313.73
13	32109191.18	16959191.18	21459191.18	-4540808.82	-16426604.56	59191.18
14	27527696.08	12677696.08	22677696.08	-9822303.92	-19168272.94	-4672303.92
15	19346200.98	16746200.98	20346200.98	-5603799.02	-17755160.61	-1253799.02
16	7814705.88	25614705.88	13414705.88	-8585294.12		-11785294.12
17	13083210.78	21333210.78	-1766789.22	-966789.22		-7916789.22
18	23601715.69	25501715.69	1601715.69	-10498284.31		-2148284.31
19	19720220.59	25420220.59	120220.59	-3229779.41		-5679779.41
20	22538725.49	15938725.49	3238725.49	-15711274.51		-7111274.51
21	24207230.39	20757230.39	-7792769.61	-2542769.61		-7542769.61
22	25125735.29	19525735.29	-8124264.71	-4224264.71		-9824264.71
23	18694240.20	19444240.20	-6755759.80	-6205759.80		10894240.20
24	13512745.10	-5537254.90	-19237254.90	-13987254.90		15212745.10
25	20881250.00	-918750.00	-5468750.00	-6115725.00		18981250.00
26	18099754.90	-500245.10	-6350245.10			11299754.90
27	-981740.20	1068259.80	-1081740.20			6969217.75
28	-8313235.29	-10713235.29	-12113235.29			
29	105269.61	-9244730.39	-7594730.39			
30	-126225.49	-5876225.49	-14276225.49			
31	5442279.41	-14907720.59	4142279.41			
32	-15439215.69	-12139215.69	18310784.31			
33	-6470710.78	-6970710.78	16079289.22			
34	-6652205.88	-452205.88	16647794.12			
35	-14533700.98	-8983700.98	14616299.02			
36	-6315196.08	-9715196.08	8784803.92			
37	-6796691.18	-17396691.18	17753308.82			
38	-2828186.27	-5628186.27	18921813.73			
39	-8809681.37	-6809681.37	18390318.63			
40	-5491176.47	-291176.47	18958823.53			
41	-9821918.58	-8822671.57	16927328.43			
42		-9554166.67	11095833.33			
43		-16970232.57	20064338.24			
44		-3964782.16	15071072.06			
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DISCOUNTED RATES AND TOTAL NET PRESENT VALUE OF ALTERNATIVES:

YEAR	3% Discount rate	7% Discount Rate
1	0.97087379	0.93457944
2	0.94259591	0.87343873
3	0.91514166	0.81629788
4	0.88848705	0.76289521
5	0.86260878	0.71298618
6	0.83748426	0.66634222
7	0.81309151	0.62274974
8	0.78940923	0.5820091
9	0.76641673	0.54393374
10	0.74409391	0.50834929
11	0.72242128	0.4750928
12	0.70137988	0.44401196
13	0.68095134	0.41496445
14	0.66111781	0.38781724
15	0.64186195	0.36244602
16	0.62316694	0.3387346
17	0.60501645	0.31657439
18	0.58739461	0.29586392
19	0.57028603	0.27650833
20	0.55367575	0.258419
21	0.53754928	0.24151309
22	0.5218925	0.22571317
23	0.50669175	0.21094688
24	0.49193374	0.19714662
25	0.47760557	0.18424918
26	0.46369473	0.17219549
27	0.45018906	0.16093037
28	0.43707675	0.15040221
29	0.42434636	0.14056282
30	0.41198676	0.13136712
31	0.39998715	0.12277301
32	0.38833703	0.11474113
33	0.37702625	0.1072347
34	0.3660449	0.10021934
35	0.3553834	0.09366294
36	0.34503243	0.08753546
37	0.33498294	0.08180884
38	0.32522615	0.07645686
39	0.31575355	0.07145501
40	0.30655684	0.06678038
41	0.297628	0.06241157
42	0.28895922	0.05832857
43	0.28054294	0.05451268
44	0.27237178	0.05094643
45	0.26443862	0.04761349
46	0.25673653	0.04449859
47	0.24925876	0.04158747
48	0.2419988	0.03886679
49	0.23495029	0.0363241
50	0.22810708	0.03394776

NET PRESENT VALUE OF EACH ALT

	3%	7%
AP	$364,300,910	$277,903,277
EAPA	$524,097,626	$352,411,516
EAPB	$480,656,851	$328,416,387
SCRA	$322,546,489	$253,026,944
SCRB	$293,339,783	$231,303,420
ALT L	$358,954,836	$271,764,926
ALT M	$445,195,180	$321,454,433
SJAA	$346,132,934	$266,988,899
SJAB	$353,940,972	$247,989,896
S33AP	$121,250,675	$122,320,107
No Action	($15,417,604)	$7,000,404
DL1B	$211,886,850	$154,818,541

RANKED NET PRESENT VALUE OF EACH ALT

	3%	7%
EAPA	$524,097,626	$352,411,516
EAPB	$480,656,851	$328,416,387
ALT M	$445,195,180	$321,454,433
AP	$364,300,910	$277,903,277
ALT L	$358,954,836	$271,764,926
SJAB	$353,940,972	$247,989,896
SJAA	$346,132,934	$266,988,899
SCRA	$322,546,489	$253,026,944
SCRB	$293,339,783	$231,303,420
DL1B	$211,886,850	$154,818,541
S33AP	$121,250,675	$122,320,107
No Action	-$15,417,604	$7,000,404

DISCOUNTED ANNUAL PROFITS FOR EACH ALTERNATIVE

YEAR	AP -- 3%	AP -- 7%	EAPA -- 3%	EAPA -- 7%	EAPB -- 3%	EAPB -- 7%	SCRA -- 3%
1	38628283.84	37184235.84	38628283.84	37184235.84	38628283.84	37184235.84	27560322.67
2	26963556.65	24985271.43	26963556.65	24985271.43	26963556.65	24985271.43	29461435.81
3	23770019.55	21202637.1	23770019.55	21202637.1	23770019.55	21202637.1	25737574.12
4	23671646.83	20325547.88	23671646.83	20325547.88	23671646.83	20325547.88	18074178.43
5	27354318.24	22609613.08	27354318.24	22609613.08	27354318.24	22609613.08	30330318.55
6	21380685.7	17011488.33	21380685.7	17011488.33	21380685.7	17011488.33	26949956.01
7	23578159.18	18058597.75	23578159.18	18058597.75	23578159.18	18058597.75	22887031.39
8	22669201.85	16713361.45	22669201.85	16713361.45	22669201.85	16713361.45	19708917.22
9	21716549.6	15412455.92	21716549.6	15412455.92	21716549.6	15412455.92	22521287.17
10	25115905.27	17158657.54	25115905.27	17158657.54	25115905.27	17158657.54	18121422.47
11	24903437.27	16377485.05	24903437.27	16377485.05	24903437.27	16377485.05	11105190.89
12	23770245.48	15047870.01	23770245.48	15047870.01	23770245.48	15047870.01	10303751.78
13	22852176.2	13925871.24	22852176.2	13925871.24	22852176.2	13925871.24	18494087.62
14	21603806.73	12672973.94	20744353.58	12168811.52	20876577.14	12246374.97	16711534.97
15	16322917.31	9217210.073	19349699.27	10926370.55	20312492.19	11470039.58	16814344.58
16			15650654.39	8507219.796	13282620.03	7220028.324	10384893.76
17			18231088.09	9539402.837	16658045.33	8716309.422	13269953.23
18			15508225.43	7811315.001	15713813.54	7914867.371	13276125.92
19			15694397.26	7609570.319	13441767.45	6517362.404	7510792.772
20			7800585.711	3640794.392	10735067.21	5010415.107	-4380280.881
21			8846572.281	3974636.511	11722460.91	5266731.525	-3839590.631
22			8807319.697	3809075.628	10947078.95	4734499.605	13431.05701
23			12791048.2	5325193.792	6761416.396	2814925.88	-509610.1935
24			8811883.624	3531437.15	596590.2273	239088.5969	-3092912.795
25			12743113.59	4915998.368	659692.6925	254494.1765	-1799975.989
26			11569069.8	4296235.346	1901034.732	705959.3166	-2504065.179
27			10272530.84	3672150.931	1966542.756	702985.6547	-5011387.608
28			7708619.854	2652608.432	-2824929.897	-972084.8877	-3218298.975
29			8149686.295	2699546.766	-3965402.349	-1313521.613	-910108.54
30			9094102.831	2899768.122	-2070738.352	-660280.7528	-3533291.349
31			6136714.542	1883617.773	-1443041.859	-442930.7039	-2523007.151
32			2295376.45	678210.058	-1335574.819	-394619.4864	-5367532.2
33			633136.1102	180078.0733	-3250234.231	-924439.3246	
34			2561506.846	701314.3408	-1776125.216	-486284.8939	
35			1391787.652	366812.0761	-4152193.353	-1094329.772	
36			-108752.8673	-27590.83276	-2403218.494	-609701.6217	
37			-2025538.369	-494672.7807	-903345.5303	-220613.1724	
38			-4058232.511	-954042.9189	-2302011.288	-541175.8845	
39			-1502886.271	-340103.0691	-3097441.678	-700950.8579	
40			-1499423.606	-326634.6283	-2296471.393	-500263.619	
41			-1182378.297	-247940.6738	4472553.718	937879.176	
42			-3396474.879	-685603.7458	6009147.863	1212991.242	
43			-1300502.162	-252702.3614	5530718.329	1074681.476	
44			-3559124.807	-665725.0308	5143153.644	962013.5015	
45			-951622.5719	-171344.3746	5183353.499	933288.5639	
46			-1432627.581	-248308.6627	3689266.151	639438.1598	
47			-1623083.882	-270802.6906	3187610.282	531835.3847	
48			-3628321.238	-582735.1135	4623837.874	742622.4172	
49			-799063.0068	-123537.8188	2688553.227	415659.3393	
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YEAR	SCRA -- 7%	SCRB -- 3%	SCRB -- 7%	ALT L -- 3%	ALT L -- 7%	ALT M -- 3%
1	26530030.24	27560322.67	26530030.24	27560322.67	26530030.24	34016633.35
2	27299884.06	29461435.81	27299884.06	29461435.81	27299884.06	32760521.5
3	22957677.53	25737574.12	22957677.53	25737574.12	22957677.53	30176011.17
4	15519308.04	18074178.43	15519308.04	18074178.43	15519308.04	21894672.74
5	25069415.4	30330318.55	25069415.4	30330318.55	25069415.4	20410317.53
6	21442664.12	26949956.01	21442664.12	26949956.01	21442664.12	28457427.67
7	17529260.47	23252922.57	17809497.86	22439831.06	17186748.12	25570233.38
8	14530827.31	19274742.14	14210722.3	21564028.92	15898548.71	25432134.17
9	15983586.35	21908153.79	15548439.35	25280387.41	17941747.82	26276729.16
10	12380174.19	21321026.3	14566076.15	21767482.65	14871085.73	22027915.52
11	7303212.635	19665883.02	12933062.27	16270503.02	10700126.13	24433863.44
12	6522840.395	11951994.5	7566268.5	5148609.66	3259352.495	18053999.46
13	11270098.77	13625285.54	8303102.969	10220528.84	6228280.73	21864796.76
14	9803126.352	13901784.29	8154903.078	14133175.52	8290639.112	18199050.03
15	9494708.775	2276171.467	1285306.43	12770614.31	7211298.851	12417590.24
16	5644912.444	-8185481.031	-4449378.57	14217370.43	7728130.221	4869866.346
17	6943492.835	1895644.053	991894.2942	14782494.35	7734928.811	7915557.689
18	6687032.119	676511.5836	340751.1134	14656503.24	7382312.322	13863520.52
19	3641675.74	-2583269.903	-1252521.754	11046566.14	5356027.405	11246166.25
20	-2044423.67	-3272929.372	-1527585.664	7496064.047	3498663.941	12479145.83
21	-1725072.336	-3866468.094	-1737147.99	10889259.53	4892386.241	13012579.17
22	5808.794692	-3900762.7	-1687039.944	11495066.08	4971498.429	13112932.83
23	-212161.896	-1218978.641	-507487.5327	529107.8907	220279.2148	9472217.251
24	-1239511.053	-4593310.691	-1840808.244	-4863874.246	-1949238.884	6647375.184
25	-694389.0878	-1322370.42	-510139.9103	277608.2371	107094.8344	9973001.293
26	-929897.867	-3848779.888	-1429264.797	-347884.6962	-129188.8245	8392760.916
27	-1791435.038	-4088500.044	-1461527.785	3339619.377	1193823.275	-441968.6919
28	-1107446.879	1480276.121	509376.9047	-5950028.682	-2047460.707	-3633521.891
29	-301469.3421	7704122.615	2551955.81	-3371317.441	-1116733.671	44670.77515
30	-1126634.019	7054768.371	2249500.892	-2111937.028	-673417.4645	-52003.23067
31	-774417.822	5136746.679	1576685.256	-5222920.38	-1603135.617	2176841.805
32	-1585933.464	980815.2327	289799.4165	-3646180.172	-1077329.196	-5995619.229
33				-2439627.801	-693884.7221	-2439627.801
34				-1135546.641	-310901.0406	-2435006.035
35				-3157119.84	-832073.5428	-5165036.037
36				-1540637.431	-390862.9792	-2178947.418
37				-3696695.777	-902799.3778	-2276775.572
38						-919800.1403
39						-2781688.132
40						-1683357.711
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YEAR	ALT M – 7%	SJAA – 3%	SJAA – 7%	SJAB – 3%	SJAB – 7%	S33AP – 3%
1	32744983.51	28239934.32	27184235.84	28239934.32	27184235.84	27997215.88
2	30356919.6	23711600.77	21971907.81	23711600.77	21971907.81	26256609.72
3	26916722.23	22809120.81	20345524.33	22809120.81	20345524.33	25920602.45
4	18799757.45	17052418.33	14641978.55	17052418.33	14641978.55	17318964.44
5	16870074.34	25327187.6	20934095.56	25327187.6	20934095.56	19504578.31
6	22642080.12	24688748.51	19643540.11	24688748.51	19643540.11	22008798.89
7	19584334.62	23578159.18	18058597.75	23578159.18	18058597.75	15325280.34
8	18750393.32	23498081.54	17324471.01	23498081.54	17324471.01	6959958.083
9	18648861.69	27004825.06	19165598.74	27349712.59	19410368.93	2977660.498
10	15049007.98	22251143.69	15201512.77	20539727.69	14032309.39	4095252.171
11	16068674.73	19665883.02	12933062.27	19629761.96	12909307.63	3411404.295
12	11429172.54	14336686.09	9075909.161	15669307.86	9919531.884	1817055.229
13	13324172.79	11548383.96	7037461.403	14612664.99	8904801.419	-3092069.853
14	10675715.14	8381450.614	4916629.116	14992628.67	8794801.526	-6493700.017
15	7011953.541	10748749.17	6069593.889	13059452.18	7374399.56	-3596865.352
16	2647111.254	15962237.86	8676587.095	8359601.205	4544025.002	-5350071.458
17	4141809.479	12906943.37	6753548.201	-1068936.532	-559320.219	-584923.3752
18	6982896.035	14979570.28	7545037.476	940839.1571	473889.8758	-6166635.595
19	5452805.321	14496796.6	7028902.82	68560.12161	33241.99445	-1841898.068
20	5824434.966	8824885.857	4118869.547	1793203.778	836948.2116	-8698951.763
21	5846362.933	11158034.17	5013142.784	-4188997.66	-1882055.842	-1366863.961
22	5671209.241	10190334.82	4407215.516	-4239992.825	-1833753.502	-2204612.072
23	3943491.706	9852236.062	4101701.868	-3423087.747	-1425106.475	-3144407.285
24	2663992.022	-2723962.493	-1091651.088	-9463454.681	-3792559.781	-6880802.565
25	3847353.138	-438800.1168	-169278.9318	-2611905.457	-1007612.69	-2920904.32
26	3116696.219	-231961.0144	-86139.95128	-2944575.17	-1093483.585	
27	-157991.8103	480918.8724	171915.4426	-486987.5975	-174084.8471	
28	-1250328.981	-4682506.098	-1611294.291	-5294413.553	-1821857.388	
29	14796.99245	-3922967.712	-1299465.331	-3222796.215	-1067536.686	
30	-16581.87876	-2420927.098	-771942.8024	-5881615.878	-1875426.586	
31	668165.0066	-5962896.599	-1830265.679	1656858.516	508560.0979	
32	-1771513.019	-4714107.016	-1392867.298	7110755.673	2101000.042	
33	-693884.7221	-2628140.924	-747502.0716	6062314.063	1724257.736	
34	-666679.7143	-165527.6569	-45319.7772	6093840.129	1668431.017	
35	-1361269.148	-3192658.179	-841439.8366	5194390.009	1369005.523	
36	-552803.5747	-3352057.663	-850424.1284	3031042.201	768981.8258	
37	-556029.4094	-5827594.703	-1423203.095	5947055.53	1452377.571	
38	-216234.237	-1830433.367	-430313.4401	6153868.674	1446702.429	
39	-629495.8502	-2150181.04	-486585.8348	5806808.319	1314080.359	
40	-366702.8569	-89262.13893	-19444.87565	5811957.046	1266077.459	
41	-613001.3691	-2625874.1	-550636.7934	5038046.919	1056461.161	
42		-2760764.586	-557280.8894	3206243.39	647204.1031	
43		-4760878.87	-925092.9128	5628908.356	1093760.915	
44		-1079894.783	-201991.5083	4104934.761	767817.3619	
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YEAR	S33AP -- 7%	No Action -- 3%	No Action -- 7%	DL1B -- 3%	DL1B -- 7%
1	26950590.98	20181681.9	19427226.5	25837132.35	24146852.67
2	24330192.38	20506774.68	19002216.14	28805637.25	25159959.17
3	23120937.11	18050384.18	16100775.37	27724142.16	22631158.38
4	14870847.11	4302629.189	3694432.255	24292647.06	18532744.13
5	16121438.85	397793.7323	328794.9747	28461151.96	20292408
6	17511245	-6130672.131	-4877853.725	25979656.86	17311342.33
7	11737687.87	-1749641.403	-1340056.706	21698161.76	13512524.64
8	5131380.272	-8394051.525	-6188696.812	18716666.67	10893270.41
9	2113275.912	-9285007.219	-6589663.969	22435171.57	12203246.84
10	2797790.038	-6061629.767	-4141177.8	1303676.47	662723.011
11	2243474.353	-5907830.173	-3885222.72	-9277818.63	-4407824.796
12	1150295.689	-6073468.423	-3844838.853	-2609313.73	-1158566.5
13	-1884274.226	-11185718.39	-6816456.891	59191.18	24562.23386
14	-3809258.807	-12672486.55	-7433786.727	-4672303.92	-1812000.016
15	-2031074.65	-11396361.97	-6435287.292	-1253799.02	-454434.4641
16	-2908136.15			-11785294.12	-3992086.863
17	-306060.7067			-7916789.22	-2506252.72
18	-3106063.512			-2148284.31	-635599.8104
19	-893060.9211			-5679779.41	-1570506.337
20	-4060091.892			-7111274.51	-1837688.468
21	-614112.1369			-7542769.61	-1821677.571
22	-953472.1573			-9824264.71	-2217465.882
23	-1309085.689			10894240.20	2298106.016
24	-2757540.026			15212745.10	2999141.276
25	-1126817.301			18981250.00	3497279.701
26				11299754.90	1945766.866
27				7315.739412	1121558.772
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"Schafale, Michael" <michael.schafale@ncdenr.gov>
04/08/2009 03:13 PM

To Rebecca Fox/R4/USEPA/US@EPA
cc
bcc
Subject RE: PCS question

Exemption 6 Personal Privacy

I can talk. I'm working at home today. You can reach me here at I'll be unavailable tomorrow and Friday, and tied up in meetings much of Monday.

-----Original Message-----
From: Fox.Rebecca@epamail.epa.gov [mailto:Fox.Rebecca@epamail.epa.gov]
Sent: Wednesday, April 08, 2009 2:08 PM
To: Schafale, Michael
Subject: RE: PCS question

Mike,

Do you have a few minutes to chat? If so, could you send me your phone #? Just have a few questions.... b

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov

"Schafale, Michael" <michael.schafale@ncdenr.gov>
04/08/2009 01:34 PM

To Rebecca Fox/R4/USEPA/US@EPA
cc
Subject RE: PCS question

Sparrow Road is way south, just 2 miles north of the Pamlico County line. Here is a screen shot. It is the yellow filled in site. The other orange lines are other SNHAs. The collection near it, the southwestern most in the view, is our Suffolk Scarp Bogs and Western Gum Swamp sites. My understanding is that they intend to eventually mine all the way down to there and mine the Sparrow Road site.

Of the northern SNHAs, Bonnerton is the western one, the eastern one is Drinkwater Creek, a regionally significant SNHA that has younger Nonriverine Wet Hardwood Forest. It is about half in the mining area

and half in the mine buffer and exclusion for a creek. The green hatched areas are state game lands. I can send a shapefile if you wish.

But, given the complications involved, I don't push bringing Sparrow Road in. It looks hard enough to work for the Bonnerton site.

-----Original Message-----
From: Fox.Rebecca@epamail.epa.gov [mailto:Fox.Rebecca@epamail.epa.gov]
Sent: Wednesday, April 08, 2009 12:55 PM
To: Schafale, Michael
Subject: RE: PCS question

Yep, I know all the push back DWQ ran into and had to modify original 401. We are going to get a lot of resistance too and it is being handled at the highest levels now we will see where we end up. Where exactly is the Sparrow Road site? b

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov

"Schafale, Michael" <michael.schafale@ncdenr.gov>

04/08/2009 12:49 PM

To: Rebecca Fox/R4/USEPA/US@EPA

cc:

Subject: RE: PCS question

Here is the timeline.

I understand that the state tried to get a non-mining move from north to south and ran into a lot of opposition from PCS. I don't know how hard they tried to get no mining of the northwest area. There is also the Sparrow Road site, which looks like about half is slated to be mined, which I don't know that anybody tried to get eliminated from mining. It's good, but the Bonnerton site is definitely better.

One of the awkward things about this all is that it's so easy to destroy these communities. Clearcutting this site would pretty well eliminate its significance, and would be perfectly legal. This site became nationally significant because other private land owners degraded some of the better examples. It was state significant when it was first

discovered in 2005. And in 1960 we probably wouldn't have thought it worth worrying about.

-----Original Message-----
From: Fox.Rebecca@epamail.epa.gov [mailto:Fox.Rebecca@epamail.epa.gov]
Sent: Wednesday, April 08, 2009 12:20 PM
To: Schafale, Michael
Subject: RE: PCS question

Mike,

Ok, thanks! Was going to send this afternoon. The time line would be helpful. Just for your information, the boundary we are trying to get on Bonnerton would add the northwestern area and extend to the western boundary to include the wetland mixed pine hardwood forest and wet pine plantation just west of that NW area. We are also asking for a non mining, non impacting way to proceed from N to S in Bonnerton so to leave the connecting area as it is. Course we do not know how this will all turn out but that is what we are shooting for. b

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov

"Schafale, Michael" <michael.schafale@ncdenr.gov> 04/08/2009 11:41 AM

To: Rebecca Fox/R4/USEPA/US@EPA
cc:
Subject: RE: PCS question

Hi Becky,

Linda tells me that she got the information she needs on the elevation package from Colleen Sullins, so we don't need you to send it. Thanks for checking on it for us.

Do you have the time line I did of NHP actions on the Bonnerton site? Would that be of use to you?

-----Original Message-----
From: Fox.Rebecca@epamail.epa.gov [mailto:Fox.Rebecca@epamail.epa.gov]
Sent: Tuesday, April 07, 2009 5:39 PM
To: Schafale, Michael
Subject: RE: PCS question

just got teh ok to share the elevation package tomorrow -- have to wait for it to be received by PCS. i can send tomorrow -- do you want the cover letter and the detailed comments? I assume you probably do not want to see the economic appendix? b

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov

"Schafale, Michael" <michael.schafale@ncdenr.gov> 04/07/2009 04:18 PM

To: Rebecca Fox/R4/USEPA/US@EPA
cc:
Subject: RE: PCS question

Hi Becky,

Can you share the EPA letter to the Corps with me?

-----Original Message-----
From: Fox.Rebecca@epamail.epa.gov [mailto:Fox.Rebecca@epamail.epa.gov]
Sent: Monday, April 06, 2009 3:12 PM
To: Schafale, Michael
Subject: Fw: PCS question

Hi Mike,

As you may have heard, EPA is elevating to the Assistant Secretary of the Army (Civil Works) the COE's permit decision for PCS. One of the things we are asking for is full protection of the SNHA including the north west more recently disturbed area. In reading through the COE's draft Record of Decision an email correspondence from you is cited and I wanted to check to see if the context is correct. The topic is the additional 73 acres that was added to the original SNHA and the COE states that you say that the additional acreage is a headwater stream on

the face of the Suffolk Scarp comprised of a headwater stream on the face of the Suffolk Scarp to the west of the Bonnerton Tract and other areas that are included as "connectors but aren't otherwise in good condition". It is my understanding that the scarp area was in the original southern area that will be protected by the DWQ 401 and that the 73 acres includes approximately 45 acres of the less mature wet hardwood forest and the connecting area between this area and the more mature area to the south. The discussion citing you in the ROD does not mention the less mature WHF. Just wanted to check to see if this is an accurate characterization of your communication with them. The cite they made from you was an email from 8-26-08. Thanks Mike, Becky

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov

(See attached file: PCStimeline.doc)
[attachment "sparrowroad.doc" deleted by Rebecca Fox/R4/USEPA/US]

Rebecca Fox/R4/USEPA/US
04/09/2009 10:19 AM

To Palmer Hough/DC/USEPA/US@EPA
cc Mike_Wicker@fws.gov, Ron Sechler <ron.sechler@noaa.gov>
bcc
Subject Re: Fw: Onsite ASA(CW) Meeting 17 April 2009

Palmer,

I would definitely say Ross Smith should be your first contact at PCS. He is their environmental manager. I can't find my sign up list from the mtg at this moment -- wonder why... i actually had 2 of them but they are somewhere in this mass of papers strewn about my office :) But I do have a number for Ross = 252.322.8270. b

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov
Palmer Hough/DC/USEPA/US

Palmer Hough/DC/USEPA/US
04/09/2009 10:13 AM

To Rebecca Fox/R4/USEPA/US@EPA
cc Mike_Wicker@fws.gov, Ron Sechler <ron.sechler@noaa.gov>
Subject Re: Fw: Onsite ASA(CW) Meeting 17 April 2009

Becky/Mike/Ron:

Can one of you send me the sign up sheet from the 3/24 meeting. As Becky's email notes we are going to reach out to PCS directly to set up a site visit on 4/27 and I need the phone numbers of the PCS folks who attended that meeting so that I can start the ball rolling on that.

Also, of the four folks who attended the 3/24 meeting, who do you think would be the best person to reach out to first to set this site visit up?

Thanks, Palmer

Palmer F. Hough
US Environmental Protection Agency
Wetlands Division
Room 7231, Mail Code 4502T
1200 Pennsylvania Avenue, NW
Washington, DC 20460
Office: 202-566-1374
Cell: 202-657-3114
FAX: 202-566-1375
E-mail: hough.palmer@epa.gov

Street/Courier Address
USEPA

Palmer Hough
EPA West -- Room 7231-L
Mail Code 4502T
1301 Constitution Avenue, NW
Washington, DC 20460

Rebecca Fox Mike/Ron, Just to keep you all in the loop on all t... 04/09/2009 10:07:16 AM

From: Rebecca Fox/R4/USEPA/US
To: Mike_Wicker@fws.gov
Cc: Ron Sechler <ron.sechler@noaa.gov>, Palmer Hough/DC/USEPA/US@EPA
Date: 04/09/2009 10:07 AM
Subject: Re: Fw: Onsite ASA(CW) Meeting 17 April 2009

Mike/Ron,

Just to keep you all in the loop on all this, EPA had asked for a site visit on 4-27 in our email that went out to all attendees from our Raleigh mtg. The Army set up this 4-17 mtg and are inflexible about the date. Our managers from DC to RA in Atlanta can not make this date so we are still planning on the 4-27 date. Just to let you know that it looks like there will be two onsite meetings.

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov

Mike_Wicker@fws.gov

Mike_Wicker@fws.gov
04/09/2009 09:58 AM

To Ron Sechler <ron.sechler@noaa.gov>, Rebecca Fox/R4/USEPA/US@EPA
cc
Subject Fw: Onsite ASA(CW) Meeting 17 April 2009

----- Forwarded by Mike Wicker/R4/FWS/DOI on 04/09/2009 09:57 AM -----

Mike Wicker/R4/FWS/DOI

To"Jolly, Samuel K SAW" <Samuel.K.Jolly@usace.army.mil>

cc"Moyer, Jennifer A HQ02" <Jennifer.A.Moyer@usace.army.mil>, "Gaffney-Smith, Margaret E" <Meg.E.Gaffney-Smith@usace.army.mil>, pete_benjamin@fws.gov, "Smith, Chip R HQDA" <SmithCR@HQDA.Army.Mil>, "Walker, William T SAW" <William.T.Walker@usace.army.mil>

SubjectRe: Onsite ASA(CW) Meeting 17 April 2009

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Ken,

Do you have any information as to the response to our request for an extension as it will have a bearing on what we do? Please let us know as soon as possible because our deadline for elevation is today (April 9) so that we will have time to make arrangements.

(See attached file: 040617 FINAL signed 20 day extenson to review ROD.pdf)

Thanks,

Mike

"Jolly, Samuel K SAW" <Samuel.K.Jolly@usace.army.mil>

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To<pete_benjamin@fws.gov>, <mike_wicker@fws.gov>

cc"Walker, William T SAW" <William.T.Walker@usace.army.mil>,
"Moyer, Jennifer A HQ02" <Jennifer.A.Moyer@usace.army.mil>,
"Smith, Chip R HQDA" <SmithCR@HQDA.Army.Mil>,
"Gaffney-Smith, Margaret E" <Meg.E.Gaffney-Smith@usace.army.mil>

SubjectOnsite ASA(CW) Meeting 17 April 2009

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Pete/Mike,

As per the below email, Chip Smith (ASA(CW)) has scheduled his 404(q) site visit to PCS on 17 April 2009. Should USFWS elevate the decision to ASA this Friday, please accept this email as your agency's invitation to attend and notify your Region and HQ personnel accordingly. Thanks.

Ken Jolly
Chief, Regulatory Division
Wilmington District

From: Smith, Chip R Mr CIV USA ASA CW
To: Peck.Gregory@epamail.epa.gov
Cc: evans.david@epa.gov ; Chubb, Suzanne L Ms CIV USA ASA CW ; James, William L LRN; Gaffney-Smith, Margaret E; Pfenning, Michael COL HQDA

Sent: Wed Apr 08 15:44:28 2009

Subject: PCS Phosphate Site Visit

As stated previously I have scheduled the 404q site visit for April 17th. This is firm. I will meet with the applicant and agency representatives that day. This site visit will cover EPA and FWS should they request higher level review. If NMFS requests ASA review we will address that separately, with a separate site visit and separate documentation.

Chip

Sent from my BlackBerry Wireless Device [attachment "040617 FINAL signed 20 day extenson to review ROD.pdf" deleted by Palmer Hough/DC/USEPA/US]

Tom Welborn/R4/USEPA/US
04/13/2009 12:24 PM

To Suzanne Schwartz/DC/USEPA/US@EPA, Palmer Hough/DC/USEPA/US@EPA, Rebecca Fox/R4/USEPA/US@EPA, Jennifer
cc
bcc
Subject PCS articles.

[1 Attachment]
Sent by EPA Wireless E-Mail Services

----- Original Message -----
From: ust-waste
Sent: 04/13/2009 12:17 PM GMT
To: Tom Welborn; Angela Ellis
Subject: Scan from a Xerox WorkCentre Pro

Please open the attached document. It was scanned and sent to you using a Xerox WorkCentre Pro.

Sent by: Guest [ust-waste@epa.gov]
Number of Images: 6
Attachment File Type: PDF

WorkCentre Pro Location: machine location not set
Device Name: XRX-WATER-16SW

For more information on Xerox products and solutions, please visit http://www.xerox.com

THE NEWS&OBSERVER
newsobserver.com

Published: Apr 11, 2009 02:00 AM
Modified: Apr 11, 2009 03:46 AM

Mine ties layoffs to permit problems

PCS Phosphate has sought expansion, but EPA wants a review of wetlands, river impact.

BY WADE RAWLINS, Staff Writer
Comment on this story

PCS Phosphate announced Friday that it planned to eliminate 12 contractor jobs and reassign 12 other workers involved in mining and blamed delays in getting a federal permit to expand its mining operation in Beaufort County. Environmental advocates said the company has itself to blame.

The company said it plans to idle one of two excavation teams that strip off the top 100-foot layer of soil and rock to prepare the site for mining of phosphate ore. Actual mining will continue.

"Our mining operations are quickly approaching the end of our existing permit boundary," said Steve Beckel, general manager of the PCS Phosphate's Aurora facility. "We began the permitting process more than eight years ago in hopes of avoiding this situation."

PCS's announcement comes after leaders of the U.S. Environmental Protection Agency last week asked the assistant secretary of the Army to intervene in the permit review and require changes to the mining expansion plan drafted by the Corps of Engineers office in Wilmington. EPA says the environmental harm the expansion would entail is unacceptable to the Pamlico River and wetlands.

The mining expansion would allow the company to mine about 11,000 acres adjacent to its current open-pit mine, including impacts to nearly 4,000 acres of wetlands and about five miles of streams. The expansion would cause the largest permitted destruction of streams and wetlands in North Carolina.

The rich deposit of black phosphate rock has been extracted from the site by various companies for about 40 years. PCS Phosphate, part of an international company based in Canada, has worked the mine since 1995. It is the largest employer in Beaufort County, with 1,100 full-time workers and hundreds of contract workers.

The company's permit allows it to mine the site until 2017, but it may exhaust the available phosphate before then. As part of its long-range plans, the company is seeking a permit to expand its mining operations at the site for another 35 years.

The EPA said PCS's mining expansion plan is unacceptable because of the magnitude of harm it would cause to the Pamlico River estuary and to tidal creeks and wetlands.

The agency said it was particularly concerned about a "nationally significant" 271-acre hardwood swamp forest that would be destroyed under the existing expansion plan. Another big concern was the mining of the drainages of 10 tidal creeks, many of which provide important nursery areas for young fish and marine life.

The assistant secretary of the Army has until early May to decide whether to order changes to the mining permit or approve it as proposed. EPA officials can veto the permit if they still find the permit objectionable.

With the economic slowdown reducing demand for phosphate, the company announced in January that it planned to reduce production at its Aurora facility at least through the first quarter. But on Friday it blamed the layoffs on delays in obtaining a permit.

"The global market for phosphate has followed the economic situation in the world," said Ross Smith, environmental manager for PCS Phosphate. "This idling doesn't have anything to do with market conditions. It's solely due to not receiving permits for our mine continuation."

David Emmerling, executive director of Pamlico Tar River Foundation, an advocacy group for the Pamlico and Tar rivers, said the group deeply regretted that 24 employees' jobs have been affected. But Emmerling faulted the company for being unwilling to compromise during permit negotiations.

"I find it regrettable that PCS employees and contractors have to bear the consequences of the hardball strategy that PCS has used in the permitting process," Emmerling said. "The layoff is a direct result of their unwillingness to compromise and instead to try to use this strategy to create pressure with this 11th-hour maneuvering."

"They have advanced a mining expansion alternative that they were told at the very beginning of the process was not going to be allowed," Emmerling said.

The company first applied to expand its mine in 2000. It sought to mine through wetlands, salt marsh, headwaters of a number of creeks and navigable waters -- a plan state regulators said violated state law, causing the issue to be tied up in court until 2006.

Since then, the company has offered a different plan, and the permitting process has moved forward.

wade.rawlins@newsobserver.com or 919-829-4528

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WASHINGTON DAILY NEWS

The Voice of the Pamlico

MONDAY, APRIL 13, 2009

Local News

PCS cuts 12, blames permitting delays

PTRF head: PCS to blame, not EPA

By TED STRONG

Staff Writer

PCS Phosphate announced Friday it will cut 12 contractor positions at its Aurora facility. The company blamed the move, which will take effect April 20, on permitting delays, but environmentalists said the company is to blame.

The cuts stem from PCS Phosphate's decision to idle one of its bucket-wheel excavators, giant machines that scoop away upper layers of earth to make it easier for mining machines to access the phosphate ore below.

"We've only got room for one to be able to operate,' said Ross Smith, PCS Phosphate's manager of environmental affairs. Twelve PCS Phosphate employees affected by the cuts were reassigned to other duties at the facility.

He said the mine is nearing the edge of its permitted area.

"Everyone deeply regrets the impact this is having on these families," said David Emmerling, executive director of the Pamlico-Tar River Foundation in an e-mail. "This occurred because PCS ignored the concerns state and federal agencies presented from the beginning of the 8 year process."

He added later in the e-mail, "The company steadfastly refused to compromise and it is their decisions that create the present situation."

Environmentalists have been under fire lately for their opposition to some of PCS Phosphate's proposed expansion. The Beaufort County Board of Commissioners recently decided to begin lobbying on PCS Phosphate's behalf, and two commissioners condemned "long-haired" environmentalists at a recent meeting.

The latest setback to PCS Phosphate's pursuit of its permit was a decision this week by the Environmental Protection Agency to ask for a second review of PCS Phosphate's permit application by the U.S. Army Corps of Engineers' office in Washington, D.C. The review will take a maximum of 30 days, and it comes on the heels of a more-than-eight-year process of review at the Corps of Engineers' office in Wilmington.

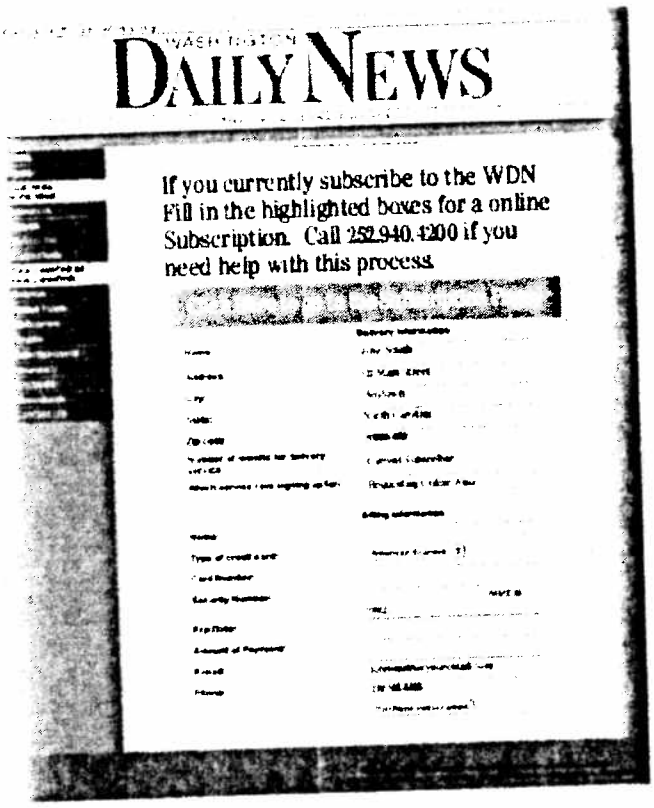
Smith said he's not sure if more cuts could be coming, saying the permit-approval path from this point forward is uncertain. The Corps of Engineers' Washington, D.C., office likely will either order its Wilmington office to approve the permit or reconsider the permit application. If the Corps of Engineers swiftly approves PCS Phosphate's expansion, the Environmental Protection Agency has veto power over the permit.

"I believe if a viable and practical permit is issued that we would restart everything," said Smith. "The unknown is what the actual permit boundary and restrictions would be, given the EPA's recent action."

The EPA contends the proposed expansion would adversely affect nearby waterways and the aquatic life within them. The objections mirror protests raised by environmentalists over a water-quality certification issued by the N.C. Division of Water Quality for the

project. Smith said the DWQ certification adequately addressed many such worries.

Related photo: PCS Phosphate has idled one of its two bucket-wheel excavators. One of the company's excavators clears earth in this June 2008 photograph. (WDN File Photo/Ted Strong)



Print Article

Print This Story

Phosphate mine blames NC layoffs on permit delay

By The Associated Press

A phosphate mining company is blaming layoffs at a North Carolina facility on delays in getting permits to expand its operation.

PCS Phosphate announced Friday it planned to eliminate 12 contractor jobs and reassign 12 other workers.

PCS Phosphate wants federal permits to continue mining phosphate ore on the Pamlico River in Beaufort County for 30 more years.

The U.S. Environmental Protection Agency has expressed concern about effects the project may have on wetlands and streams.

PCS Phosphate is part of a company based in Canada and has mined phosphate since 1995 for fertilizer and other uses. The company is Beaufort County's largest employer with 1,100 workers.

Mike_Wicker@fws.gov
04/13/2009 03:20 PM

To Rebecca Fox/R4/USEPA/US@EPA, Ron Sechler <ron.sechler@noaa.gov>
cc
bcc
Subject Fw: draft PCS letter with attachments

(See attached file: 20090413_PCS_404qf1.doc)(See attached file: 20090413_PCS_NCMFC.pdf)(See attached file: 20090413_PCS_ncwrc.pdf)(See attached file: 20090413_PCS_NMFS.doc)

Dear:

This letter is provided under Part IV, paragraph 3(f)(1), of the 1992 Memorandum of Agreement (MOA) between the Department of the Interior and the Department of Army, under Clean Water Act (CWA) Section 404(q). The U.S. Fish and Wildlife Service (Service) has decided not to seek higher level review of the proposed decision by the Army Corps of Engineers' Wilmington District to issue a CWA Section 404 permit to the Potash Corporation of Saskatchewan, Phosphate Division, Aurora Operation. Nonetheless, the Service has substantial unresolved concerns regarding the proposed project and our decision to not seek higher level review is not an indication that these concerns have been resolved. To the contrary, the Service fully concurs with the views expressed by the U.S. Environmental Protection Agency in their letter to the Assistant Secretary of the Army (Civil Works) dated April 6, 2009.

The Wilmington District issued a Notice of Intent to Proceed letter regarding this permit under paragraph 3(c)(3) of the MOA on March 2, 2009; this letter was received by our Southeast Regional Office on March 5, 2009. The proposed project is an expansion of the mine's 1997 CWA permit. The expansion, as currently proposed, will impact 3,953 acres of wetlands and 25,727 linear feet of streams, including a portion of a Significant Natural Heritage Area designated as "nationally significant." In addition, the project is adjacent to the Pamlico River and will result in a loss of approximately 70 percent of the watersheds of the project area streams which drain to the Albemarle-Pamlico Estuary Complex.

The March 2, 2009, Notice of Intent to Proceed included some provisions to minimize impacts through minor project reduction and compensatory mitigation. The Wilmington District concluded that these steps would adequately address our concerns for the project. Both the Service's Raleigh, North Carolina Field Office and Southeast Regional Office staff carefully considered these measures, and responded on March 20, 2009, pursuant to Part IV, paragraph 3(d)(2) of the 1992 MOA. That response stated that the Service does not concur that our concerns have been adequately addressed.

Pursuant to Part IV, paragraph 3(f) of the 1992 MOA, the Department of the Interior had until April 9, 2009, to notify the ASA (CW) that Interior was requesting higher level review. On April 3, 2009, the District provided the Service with an 80-page draft Record of Decision containing information not previously reviewed by the Service. In response the Service requested, via a letter dated April 8, 2009, an extension of the MOA timeframe in order to allow a review of the new information. The Corps denied that request, and the Service was unable to complete its review within the timeframe prescribed by the MOA.

Throughout the permit review process, the Service has consistently stated our concerns regarding the effects of the proposed project on the nationally significant fish and wildlife resources of the Albemarle-Pamlico Estuary System, of which the project site is apart. The proposed project would eliminate critical ecological functions provided by approximately 3,953 acres of wetlands and 25,727 linear feet of streams within the nationally significant Albemarle Pamlico Estuary. Wetland functions include temporary storage of surface water, nutrient cycling, organic carbon export, pollutant filtering/removal, and maintenance of biologically diverse plant and animal

habitat. Stream functions include transport of water, nutrients and sediment downstream, pollutant processing and removal, and maintenance of biologically diverse plant and animal habitat. Of particular concern are the proposed projects:

- Direct impacts to portions of a nonriverine hardwood wetland forest that has been designated as a Nationally Significant Natural Heritage Area by the NC Natural Heritage Program; and,
- Indirect impacts to the site's tidal creeks, four of which have been designated as Primary Nursery Areas by the NC Wildlife Resources Commission, associated with the 70 percent reduction in the drainage basins for these creeks.

The Service believes that impacts to these ecological functions at the scale associated with this project would cause substantial and unacceptable adverse impacts to these aquatic resources of national importance and that the concerns expressed by the Service throughout the permit review process have not been adequately addressed. Eliminating the headwater streams and wetlands and significantly reducing the drainage areas of the project site's Primary Nursery Areas and other tidal creeks would:

- Reduce flow from ground water and increase variability in surface water flows to the tidal creeks, thereby increasing the frequency and magnitude of short-term salinity fluctuations;
- Reduce filtration of nutrients and other contaminants previously accomplished by the site's streams and wetlands, increasing sedimentation and turbidity in tidal creeks;
- Reduce productivity of native fish and shellfish in the downstream estuary by disrupting the estuarine food web (caused by a reduction of organic materials critical for biological activity in the surface water drainage); and
- Shift downstream estuarine productivity from the benthic community which is dominated by sensitive submerged aquatic vegetation and benthic invertebrate species to tolerant phytoplankton species. This would exacerbate ongoing environmental stress and create an open niche for problematic invasive plant and animal species to colonize and degrade the estuary.

We believe the disruption of these processes and functions in the drainage basin will significantly impact the site's tidal creeks and impair the ability of these systems to function as Primary Nursery Areas. Further, we agree with the EPA that the adverse impacts to these resources have not been avoided and minimized to the extent possible and the proposed compensatory mitigation would not reduce these adverse impacts to an acceptable level.

Since the formal permit elevation process was initiated with the Corps' March 2, 2009, letter, the Service has continued to coordinate with the Corps, Applicant, and others in an effort to resolve our concerns regarding the proposed project. To this end, on March 24, 2009, representatives from the Service, Environmental Protection Agency (EPA), and National Marine Fisheries Service (NMFS) met with the Corps and the Applicant to discuss our continued concerns with the proposed project. At that meeting, the Service, EPA, and NMFS presented a potential alternative plan for mining the site that would address the concerns raised by the agencies by avoiding and minimizing impacts to the aquatic ecosystem. Details regarding the development of the EPA/FWS/NMFS alternative are provided in the April 6, 2009, letter from the EPA and are incorporated herein by reference.

To summarize, the EPA/FWS/NMFS proposal includes four key components:

1) Additional Aquatic Resource Avoidance: The alternative reduces impacts to wetlands from the approximately 3,953 acres of impacts associated with the proposed project down to approximately 2,787 acres of impacts. As previously discussed, the Service has significant concerns regarding the proposed project's direct and indirect adverse impacts to the site's high value aquatic resources, specifically the site's Nationally Significant Natural Heritage Area as well as the site's estuaries, including those identified as Primary Nursery Areas. The additional avoidance was designed to reduce the project's direct and indirect impacts to these resources down to an acceptable level. It should be noted that this alternative which would allow impacts to approximately 2,787 acres of wetlands continues to be extraordinarily large, and would continue to represent the single largest wetland fill authorized to date in the state of North Carolina, amplifying the need to pay very close attention to the execution, monitoring and adaptive management of the project's compensatory mitigation so that the Nation's waters are not significantly degraded.

2) Protection of Avoided Aquatic Resources: The alternative provides permanent protection from mining to the site's avoided areas through the use of appropriate binding real estate instruments such as conservation easements. We are open to discussion regarding compensatory mitigation credit for the permanent protection of these avoided areas. We also note that many of the aquatic resource areas avoided under this alternative provide restoration and enhancement opportunities. We are open to discuss the Applicant's recommendations regarding the appropriate level of compensation credit for the preservation, enhancement, and/or restoration of avoided aquatic resources.

3) Improvements to Site Reclamation: The alternative includes additional measures to minimize the impact of the mining project on avoided aquatic resources by improving the quality of the reclamation areas. Specifically, these measures include the reuse of topsoil from mined areas to re-cover reclaimed areas to the extent appropriate and practicable and the replanting of reclaimed areas with target tree species (longleaf pine, bald cypress and/or Atlantic white cedar) that are expected to improve soil quality and habitat over the long-term.

4) Improvements to Monitoring and Adaptive Management Plan: The alternative includes additional measures to improve the monitoring and adaptive management of both the mining and mitigation sites. While the footprint of the mining alternative does not extend into the Primary Nursery Areas, we are concerned that the extensive mining of wetlands and streams that serve as the headwaters of these creeks may impair the function of these Primary Nursery Areas. Accordingly, a monitoring program coupled with an adaptive management process is proposed to gauge the impacts to the Primary Nursery Areas from the mining so that appropriate adjustments can be made to mine operations. The monitoring provisions also require the establishment of an independent panel of scientists and engineers to annually evaluate whether direct and indirect impacts from mining and

benefits from the compensatory mitigation are in accordance with expectations at the time of permitting.

The Service has conducted an expedited review of the draft Record of Decision provided by the Corps on April 3. It appears as though the Corps has included permit conditions intended to address our recommendations related to site reclamation and monitoring. The monitoring protocols represent an improvement; however, the conditions regarding site reclamation provide no standards or performance measures, and appear to the Service to be unenforceable, and hence ineffective.

The draft Record of Decision also contains the same flaws the Service and others have previously noted in the Final Environmental Impact Statement (FEIS). Specifically, in addition to comments of the EPA referenced above regarding the availability of less environmentally damaging practicable alternatives, it is also our view that the Corps has consistently drawn inappropriate conclusions from limited data that are contrary to, and not supported, by the vast body of knowledge regarding the functioning of estuarine systems.

The FEIS, the March 2, 2009, Notice of Intent to Proceed letter, and the draft Record of Decision rely heavily on monitoring data and studies of local estuaries to support the conclusion that project-related reductions of approximately 70 percent of the watersheds of project area streams would not substantially impair the functioning of those stream or their associated estuaries. The Service and other agencies have consistently noted the limitations of these analyses.

To summarize, it has been pointed out by the Service and others that these studies are of insufficient scope, duration, and design to provide a basis for determining the effects of project-related drainage basin reduction on the creeks and estuaries of the project area. The Corps appears to acknowledge this in the FEIS with statements such as those appearing on page 4-14 of the FEIS: "...although a definitive conclusion cannot be made because the pre-drainage basin reduction monitoring data on flow and salinity for this creek covers less than a year." The FEIS further states (page 4-16) "it is difficult to draw any definite conclusions because there was no control site for Stanley's 1990 statistical study and there was only one year of baseline water quality and flow data for Jacks Creek." Also in Appendix J.II-7 of the FEIS it is stated in reference (in part) to a report by Entrix: "Although the Corps does not endorse or agree with all of the conclusions and statements found in either of these reports, both have been included in Appendix F in their entirety and the relevant information from these reports has been used as appropriate in the discussion of potential impacts found in Section 4.0 of the FEIS. Additionally, the Entrix report was supplied to the Review Team and their comments have been considered." We note that this is apparently in response (at least in part) to a critique of the Entrix study provided by NMFS following the February 12, 2008, interagency meeting (see attached). We concur completely with the NMFS comments, and note that although the Corps states that these comments were "considered" we can find no specific evidence of such consideration in the FEIS or draft Record of Decision.

Despite acknowledgement of the limitations of these studies, the Corps consistently overlooks these limitations and draws definitive conclusions that the project will not result in substantial adverse impacts to the Albemarle-Pamlico Estuary. We view this as an inappropriate use of the available information. We point again to the comments submitted throughout the process by the

State and federal agencies responsible for the management and conservation of the Albemarle-Pamlico Estuary including the Service, NMFS, EPA, NC Wildlife Resources Commission, and NC Division of Marine Fisheries (see attached comments of the NC WRC and NC DMF) that have noted the limitations of these studies, and drawing on their accumulated expertise and the vast body of available scientific information have concluded that one cannot deprive a stream of 70 percent of its watershed and expect it to function normally.

We remain committed to working with the Corps of effectively address our concerns. We are hopeful that a reasonable outcome can be achieved that satisfies the economic interests of the applicant while sustaining the ecologically and economically vital resources of the Albemarle-Pamlico Estuary. Thank you for your consideration in this matter. Should you have any questions regarding these comments or wish to discuss this matter further please contact Pete Benjamin, Supervisor of the Raleigh Field Office, at (919) 856-4520 extension 11.

Sincerely,

Sam D. Hamilton
Regional Director

Attachments

RECEIVED
JUL 03 2008
REGULATORY
WILMINGTON

NORTH CAROLINA MARINE FISHERIES COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

JUL 14 2008

June 26, 2008

US Army Corps of Engineers
Wilmington District
Regulatory Division
69 Darlington Ave.
Wilmington, NC 28403

To Whom It May Concern:

We appreciate the opportunity to review and comment on the Final Environmental Impact Statement (FEIS) for The Potash Corporation of Saskatchewan Phosphate Division (PCS), Aurora Operation. PCS has applied for a Department of the Army authorization to continue its phosphate mining operation on the Hickory Point peninsula adjacent the Pamlico River and South Creek, north of Aurora, in Beaufort County. Our understanding is that the preferred mining option is Alternative L. We address Alternative L in our comments below.

We recognize the economic benefits that will likely result from continued extraction of phosphate ore and in particular expanded opportunities resulting from Alternative L. However, this option will result in unacceptable tradeoffs as a result of negative impacts to habitats supporting important estuarine, marine, and coastal species. Many of these species are fishery resources that significantly contribute to the economies of the region and the state of North Carolina.

The N.C.Marine Fisheries Commission is statutorily responsible for management of our state's coastal fisheries and the habitats that support those fisheries. Headwater drainages, riparian wetlands and coastal marshes associated with estuarine nursery areas serve as the backbone for our coastal fisheries. Any loss of function of these critical fish habitats seriously threatens the productivity of our fisheries.

The loss of wetlands eliminates their filtering effect that would otherwise maintain water quality at a high level critical to the propagation and productivity of estuarine organisms. Loss and degradation of wetlands compromises the integrity of downstream Primary Nursery Areas and essential fish habitat. We are losing Primary Nursery Area function throughout the coastal areas of the state. Destruction and impairment of headwater drainages, riparian wetlands, and coastal marshes lead to the accumulation of negative impacts on recreational and commercial fisheries. This results in environmental impacts that will have significant and negative economic effects for the state. The proposed activities will lead to predictable hydrological changes in addition to impacts that cannot be predicted because of the large spatial scale and the long time scale at which proposed mining activities occur. Heavy metals and other contaminants resulting from the mobilization of overburden and the handling of ore will reduce water

quality and degrade bottom habitat of adjacent nursery areas. While mitigation of these impacts is theoretically possible, no available alternatives to offset these effects are available locally. We see no convincing evidence that impacts to Primary Nursery Areas can be mitigated.

We urge you to seek alternatives that will avoid and minimize impacts and will protect headwaters and wetlands through the permit process. Alternative L will not provide adequate protection of fisheries resources. We believe that reasonable and practicable alternatives are available that will not degrade the sensitive habitat of the Pamlico River, South Creek, and its tributaries. If reasonable alternatives cannot be found, we request that the permit be denied.

Sincerely,

Mac Currin

Mac Currin, Chairman
N.C. Marine Fisheries Commission

cc: DENR Secretary William G. Ross, Jr.
Melba McGee, Environmental Coordinator
N.C. Marine Fisheries Commission
Louis Daniel, DMF Director

North Carolina Wildlife Resources Commission

MEMORANDUM

TO: Melba McGee, Environmental Coordinator
Office of Legislative and Intergovernmental Affairs
North Carolina Department of Environment and Natural Resources
and
Tom Walker
U.S. Army Corps of Engineers
Wilmington District

FROM: Shannon L. Deaton, Manager
Habitat Conservation Program
Shannon L Deaton

DATE: July 1, 2008

SUBJECT: Comments on Final Environmental Impact Statement for the PCS Mine Continuation, Aurora, North Carolina.
OLIA No. 08-0356; Corps Action ID No. 200110096

Biologists with the North Carolina Wildlife Resources Commission (NCWRC) reviewed the final environmental impact statement (FEIS) with regard to impacts of the project on fish and wildlife resources. Our comments are provided in accordance with the North Carolina Environmental Policy Act (G.S. 113A-1 et seq., as amended; 1 NCAC-25), provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Clean Water Act of 1977 (as amended) and the Coastal Area Management Act (G.S. 113A-100 through 113A-128), as amended.

The applicant, PCS Phosphate, Inc., Aurora (PCS) submitted a DEIS with the US Army Corps of Engineers (USACE) on October 20, 2006. This document was reviewed by the NCWRC and formal comments were issued on February 1, 2007. On December 31, 2007 the NCWRC submitted formal comments to a supplement of the DEIS that presented two new alternatives, Alternative L and Alternative M. Descriptions of these alternatives and differences in impact area have been thoroughly described in the DEIS and SDEIS. The USACE posted the FEIS for review on May 23, 2008. The applicant's overall purpose and need is to continue mining its phosphate reserve in an economically viable fashion. More specifically, the applicant's purpose and need is to implement a long-term systematic and cost-effective mine advance within the project area for the ongoing PCS mine operation at Aurora, North Carolina. Although the purpose and need of the applicant has remained the same, PCS is now pursuing Alternative L rather than the Applicant Preferred (AP) and Expanded Applicant Preferred (EAP) boundaries.

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Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

collected after Jack's Creek watershed had already been diminished by almost 20% as "pre-data". Small reductions in watershed area, less than 10%, may have large biotic impacts and therefore is problematic when comparing watershed reduction and biota in the South Creek system if "pre-data" includes significantly impacted areas.

Removal of headwater streams and drainage areas would directly alter flow from ground water and stormwater runoff, therefore decreasing fresh water input, increasing salinity through estuarine tidal influences, impact filtration of nutrients and other contaminants from decreased wetlands, increase sedimentation, and reduce the input of organic materials. The disruption of these functions in the drainage basin will significantly impact the ability of these systems to function as an inland PNA. The value of a PNA cannot be measured in fisheries catch per unit effort alone.

Special conditions for the Department of the Army Permit No. 198899449 and DWQ issued Water Quality Certification #3092 included three conditions stating PCS must perform appropriate studies to assess whether there are water quality impacts or hydrologic impacts of the tributaries of South Creek and the Pamlico River due to the removal of drainage area from these tributaries. PCS requested CZR Incorporated (CZR) and Dr. Wayne Skaggs to prepare a stream monitoring plan. This plan, "NCPC Tract Stream Monitoring Program", has been implemented and reported to state and federal agencies for six years. Included in this plan were the monitoring and data comparison of Huddles Cut, Tooley, and Jacks creeks. As a result of the issued permit, the drainage basins for these streams were significantly altered. The drainage area for Huddles Cut was reduced from 872 acres to 651 acres (25.3%); Jacks Creek was reduced from 528 acres to 331 acres (37.3%), and Tooley Creek from 498 acres to 431 acres (13.5%). Review of these data has shown elevated levels of cadmium (Cd) within Huddles Cut and Jacks Creek as compared to background levels of Cd in the open areas of the Pamlico River estuary. Cd is a priority pollutant with no known biological function and a host of known adverse effects, including mutagenicity, teratogenicity and suspected carcinogenicity. The "NCPC Tract Stream Monitoring Program" reports state, "*We may predict, within the limits of established guidelines, that Cd concentrations in sediments from Jacks Creek may occasionally cause adverse biological effects*". These results were found in only six years of study, with 37.3% of the total drainage area reduced. Therefore, it can be concluded that the predicted long term effects would be greater when the drainage area is significantly reduced again. One explanation of the increased levels of Cd within the sediment of Huddles Cut was that the sediment is rich in fine grained, clay material. This result may be due to recent deposition or part of an overall patchy distribution of sediment in the area. A reduction of wetlands adjacent to surface waters would once again greatly reduce the opportunity for removal of these sediments prior to reaching the creeks and river.

The FEIS states drainage area impacts are considered temporary for those areas where mine configuration allows drainage areas to be restored throughout the approximate 15-year land reclamation process. However, due to the importance of these systems and lack of examples and references on reconstructing functional drainage basins especially on reclaimed mines containing high levels of nutrients and contaminants we feel the impacts will likely be much more far reaching and these systems may never recover. The FEIS states the area impacted will be reclaimed, not restored. Therefore essential components such as headwater drainages, riparian wetlands, and transitional areas that lead to coastal marshes that support the highly productive Pamlico estuarine system will be directly impacted and permanently removed, indirectly impacting the entire South Creek and Pamlico River systems.

Alternative L has less impact than AP / EAP, but still significantly impacts wetlands and watersheds with the meandering path between creeks and watersheds. We do not concur that appropriate avoidance and minimization has been conducted prior to consideration of mitigation. Reduction of impacts to these valuable systems would allow mitigation to be considered appropriate and adequate. We understand the

applicant does not have to demonstrate "no impact", but we feel impacts within the current proposal will be significant and could not be adequately offset even with compensatory mitigation.

The FEIS contains a section that provides information on several proposed mitigation sites located near the South Creek area and within the Tar / Pamlico River Basin. The NCWRC appreciates the effort PCS has put forth to show commitment in moving forward to mitigate impacts that cannot be avoided and minimized. However, we believe impacts could be reduced significantly and are concerned with the ability to mitigate for the loss of wetlands, streams, stream buffers, and the biological and chemical functions of the systems within Alternative L. The mitigation strategy proposed in the FEIS does not appropriately compensate for the proposed impacts to submerged aquatic vegetation (SAV), shallow water habitat, essential fish habitat (EFH), riparian wetlands, coastal marsh, inland PNAs, and the role of drainage basin areas to these important inland and estuarine systems immediately adjacent the Pamlico River system in the NCPC tract. Direct removal of some of these resources may not occur with the proposed actions, but the indirect, secondary, and cumulative impacts with the removal and degradation of the system leads to the impacts and the potential functional removal of these resources. The FEIS states impacts to jurisdictional areas under Alternative L within the NCPC and Bonnerton tracts would be mitigated at approximately a 1.8:1 ratio. This ratio is used to help calculate the cost models and therefore the expense of mitigation for each alternative and was obtained by giving 1:1 to poor-fair valued systems, 2:1 to good systems, and 3:1 to excellent systems. NCWRC has reviewed the provided information and does not agree that the proposed 1.8:1 ratio is adequate for the impacts the project will have on the ecosystem.

The potential mitigation sites at Bay City Farm, Hell Swamp, and Scott Creek may be good wetland enhancement or restoration sites for the wetlands and streams they once were, but may not replace the valuable wetland and aquatic habitats and functions lost within the NCPC and Bonnerton tracts. We still do not believe the FEIS adequately addresses the differences in complexity and function between ecosystems within the NCPC tract and the proposed mitigation areas. Replacement of lost functions is a critical consideration as well as general availability of lands in the area appropriate for wetland, stream, and buffer mitigation. Due to the inability of the applicant to find adequate area to mitigate and restore mined buffers, PCS is proposing to present "flexible buffer mitigation" before the Environmental Management Commission. We do not support this proposal especially for the proposed area of impact versus conventional buffer mitigation. This discrepancy could be resolved by avoiding and minimizing impacts to these areas.

The FEIS states continued mining of the NCPC tract would have temporary impacts that would be mitigatable. However, due to the importance of these systems, NCWRC disagrees. The FEIS states the area impacted will be reclaimed, not restored. Therefore, essential components such as headwater drainages, riparian wetlands, and transitional areas that lead to coastal marshes that support the highly productive Pamlico estuarine system will be directly impacted and permanently removed, indirectly impacting the entire South Creek and Pamlico River systems. We continue to question how the functional loss of three inland PNAs would be mitigated.

The NCWRC has reviewed the compensatory mitigation section contained within the FEIS. At this time, we are not providing detailed comments about these proposals. These options are being pursued with the understanding from the applicant that they may not be accepted as adequate mitigation for the proposed mining plan. We will provide more detailed comments on the individual mitigation sites during the 401(b)(1) review process of the NC Division of Water Quality. Concerns and comments for overall proposed mitigation as well as individual sites would include inability to mitigate the complexity and function of areas in the South Creek estuary with proposed mitigation areas, inability to mitigate the

functional loss of PNAs, restoration versus enhancement, insuring restored mitigation areas are not limited in their function by downstream constraints, grading, planting, and site specific construction conditions.

Due to the afore mentioned concerns, we cannot concur that Alternative L is an appropriate mining option on the NCPC tract because of significant degradation of fish and wildlife resources and the uncertainty in providing adequate, functional compensatory mitigation. We have made this statement for alternatives AP, EAP, SCR, SJA, and Alternative M on the NCPC tract as well. This concern also extends to the significant wetland areas on Bonnerton.

The concerns we have with the impacts of mining important ecosystems adjacent the South Creek, Durham Creek, and Pamlico River systems and the inability to adequately mitigate those impacts could be addressed with more intense avoidance and minimization. Once avoidance and minimization has been satisfied, a detailed mitigation plan for unavoidable impacts should be submitted detailing the ability to mitigate for the loss of important wetland habitat areas as well as water quality functions. The mitigation plan should include specific details for any areas impacted including potential SAV, shallow water habitat, EFH, inland PNAs, perennial streams, intermittent streams, coastal marsh, riparian wetlands, and riparian buffers. All impacts should be considered when developing such a plan, including direct, indirect, secondary, and cumulative impacts.

We appreciate the opportunity to participate in the commenting process and review of the FEIS. We also look forward to any additional information, response, and discussion of our comments during this process. If you have further questions or comments, please contact Maria Dunn at (252) 948-3916.

cc: Lekson, D. – US Army Corps of Engineers
Wicker, M. – US Fish and Wildlife Service
Fox, B. – US Environmental Protection Agency
Sechler, R. – National Marine Fisheries Service
Moye, D. – NC Division of Coastal Management
Rynas, S. – NC Division of Coastal Management
Peed, R. – NC Division of Land Resources
McKenna, S. – NC Division of Marine Fisheries
Dorney, J. – NC Division of Water Quality
Barnes, K. – NC Division of Water Quality
Emmerling, D. – Pamlico-Tar River Foundation
McNaught, D. – Environmental Defense
Cooper, S. – CZR, Inc - Wilmington
Furness, J. – PCS Phosphate Co.

ATTACHMENT 1
(sent to Tom Walker from Ron Sechler)

Review of the ENTRIX Report Titled: Potential Effects of Watershed Reduction on Tidal Creeks- An Assessment.

In reviewing the report by ENTRIX concerning the proposal by PCS Phosphate mine expansion I have difficulty believing the conclusions of the report. There are many reasons to question these conclusions, but I will enumerate some of the more significant ones.

The analyses that were performed were flawed in that the Kolmogorov-Smirnov two sample test, which is used to compare distribution frequency, was used. This type of test should be used for continuous data (as in length, weight, volume etc.) frequency analysis, and not catch data (which is not continuous) that has been altered in an attempt to make it continuous. Because of this the analyses provided and conclusions derived from these analyses are not acceptable evidence. Further, the replication level is too low to give an appropriate indication of significant difference at the $p < 0.05$ level. The maximum number of annual catch replicates used in this report is seven, and this is much too low for a reasonable and reliable testing. Distribution analysis typically involves many more observations than used in this report and even Chi Square Analysis (a more appropriate test for this data) requires at least 6 independent replicates to show significant differences, and those can only be revealed if all 6 replicate outcomes favor a particular treatment. If differences between treatments are not so overwhelmingly consistent then many more replicates are necessary to detect significant differences that might occur. The fact is, that even had that correct analysis been conducted, the replication level used was not sufficient to test for significant differences and the replication level would have needed to be much higher, by at least a factor of 2-3 times.

Another major flaw is the nekton community assessed for effects. The community that should have been tested should be that which might be reliant on the shallow water marsh and wetland. Species that spawn in pelagic marine environments (spot, flounder, shrimp etc.) and who are known to have good dispersal ability should be less affected than marsh dependant species such as mummichog and sheepshead minnow. Mummichog and sheepshead minnow are key estuarine species and are useful in determining marsh health. These two species are marsh residents and complete their entire life history within marshes. Based on the limited data that this report presents, these two species were prevalent in the less impacted marsh at Tooley Creek and essentially non-existent in the more impacted Jacks Creek and created marsh PAII. These two species are reliant on shallow marsh and lay their eggs in the shallows where their larvae and juveniles grow until they are large enough to survive in deeper water areas of the marsh. Any direct or in this case indirect impact to shallow water marsh areas can significantly negatively affect these species population size and extinction potential. Mummichog and sheepshead minnow are also important vectors for energy transfer of marsh productivity to higher trophic levels, thus providing a key ecological link to economically valuable fisheries species.

I am also concerned that a well designed study to assess the effect of drainage basin reduction on creek nekton function was not instituted with a replication level sufficient to adequately test for potential effects. Given the planned expansion for the mining operation, it would have been better to institute such a study which could have produced appropriate original data and perhaps more convincing results based on specifically testing associated hypotheses. Instead, what is presented is a poorly composed report that does not give details of how data were collected, collection frequency, temporal periods, site or sub-site replication, excludes the marsh community that could be most impacted, and uses inappropriate data analysis that are bound to show no significant effect, as was the intent of the report. This method of data mining really does nothing to support the report conclusions.

To exacerbate the obvious bias the report further does not tend to recognize the results that are contrary to the reports predetermined objectives nor realize their significance. The trend of differences in mummichog and sheepshead minnow abundance and the preponderance of "freshwater" benthic species in the downstream location of Muddy Creek (un-impacted) compared to Jacks Creek (after impact), and their preponderance within the downstream location of Jacks Creek prior to impact compared to after impact, suggests that freshwater pulses into Jacks Creek might have become too less frequent and intense for support of these species. These results, tentative as they are, suggest that a change within Jacks Creek might have occurred with only a 51% reduction in drainage basin. One can only imagine what a 90% or larger reduction in drainage basin would do.

I have no choice but to reject the conclusions of this study due to its shortcomings and suggest that no such permit be allowed for mining expansion due to apparent detrimental effects on the bordering creeks and adjacent estuary.

Rebecca Fox /R4/USEPA/US
04/13/2009 03:47 PM

To Palmer Hough/DC/USEPA/US@EPA
cc
bcc
Subject FWS 3f1 letter

mike just sent me a draft of their letter --see attached. just starting to read it. b

FWS 3f1 draft letter.doc

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov

Dear:

This letter is provided under Part IV, paragraph 3(f)(1), of the 1992 Memorandum of Agreement (MOA) between the Department of the Interior and the Department of Army, under Clean Water Act (CWA) Section 404(q). The U.S. Fish and Wildlife Service (Service) has decided not to seek higher level review of the proposed decision by the Army Corps of Engineers' Wilmington District to issue a CWA Section 404 permit to the Potash Corporation of Saskatchewan, Phosphate Division, Aurora Operation. Nonetheless, the Service has substantial unresolved concerns regarding the proposed project and our decision to not seek higher level review is not an indication that these concerns have been resolved. To the contrary, the Service fully concurs with the views expressed by the U.S. Environmental Protection Agency in their letter to the Assistant Secretary of the Army (Civil Works) dated April 6, 2009.

The Wilmington District issued a Notice of Intent to Proceed letter regarding this permit under paragraph 3(c)(3) of the MOA on March 2, 2009; this letter was received by our Southeast Regional Office on March 5, 2009. The proposed project is an expansion of the mine's 1997 CWA permit. The expansion, as currently proposed, will impact 3,953 acres of wetlands and 25,727 linear feet of streams, including a portion of a Significant Natural Heritage Area designated as "nationally significant." In addition, the project is adjacent to the Pamlico River and will result in a loss of approximately 70 percent of the watersheds of the project area streams which drain to the Albemarle-Pamlico Estuary Complex.

The March 2, 2009, Notice of Intent to Proceed included some provisions to minimize impacts through minor project reduction and compensatory mitigation. The Wilmington District concluded that these steps would adequately address our concerns for the project. Both the Service's Raleigh, North Carolina Field Office and Southeast Regional Office staff carefully considered these measures, and responded on March 20, 2009, pursuant to Part IV, paragraph 3(d)(2) of the 1992 MOA. That response stated that the Service does not concur that our concerns have been adequately addressed.

Pursuant to Part IV, paragraph 3(f) of the 1992 MOA, the Department of the Interior had until April 9, 2009, to notify the ASA (CW) that Interior was requesting higher level review. On April 3, 2009, the District provided the Service with an 80-page draft Record of Decision containing information not previously reviewed by the Service. In response the Service requested, via a letter dated April 8, 2009, an extension of the MOA timeframe in order to allow a review of the new information. The Corps denied that request, and the Service was unable to complete its review within the timeframe prescribed by the MOA.

Throughout the permit review process, the Service has consistently stated our concerns regarding the effects of the proposed project on the nationally significant fish and wildlife resources of the Albemarle-Pamlico Estuary System, of which the project site is apart. The proposed project would eliminate critical ecological functions provided by approximately 3,953 acres of wetlands and 25,727 linear feet of streams within the nationally significant Albemarle Pamlico Estuary. Wetland functions include temporary storage of surface water, nutrient cycling, organic carbon export, pollutant filtering/removal, and maintenance of biologically diverse plant and animal

habitat. Stream functions include transport of water, nutrients and sediment downstream, pollutant processing and removal, and maintenance of biologically diverse plant and animal habitat. Of particular concern are the proposed projects:

- Direct impacts to portions of a nonriverine hardwood wetland forest that has been designated as a Nationally Significant Natural Heritage Area by the NC Natural Heritage Program; and,
- Indirect impacts to the site's tidal creeks, four of which have been designated as Primary Nursery Areas by the NC Wildlife Resources Commission, associated with the 70 percent reduction in the drainage basins for these creeks.

The Service believes that impacts to these ecological functions at the scale associated with this project would cause substantial and unacceptable adverse impacts to these aquatic resources of national importance and that the concerns expressed by the Service throughout the permit review process have not been adequately addressed. Eliminating the headwater streams and wetlands and significantly reducing the drainage areas of the project site's Primary Nursery Areas and other tidal creeks would:

- Reduce flow from ground water and increase variability in surface water flows to the tidal creeks, thereby increasing the frequency and magnitude of short-term salinity fluctuations;
- Reduce filtration of nutrients and other contaminants previously accomplished by the site's streams and wetlands, increasing sedimentation and turbidity in tidal creeks;
- Reduce productivity of native fish and shellfish in the downstream estuary by disrupting the estuarine food web (caused by a reduction of organic materials critical for biological activity in the surface water drainage); and
- Shift downstream estuarine productivity from the benthic community which is dominated by sensitive submerged aquatic vegetation and benthic invertebrate species to tolerant phytoplankton species. This would exacerbate ongoing environmental stress and create an open niche for problematic invasive plant and animal species to colonize and degrade the estuary.

We believe the disruption of these processes and functions in the drainage basin will significantly impact the site's tidal creeks and impair the ability of these systems to function as Primary Nursery Areas. Further, we agree with the EPA that the adverse impacts to these resources have not been avoided and minimized to the extent possible and the proposed compensatory mitigation would not reduce these adverse impacts to an acceptable level.

Since the formal permit elevation process was initiated with the Corps' March 2, 2009, letter, the Service has continued to coordinate with the Corps, Applicant, and others in an effort to resolve our concerns regarding the proposed project. To this end, on March 24, 2009, representatives from the Service, Environmental Protection Agency (EPA), and National Marine Fisheries Service (NMFS) met with the Corps and the Applicant to discuss our continued concerns with the proposed project. At that meeting, the Service, EPA, and NMFS presented a potential alternative plan for mining the site that would address the concerns raised by the agencies by avoiding and minimizing impacts to the aquatic ecosystem. Details regarding the development of the EPA/FWS/NMFS alternative are provided in the April 6, 2009, letter from the EPA and are incorporated herein by reference.

To summarize, the EPA/FWS/NMFS proposal includes four key components:

1) Additional Aquatic Resource Avoidance: The alternative reduces impacts to wetlands from the approximately 3,953 acres of impacts associated with the proposed project down to approximately 2,787 acres of impacts. As previously discussed, the Service has significant concerns regarding the proposed project's direct and indirect adverse impacts to the site's high value aquatic resources, specifically the site's Nationally Significant Natural Heritage Area as well as the site's estuaries, including those identified as Primary Nursery Areas. The additional avoidance was designed to reduce the project's direct and indirect impacts to these resources down to an acceptable level. It should be noted that this alternative which would allow impacts to approximately 2,787 acres of wetlands continues to be extraordinarily large, and would continue to represent the single largest wetland fill authorized to date in the state of North Carolina, amplifying the need to pay very close attention to the execution, monitoring and adaptive management of the project's compensatory mitigation so that the Nation's waters are not significantly degraded.

2) Protection of Avoided Aquatic Resources: The alternative provides permanent protection from mining to the site's avoided areas through the use of appropriate binding real estate instruments such as conservation easements. We are open to discussion regarding compensatory mitigation credit for the permanent protection of these avoided areas. We also note that many of the aquatic resource areas avoided under this alternative provide restoration and enhancement opportunities. We are open to discuss the Applicant's recommendations regarding the appropriate level of compensation credit for the preservation, enhancement, and/or restoration of avoided aquatic resources.

3) Improvements to Site Reclamation: The alternative includes additional measures to minimize the impact of the mining project on avoided aquatic resources by improving the quality of the reclamation areas. Specifically, these measures include the reuse of topsoil from mined areas to re-cover reclaimed areas to the extent appropriate and practicable and the replanting of reclaimed areas with target tree species (longleaf pine, bald cypress and/or Atlantic white cedar) that are expected to improve soil quality and habitat over the long-term.

4) Improvements to Monitoring and Adaptive Management Plan: The alternative includes additional measures to improve the monitoring and adaptive management of both the mining and mitigation sites. While the footprint of the mining alternative does not extend into the Primary Nursery Areas, we are concerned that the extensive mining of wetlands and streams that serve as the headwaters of these creeks may impair the function of these Primary Nursery Areas. Accordingly, a monitoring program coupled with an adaptive management process is proposed to gauge the impacts to the Primary Nursery Areas from the mining so that appropriate adjustments can be made to mine operations. The monitoring provisions also require the establishment of an independent panel of scientists and engineers to annually evaluate whether direct and indirect impacts from mining and

benefits from the compensatory mitigation are in accordance with expectations at the time of permitting.

The Service has conducted an expedited review of the draft Record of Decision provided by the Corps on April 3. It appears as though the Corps has included permit conditions intended to address our recommendations related to site reclamation and monitoring. The monitoring protocols represent an improvement; however, the conditions regarding site reclamation provide no standards or performance measures, and appear to the Service to be unenforceable, and hence ineffective.

The draft Record of Decision also contains the same flaws the Service and others have previously noted in the Final Environmental Impact Statement (FEIS). Specifically, in addition to comments of the EPA referenced above regarding the availability of less environmentally damaging practicable alternatives, it is also our view that the Corps has consistently drawn inappropriate conclusions from limited data that are contrary to, and not supported, by the vast body of knowledge regarding the functioning of estuarine systems.

The FEIS, the March 2, 2009, Notice of Intent to Proceed letter, and the draft Record of Decision rely heavily on monitoring data and studies of local estuaries to support the conclusion that project-related reductions of approximately 70 percent of the watersheds of project area streams would not substantially impair the functioning of those stream or their associated estuaries. The Service and other agencies have consistently noted the limitations of these analyses.

To summarize, it has been pointed out by the Service and others that these studies are of insufficient scope, duration, and design to provide a basis for determining the effects of project-related drainage basin reduction on the creeks and estuaries of the project area. The Corps appears to acknowledge this in the FEIS with statements such as those appearing on page 4-14 of the FEIS: "...although a definitive conclusion cannot be made because the pre-drainage basin reduction monitoring data on flow and salinity for this creek covers less than a year." The FEIS further states (page 4-16) "it is difficult to draw any definite conclusions because there was no control site for Stanley's 1990 statistical study and there was only one year of baseline water quality and flow data for Jacks Creek." Also in Appendix J.II-7 of the FEIS it is stated in reference (in part) to a report by Entrix: "Although the Corps does not endorse or agree with all of the conclusions and statements found in either of these reports, both have been included in Appendix F in their entirety and the relevant information from these reports has been used as appropriate in the discussion of potential impacts found in Section 4.0 of the FEIS. Additionally, the Entrix report was supplied to the Review Team and their comments have been considered." We note that this is apparently in response (at least in part) to a critique of the Entrix study provided by NMFS following the February 12, 2008, interagency meeting (see attached). We concur completely with the NMFS comments, and note that although the Corps states that these comments were "considered" we can find no specific evidence of such consideration in the FEIS or draft Record of Decision.

Despite acknowledgement of the limitations of these studies, the Corps consistently overlooks these limitations and draws definitive conclusions that the project will not result in substantial adverse impacts to the Albemarle-Pamlico Estuary. We view this as an inappropriate use of the available information. We point again to the comments submitted throughout the process by the

State and federal agencies responsible for the management and conservation of the Albemarle-Pamlico Estuary including the Service, NMFS, EPA, NC Wildlife Resources Commission, and NC Division of Marine Fisheries (see attached comments of the NC WRC and NC DMF) that have noted the limitations of these studies, and drawing on their accumulated expertise and the vast body of available scientific information have concluded that one cannot deprive a stream of 70 percent of its watershed and expect it to function normally.

We remain committed to working with the Corps of effectively address our concerns. We are hopeful that a reasonable outcome can be achieved that satisfies the economic interests of the applicant while sustaining the ecologically and economically vital resources of the Albemarle-Pamlico Estuary. Thank you for your consideration in this matter. Should you have any questions regarding these comments or wish to discuss this matter further please contact Pete Benjamin, Supervisor of the Raleigh Field Office, at (919) 856-4520 extension 11.

Sincerely,

Sam D. Hamilton
Regional Director

Attachments

Rebecca Fox /R4/USEPA/US
04/15/2009 09:34 AM

To pace.wilber@noaa.gov
cc
bcc
Subject Fw: Onsite ASA(CW) Meeting 17 April 2009 - PCS Phosphate

Sorry Pace. This got bounced too because had your address error from my original message (nmfs instead of noaa -- comes from trying to do too much at once...) b

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov
---- Forwarded by Rebecca Fox/R4/USEPA/US on 04/15/2009 09:32 AM ----

Rebecca Fox /R4/USEPA/US
04/15/2009 09:22 AM

To Mike_Wicker@fws.gov
cc pace.wilber@nmfs.gov, Pete_Benjamin@fws.gov, Palmer Hough/DC/USEPA/US@EPA
Subject Re: Fw: Onsite ASA(CW) Meeting 17 April 2009 - PCS Phosphate

Hi Mike,

Quickly looked over your revised letter. One editorial comment is to change date of EPA letter to April 3 -- it was dated on this date but sent on April 6. I think it looks good. Just a few comments.

I noted that you deleted a lot from your first version and I understand the desire to streamline and not repeat what has been already said. I do think the paragraph that was the last one on page 1 and carrying over to page 2 on the first version was a good one that you may want to consider keeping. I will copy below so you know which one I am referring to.

Throughout the permit review process, the Service has consistently stated our concerns regarding the effects of the proposed project on the nationally significant fish and wildlife resources of the Albemarle-Pamlico Estuary System, of which the project site is apart. The proposed project would eliminate critical ecological functions provided by approximately 3,953 acres of wetlands and 25,727 linear feet of streams within the nationally significant Albemarle Pamlico Estuary. Wetland functions include temporary storage of surface water, nutrient cycling, organic carbon export, pollutant filtering/removal, and maintenance of biologically diverse plant and animal habitat. Stream functions include transport of water, nutrients and sediment downstream, pollutant processing and removal, and maintenance of biologically diverse plant and animal habitat. Of particular concern are the proposed projects:

Direct impacts to portions of a nonriverine hardwood wetland forest that has been designated as a Nationally Significant Natural Heritage Area by the NC Natural Heritage Program; and,

Indirect impacts to the site's tidal creeks, four of which have been designated as Primary Nursery Areas by the NC Wildlife Resources Commission, associated with the 70 percent

reduction in the drainage basins for these creeks.

The only other suggestion is maybe to expand the discussion on the COE's conclusions on drainage basin reduction based on monitoring and PA2. They keep repeating the PA2 discussion throughout the draft ROD namely the WRC publication which they say states PA2 has a similar mixture of fresh and saltwater species as PNAs. I am going to try and touch base with WRC and also get their comments on this. I like the FWS discussion on this but since they keep repeating this over and over in draft ROD thought it might be good to be hit back hard on this...

Thanks Mike! b

Becky Fox
Wetland Regulatory Section
USEPA
Phone: 828-497-3531
Email: fox.rebecca@epa.gov
Mike_Wicker@fws.gov

Mike_Wicker@fws.gov
04/15/2009 08:31 AM

To Rebecca Fox/R4/USEPA/US@EPA, pace.wilber@nmfs.gov
cc Pete_Benjamin@fws.gov
Subject Fw: Onsite ASA(CW) Meeting 17 April 2009 - PCS Phosphate

Becky,

It is my understanding that we are not invited. However I guess we could ask to attend and see what their response would be. Is Jennifer the only EPA person that will be at the meeting? I know the COE likes to use overwhelming force at meetings (standard military procedure) and it would be uncomfortable for anyone to be one when arguing a position against the legion.

We will think about what we can do and get back to you.

Here's the latest version of the letter that we are in process of getting out.

Mike

(See attached file: PCS 3(f)(1)Letter to COE revised.doc)

(See attached file: 20090413_PCS_NCMFC.pdf)(See attached file: 20090413_PCS_ncwrc.pdf)(See attached file: 20090413_PCS_NMFS.doc)

----- Forwarded by Mike Wicker/R4/FWS/DOI on 04/15/2009 08:21 AM -----

"Smith, Chip RMr CIV USAASACW" <Chip.Smith@HQDA.Army.Mil>

04/13/2009 05:32 PM

To<Mike_Wicker@fws.gov>

cc<Pete_Benjamin@fws.gov>, <Jeff_Weller@fws.gov>, "Gaffney-Smith, Margaret E" <Meg.E.Gaffney-Smith@usace.army.mil>, <Jennifer.A.Moyer@usace.army.mil>, "Chubb, Suzanne L Ms CIV USA ASA CW" <Suzanne.L.Chubb@us.army.mil>, <William.L.James@usace.army.mil>

SubjectRE: FW: Onsite ASA(CW) Meeting 17 April 2009 - PCS Phosphate

Mike:

No inconvenience at all. These things are always a bit confusing, and
we haven't faced a potential elevation request for 8 years. I did 8 or
10 during the Clinton years.

EPA did request that my office review the case and their letter appears
to cover some of the issues of concern to FWS. I will be looking at all
of the issues raised by EPA as part of the 404q review.

Chip

-----Original Message-----
From: Mike_Wicker@fws.gov [mailto:Mike_Wicker@fws.gov]
Sent: Monday, April 13, 2009 5:23 PM
To: Smith, Chip R Mr CIV USA ASA CW
Cc: Pete_Benjamin@fws.gov; Jeff_Weller@fws.gov
Subject: Re: FW: Onsite ASA(CW) Meeting 17 April 2009 - PCS Phosphate

Chip,

You are correct that no elevation request was sent. We decided not to
continue the elevation process. I hope this has not caused you any
inconvenience.

We are in the process of reading and discussing the draft ROD. Unfortunately it appears as though we still have significant concerns.

Thanks,

Mike Wicker

Inactive hide details for "Smith, Chip R Mr CIV USA ASA CW"
<Chip.Smith@HQDA.Army.Mil>"Smith, Chip R Mr CIV USA ASA CW"
<Chip.Smith@HQDA.Army.Mil>

"Smith, Chip R Mr CIV USA ASA CW"
<Chip.Smith@HQDA.Army.Mil>

04/13/2009 04:34 PM

To

<Mike_Wicker@fws.gov>

cc

<dave_stout@fws.gov>, <Jennifer.A.Moyer@usace.army.mil>, "Chubb, Suzanne L Ms CIV USA ASA CW" <Suzanne.L.Chubb@us.army.mil>

Subject

FW: Onsite ASA(CW) Meeting 17 April 2009 - PCS Phosphate

Mike:

By separate email Jennifer Moyer, from Corps HQ, clarified that the USFWS had until COB April 10th to provide me/my office with a request for higher level review in accordance with the 404q MOA. Although it appeared that the Service was on track to request higher level review, the deadline passed and no request was received. I am sending you this email to confirm that no elevation request was sent and to close out the process. Thanks.

Dave, I called earlier and left you a message.

Chip Smith
Office of the Assistant Secretary of the Army (Civil Works)
Assistant for Environment, Tribal and Regulatory Affairs
108 Army Pentagon 3E427
Washington, D.C. 20310-0108
703-693-3655 Voice
703-839-0389 Cell
703-697-8433 Fax

-----Original Message-----
From: Jennifer.A.Moyer@usace.army.mil
[mailto:Jennifer.A.Moyer@usace.army.mil]
Sent: Thursday, April 09, 2009 12:48 PM
To: Mike_Wicker@fws.gov
Cc: Meg.E.Gaffney-Smith@usace.army.mil;
Samuel.K.Jolly@usace.army.mil;
pete_benjamin@fws.gov; William.T.Walker@usace.army.mil; Smith,
Chip R Mr
CIV USA ASA CW; Chubb, Suzanne L Ms CIV USA ASA CW;
William.L.James@usace.army.mil
Subject: RE: Onsite ASA(CW) Meeting 17 April 2009

Mr. Wicker,

I have been in direct coordination with the office of the
ASA(CW).
There will not be an extension granted; the draft ROD was
provided to
the USFWS as a courtesy by the Wilmington District not as a part
of the
404(q) process.
Therefore, the deadline for USFWS to elevate the PCS Phosphate
permit
action remains, pursuant to paragraph 3(f) of the MOA, close of
business
today, April 9, 2009.

If USFWS decides to elevate this action, the office of the
ASA(CW) has
scheduled a site visit for April 17 to which you are invited.

Please do not hesitate to contact me with any questions.

Jennifer

Jennifer Moyer
Regulatory Program Manager
Regulatory Community of Practice
Headquarters, U.S. Army Corps of Engineers
441 G Street, NW
Washington, DC 20314-1000
206-764-5526 (office)
703-589-5746 (mobile)
jennifer.a.moyer@usace.army.mil

-----Original Message-----
From: Mike_Wicker@fws.gov [mailto:Mike_Wicker@fws.gov]
Sent: Thursday, April 09, 2009 6:52 AM
To: Jolly, Samuel K SAW

Cc: Moyer, Jennifer A HQ02; Gaffney-Smith, Margaret E;
pete_benjamin@fws.gov; Smith, Chip R HQDA; Walker, William T SAW
Subject: Re: Onsite ASA(CW) Meeting 17 April 2009

Ken,

Do you have any information as to the response to our request for
an
extension as it will have a bearing on what we do? Please let us
know as
soon as possible because our deadline for elevation is today
(April 9)
so that we will have time to make arrangements.

(See attached file: 040617 FINAL signed 20 day extenson to review
ROD.pdf)

Thanks,

Mike

Inactive hide details for "Jolly, Samuel K SAW"
<Samuel.K.Jolly@usace.army.mil>"Jolly, Samuel K SAW"
<Samuel.K.Jolly@usace.army.mil>

"Jolly, Samuel K SAW"
<Samuel.K.Jolly@usace.army.mil>

04/09/2009 09:18 AM

To

<pete_benjamin@fws.gov>, <mike_wicker@fws.gov>

cc

"Walker, William T SAW" <William.T.Walker@usace.army.mil>,
"Moyer,
Jennifer A HQ02" <Jennifer.A.Moyer@usace.army.mil>, "Smith, Chip
R HQDA"
<SmithCR@HQDA.Army.Mil>, "Gaffney-Smith, Margaret E"
<Meg.E.Gaffney-Smith@usace.army.mil>

Subject

Onsite ASA(CW) Meeting 17 April 2009

Pete/Mike,

As per the below email, Chip Smith (ASA(CW)) has scheduled his 404(q)
site visit to PCS on 17 April 2009. Should USFWS elevate the decision to
ASA this Friday, please accept this email as your agency's invitation to
attend and notify your Region and HQ personnel accordingly. Thanks.

Ken Jolly
Chief, Regulatory Division
Wilmington District

From: Smith, Chip R Mr CIV USA ASA CW
To: Peck.Gregory@epamail.epa.gov
Cc: evans.david@epa.gov ; Chubb, Suzanne L Ms CIV USA ASA CW ; James,
William L LRN; Gaffney-Smith, Margaret E; Pfenning, Michael COL HQDA

Sent: Wed Apr 08 15:44:28 2009
Subject: PCS Phosphate Site Visit

As stated previously I have scheduled the 404q site visit for April
17th.
This is firm. I will meet with the applicant and agency representatives
that day. This site visit will cover EPA and FWS should they request
higher level review. If NMFS requests ASA review we will address that
separately, with a separate site visit and separate documentation.

Chip

Sent from my BlackBerry Wireless Device

[attachment "PCS 3(f)(1)Letter to COE revised.doc" deleted by Rebecca Fox/R4/USEPA/US] [attachment "20090413_PCS_NCMFC.pdf" deleted by Rebecca Fox/R4/USEPA/US] [attachment "20090413_PCS_ncwrc.pdf" deleted by Rebecca Fox/R4/USEPA/US]

[attachment "20090413_PCS_NMFS.doc" deleted by Rebecca Fox/R4/USEPA/US]