340SERBSF10,619

340SERBSF10,619

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SOUTHERN WOOD PIEDMONT (WILMINGTON)

NCD 058 517 467

Folders

1. General Correspondence, File #1: 1981—1996
2. General Correspondence, File #2: 1997—2003
3. General Correspondence, File #3: 2004—

Bound Reports

1. Groundwater Quality Assessment: August 1992
2. Phase II Groundwater Quality Assessment: February 1993
3. **Final** Phase III Groundwater Quality Assessment *[Date?]*
4. Data Summary Report for the 1990 Landfarm Area Sampling: September 1993
5. Data Summary Report for the 1991 Landfarm Area Sampling and Comparison of 1990 and 1991 Soil and Groundwater Data: September 1993
6. Data Summary Report for the Treated and Non-Treated Wood Storage Areas Soil Investigation: December 1993
7. Site Inspection Prioritization, Volume I—Text and Reference 1: January 1995
8. Site Inspection Prioritization, Volume II—References 2-12: January 1995
9. Site Inspection Prioritization, Volume III—References 13-33: January 1995
10. Site Inspection Prioritization, Volume IV—References 34-60: January 1995
11. Sediment Ecotoxicity Work Plan and Field Sampling Plan: January 1998

Three-Ring Binders

(See shelves above filing cabinets)

1. NC-DEHNR FOI Review: 1 March, 1995
2. Soil, Sediment and Surface Water Assessment Work Plan: February 1996
3. Soil, Sediment and Surface Water Assessment Report: May 1996
4. Remedial Action Plan: May 1996
5. Human Health and Ecological Risk Assessment: May 1996
6. Remedial Investigation—Volume I of XII, Text, Tables & Figures: June 1999
7. Remedial Investigation—Volume II of XII, Attachments A-J: June 1999
8. Remedial Investigation—Volume III of XII, Attachment J: June 1999
9. Remedial Investigation—Volume IV of XII, Attachment J *(cont'd)*: June 1999
10. Remedial Investigation—Volume V of XII, Attachment J *(cont'd)*-K: June 1999
11. Remedial Investigation—Volume VI of XII, References 1-15: June 1999
12. Remedial Investigation—Volume VII of XII, References 16-27: June 1999
13. Remedial Investigation—Volume VIII of XII, References 28-38: June 1999
14. Remedial Investigation—Volume IX of XII, References 39-64: June 1999
15. Remedial Investigation—Volume X of XII, References 65-69: June 1999
16. Remedial Investigation—Volume XI of XII, References 70-71: June 1999

17. Remedial Investigation—Volume XII of XII, References 72-75: June 1999
18. Supplemental Remedial Investigation Work Plan: October 1999
19. **Draft 2.0** Supplemental Remedial Investigation Work Plan: May 2000
20. Supplemental Remedial Investigation Report: October 2001
21. Summary Proposal for Additional DNAPL and Groundwater Investigation: January 2003
22. Additional DNAPL and Groundwater Investigation: July 2003

CHRONOLOGY OF CORRESPONDENCE RELATED TO
STATE DEFERRAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY:
SOUTHERN WOOD PIEDMONT – WILMINGTON NC SITE

Human Health Risk Assessment / Baseline Ecological Risk Assessment

6/24/99	**[Report by Schnabel: REMEDIAL INVESTIGATION / RISK ASSESSMENT]**
	Superfund Response: Review and Comment
10/8/99	**[Schnabel: SUPPLEMENTAL RI WORKPLAN]**
1/7/00	Aquatic Toxicology Unit (ATU) Memo re: Review of Supplemental RI Workplan
1/2000	S F Parker Review and Comment on Draft RI Workplan
5/23/00	**[Schnabel: Draft 2.0 SUPPLEMENTAL RI WORKPLAN]**
1/16/01	S F Parker letter (to DWQ) re: Fish Tissue Sampling
3/22-23/01	S F Parker E-correspondence on Fish Tissue Split Sampling:
6/14/01	Schnabel E-mail: Risk Assessment / Cleanup Goals
6/21/01	Hanna Assefa Memo: Comment on 6/14/01, Risk Assessment/ Cleanup Goals
10/30/01	**[Schnabel: SUPPLEMENTAL RI / RISK ASSESSMANT REPORT]**
8/5/02	Hanna Assefa Memo: Review and Comment on the SUPPLEMENTAL RI BERA and HHRA.
8/6/02	S F Parker submittal of **Review and Comment on 1) SUPPLEMENTAL RI; 2) SRI BERA/HHRA; 3) Aquatic toxicology Report**
10/9/02	**Schnabel: Response to Comments on Supplemental RI, BERA/HHRA, and Aquatic Toxicology Report**
10/14/02	Layton Bedsole NC PORTS E-mail: Comments on SRI
1/27/03	**Hanna Assefa: Review of (Schnabel/AMEC) Response to Comments on BERA/HHRA**
3/14/03	S F Parker Letter: Follow-up comments on HHRA/BERA
7/9, 7/23/03	S F Parker e-mail correspondence re: Data treatment
10/14/03	Hanna Assefa reports **EPA concurs not to re-do Forward Risk Calculation**.

(continued)

11/24/03	S F Parker: Letter on **1) EPA comment on ADDITIONAL DNAPL & GW DELINEATION** **2) Prospective Geophysical Exploration on site** **3) Risk Calculation requirements** Attached: Hanna's **1/27/02 and ATU's 1/6/03 Reviews of Responses to comments**
2/11/04	Schnabel responses to 11/24/03 reviews. Attachments 5-8
4/29/04	S F Parker Letter with attached responsed by H Assefa And ATU
4/30/04	**AMEC: Construction Worker Risk Evaluation Addendum**
6/7/04	**Schnabel response to 4/29/04 comments re: Risk Assessment (L*).**
6/7/04	S F Parker E-mail requesting technical conference call to discuss sediment cleanup criteria and risk assessment issues. Confirmation on 7/13 for 7/20/04
7/28/04	Transmittal of AMEC questions regarding proposed Lumbriculus Testing.
8/11/04	Forwarded Questions from SESD to AMEC
8/28/04	SWP additional response to 4/29/04 comments. **AMEC assessment of Lumbriculus approach; Proposed alternative workplan (insect sampling).**
10/1/04	Additional Response (letter) from Schnabel.
11/8/04	Hanna Assefa Response (Approval, based on discussion with EPA) *
11/9-10/04	E-correspondence re: Insect Sampling timeline.
12/28/04	**SWP: Insectivorous Bird Exposure Assessment**
1/20/05	**Hanna Assefa comment (ERA Area Use Factor)**
1/28/05	**SWP response to 1/20/05**
2/21/05	NC Ports request for RI Completion Timetable (new senior personnel). SFP forwards request to SWP
2/23/05	**Hanna Assefa response to 1/28/05**
2/24/05	SWP proposed schedule.
2/24/05	S F Parker mailing of larger documents to K Lucas (EPA R IV)
2/28/05	K Lucas notifies S F Parker that Eco Risk Contractor will review and may provide field overview of field work (Insect Sampling)
3/09/05	S F Parker sends revised estimated RI timetable to NC Ports and PRP.

(continued)

3/14/05	Hanna Assefa concurs with AMEC on calculation of Area Use Factors/
3/25/05	K Lucas notifies S F Parker that Eco comments are forthcoming for proposed May Insect Bioaccumulation sampling.
4/21/05	**EPA transmits Ecological Review of AMEC Insect Bioaccumulation workplan:** Review supports insect study BUTcalls for *additional* bioaccumulation study, using either *Chironomid* (midge) or preferably *Lumbriculus* (worm). S F Parker forwards comments to SWP.
4/27/05	SWP expresses concern about EPA comments and implications for work scope. S F Parker communicates concerns to EPA. EPA indicates willingness to provide field support for additional work if needed. **SWP indicates unwillingness to involve EPA,** citing perceived cost (efficiency) issues. S F Parker reiterates potential for EPA to assist and clarifies EPA role in Deferral.
5/2/05	Jason Wells (EPA Eco Contractor) referral to Weyerhaeuser Plymouth bioaccumulation study.
5/23/05	**Field Sampling** operations: Duration, 5.5 days. Mixed success in collecting sufficient insect mass due to cool weather.
6/17/05	AMEC Response to EPA comments on proposed Insect Bioaccumulation Study: Disagrees with validity of *Lumbriculus* or *Chironomid* study.
6/20/05	SWP expresses further concern about EPA directive to conduct Lumbriculus study, citing additional effort and cost. First invocation of ***Cooper V Aviall*** ruling limiting contribution rights.
8/31/05	SWP notifies that Insect Data are complete and that AMEC will work up in RA, anticipated "in the next few weeks".
10/27/05	S F Parker queries SWP re status of Study
12/9/05	**SWP submits Supplemental Insectivorous Bird Risk Assessment by AMEC.**
1/30/06	K Lucas notifies S F Parker that AMEC report is in review by EPA RA consultant
2/9/06	EPA completes generally unfavorable review of AMEC report and recommends that EPA and State conduct additional (Lumbriculus) data gathering. S F Parker forwards comments to Hanna Assefa.
3/7/06	NC Ports requests update.
3/21/06	After in house review and concurrence by Hanna, S F Parker sends **letter to SWP with attached EPA comments on AMEC report.** Letter includes 1) summary of EPA comments, 2) EPA legal comment on Cooper V Aviall reference, 3) Recommendations for additional study (Lumbriculus/BSAF, possibly by EPA (later rescinded).
4/18/06	S F Parker memo re: Deferral Status and potential conference call issues.
4/21/06	**Conference Call** between SWP, Schnabel, AMEC, EPA. (Absent: NC Ports) S F Parker summarizes discussions in detailed memorandum

(continued)

5/05/06	E-mail from SWP with attached AMEC response to comments re: Insect Bioaccumulation study.
5/15/06	**Field Sampling** Operations (additional Insect collection) Duration: 4 days.
5/25/06	SWP **response** to 3/21/06 Review, Comment and Recommendation for Further Investigation.
8/31/06	E-mail from J Bateson to K. Waylett (Atty, EPA) regarding potential AOC amendments
8/31/06	SWP completes **Revised Supplemental Risk Evaluation Report (Insectivorous Bird).**
1/10/07	Comments by Hanna Assefa
1/11/07	SFP forwards H. Assefa's comments and recommendations for further investigation to SWP.
1/20/07	Teleconference
2/6/07	SWP response on recommendations .
2/15/07	H. Assefa concurs with SWP responses, but notes that terrestrial eco receptors must be addressed if entire site not to be developed, contrary to previous assertion by SWP (source of controversy with SPA).
3/14/07	SWP requests 30-day extension. Granted.
4/16/07	SWP sends **Revised Baseline Ecological Risk Assessment** (RBERA) Report to SF.
5/2/07	L Bedsole (NC Ports) submits comments on RBERA
7/26/07	E-mail SFP to EPA requesting status of their review of revised BERA.
8/9/07	Memo S Thoms (EPA) to J Wendel (EPA).
9/12/07	S Thoms submits review and comment on Revised BERA to J Wendel.
10/12/07	L Bedsole announces leaving SPA
10/16/07	J Wendel e-mails S Thoms comments to SFP.
10/26/07	Hanna Assefa submits summary of review of comments to SFP.
10/29/07	SFP e-mails Sharon Thoms (EPA) for clarification of comments
10/29/07	S. Thoms reply (terse and uninformative).
2/27/08	SFP sends EPA and H.A. comments to SWP, and directs calculation of protective RGs for Terrestrial Eco Receptors
4/1/08	Conference Call: AMEC discussion of comments on RBERA; SWP submits proposed remediation maps: 1) Soil Capping ; 2) Sediment capping; 3) diversion of contaminated drainage ditch and immob of sediment to wetland grade.
5/5/08	AMEC/SWP sends formal response to comments on RBERA.

7/23/08	Discussion of Eco Risk and RG development issues with Hanna Assefa.
10/_/08	State Ports releases Proposed Facility Layout for bulk storage terminal.
10/29/08	Hanna Assefa summarizes unaddressed concerns from RBERA and AMEC response - 1ppb Diox/Furan RG or protective of Terr. Recept. - relevance of Theil Sludge Study - need PAH RG protective of insectivores - >PAH in worms, so Kingbird not good surrogate for Robin - Ditch/Creek PAH RGs too high, non-protective - Ditch needs to be remediated - sediment E/Tox not tested at 700 PPM so RG cannot be considered protective RG (EPA comment 7)
11/24/2008	SFP: Proposed Site Breakdown into Operational Units, with discussion of potential remedies and relevant considerations.
12/2/08	Conf Call with NC Ports Authority.
3/2009-3/2010	T. Augsperger (USF&W) evaluates RBERA, Insectivorous Bird study and SWP's proposed RGs.
3/24/10	NCSF meets with T Augsperger to discuss his e-mailed draft comments.
4/13/10, 5/12/10	SFP requests finalization of T Augsperger comments.
6/1-4/2010	E-mais with Ports to meet and discuss future potential site development and/or Brownfields potential if Ports sells property.
5/10-14/2012	H Assefa evaluates suitability of modified Dioxin RGs, based on terrestrial receptor Area Use Factors: Concludes that EPA human-health RGs are required as starting point.
7/02/2012	H Assefa submits Alternative RGs for upland soil and sediment
2/13/2013	H Assefa submits Revised Alternative RGs for upland soil and sediment

Upland Soil:	Dioxin/Furan = 0.600 ug/kg Total PAH = 10.5 mg/kg
Terrestrial Wetlands:	Dioxin/Furan = 0.600 ug/kg Total PAH = 10.5 to 22.8 mg/kg
Drainage Ditch/ Greenfield Creek Sediment:	Dioxin/Furan TCDD = 0.26 to 0.6 ug/kg Total PAH = 22.8 mg/kg

Date: July 02, 2012 revised February 13, 2013

To: Stuart Parker
Superfund Section

From: Hanna Assefa
Superfund Section

Re: Remediation Goals for Ecological Risk Assessment
Southern Wood Piedmont
Wilmington, New Hanover

Based on the evaluation conducted by the North Carolina Superfund Section (NCSS), the United States Environmental Protection Agency (USEPA), and the US Fish and Wildlife Service (USFWS), the Polyaromatic Hydrocarbon (PAH) and the dioxin /furan remediation goals for soil and sediment proposed by AMEC Environmental are determined not to be adequately protective of ecological receptors at the subject Site. The proposed remediation goals are not considered protective because the ecological evaluation conducted for their establishment was inadequate. In addition the proposed remediation goals are considerably higher than those developed for other similar sites in eastern NC. Therefore, the alternative preliminary remediation goals are proposed for implementation at the Southern Wood Piedmont Site.

Greenfield Creek Sediment and Drainage Ditch- The remediation goals proposed by AMEC for PAHs are 70 mg/kg for individual PAHs and 700 mg/kg for total PAHs. Previous communications and comments by NCSS and USEPA and USFWS have described why these proposed remediation goals are not considered protective nor supported by Site specific data. Based on the comments received, and our own evaluation a preliminary remediation goal for total PAHs in sediment of 22.8 mg/kg is recommended. This is the probable effects concentration from Mcdonald (2000). This preliminary remediation goal is consistent with remediation goals used at other contaminated sites by the USEPA.

For Dioxins and Furans AMEC proposed 59 ppb tcdd equivalents. Further review by the USEPA and the USFWS indicates that this value is considerably higher than that used at similar sites. For Greenfield Creek sediments we propose a preliminary remediation goal range between 0.26 ug/kg and 0.6 ug/kg. The value 0.26 ug/kg is the consensus based sediment quality concentration and 0.600ug/kg is the remediation Goal for industrial commercial exposure (the precedent for using this human health remediation goal for the ecological receptors is the Weyerhaeuser Welch Creek and Roanoke River Sites, where EPA and Weyerhaeuser did not reach consensus on ecological remediation goals. As a result the USEPA human health based soil remediation goal of 1 ug/kg* was set as the remediation goal for both Sites). The feasibility study will drive the final sediment remediation goal choice.

Upland Wetlands For Dioxin/Furans use the USEPA's 0.600 ug/kg remediation goal, based on industrial /commercial human exposure scenario. This will be complemented with land –use restrictions. The precedent for this proposed remediation goal is the Weyerhaeuser Welch Creek and Roanoke River Sites, where EPA and Weyerhaeuser did not reach consensus on ecological remediation goals. As a result the USEPA human health based soil remediation goal of 1 ug/kg* was set as the remediation goal for both Sites. For PAHs the sediment remediation goal of 22.8 mg/kg should be used to protect insectivorous wetland birds and mammals. If the upland wetlands are used by humans in the future (development) then 10.5 ppm PAHs applies for an industrial commercial scenario.

Upland Soil For dioxins and furans use 0.6 ppb remediation goal. For PAHs use 10.5 ppm. Both remediation goals are for the protection of humans in an industrial/commercial facility. Land use restrictions have to be implemented.

Area	Dioxins and Furans Ug/kg	Endpoint	Source	PAHs Mg/kg	Endpoint	Source
Greenfield Creek Sediment and Drainage Ditch	**0.26 to 0.6**	Ecological	**0.26ug/kg** – Consensus Based Sediment Value. **0.6ug/kg** Human Health dioxin/furan remediation goal for industrial commercial exposure	**22.8**	Ecological	**22.8 mg/kg** Mcdonalds (2000)Probable Effects Concentration
Upland Wetlands	**0.6**	Ecological +Human Health	**0.6ug/kg** Human Health dioxin/furan remediation goal for industrial commercial exposure	**10.5/22.8**	Human Health /Ecological	**10.5 mg/kg** is human health remediation goal at 5 .0E-05 risk **22.8 mg/kg** Mcdonalds (2000)Probable Effects Concentration
Upland Soils	**0.6**	Human Health		**10.5**	Human Health	**10.5 mg/kg** is human health remediation goal at 5 .0E-05 risk

*Since that time toxicity values have been updated. The USEPA's human health- based soil remediation goal has changed to 0.600 ug/kg for industrial /commercial use and 0.050 ug/kg for residential use

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Waste Management

Beverly Eaves Perdue
Governor

Dexter R. Matthews
Director

Dee Freeman
Secretary

May 11, 2012

MEMORANDUM

TO: Ms. Hanna Assefa, Industrial Hygiene Consultant
NC Division of Waste Management, Superfund Section

FROM: Stuart F Parker, Hydrogeologist
Site Evaluation and Removal Branch

Subject: Southern Wood Piedmont Wilmington Site
Alternative Cleanup Goal Derivation
Contaminant Stressor Areas

I have reviewed the Supplemental Remedial Investigation (SRI) report and the Revised Baseline Ecological Risk Assessment (RBERA) report, completed for this site by Schnabel Engineering Associates, Inc., and by AMEC Earth & Environmental, Inc., respectively. Based on the review, I have identified the following areal extents of Contaminants of Potential Concern (COPCs) at the site.

Figure 17 of the SRI included SWP's delineation of areas where surface soil Dioxin/Furan COPC concentrations exceeded Preliminary Remediation Goals (PRGs). I used an electronic planimeter to measure these areas, which included the Landfarm, and portions of the Production Area and the Covered Ditch Area: The total area of Dioxin/Furan PRG exceedence measured 283,882 sq ft = 6.517 acres.

At your recommendation, I expanded the area of measurement to include all positive Dioxin/Furan detections. The number and areal coverage of Dioxin/Furan sampling were very limited. However, within the Landfarm, Production and Covered Ditch areas, all samples had detections above background. I therefore treated unsampled portions of these areas as also being contaminated, due to lack of contrary evidence. Based on the expanded planimetry, these three areas totaled 510,300 sq ft = 11.71 acres.

attachments

1301 Riverplace Boulevard
Suite 2300
Jacksonville, FL 32207
Phone: (864) 599-1070

Southern Wood Piedmont Company

RECEIVED
FEB 2 2012
SUPERFUND SECTION

December 29, 2011

Mr. Stuart F. Parker, Jr.
Hydrogeologist
North Carolina DENR
401 Oberlin Road, Suite 150
Raleigh, NC 27605

Re: Southern Wood Piedmont Company, Wilmington, NC
AOC Docket #97-SF-117
EPA ID# NCD058517467

Dear Mr. Parker:

The enclosed document provides signatory authority for actions at the referenced Southern Wood Piedmont Company facility.

Please contact me at 864-599-1070 if you have questions or comments.

Sincerely,

Michael R. Herman
President

Enclosure

1301 Riverplace Boulevard
Suite 2300
Jacksonville, FL 32207
Phone: (864) 599-1070

Southern Wood Piedmont Company

December 29, 2011

To Whom It May Concern:

I am President of Southern Wood Piedmont Company, a Delaware corporation (the "Corporation"). The Corporation owns and/or operates various sites and facilities, which from time to time require permits, applications for permits, modifications, reports, manifests or other pertinent documentation to be filed pursuant to the regulatory jurisdiction of the various permitting agencies or entities of Federal, State or local government charged with environmental monitoring and management. These general requirements, which for convenience I refer to as Environmental Permitting Functions, also expressly include the signature authority for permit applications and reports under 40 CFR 270.11.

As President, acting within the scope of my authority as provided by the Bylaws of the Corporation and the laws of Delaware, I have delegated signatory authority for Environmental Permitting Functions, including the authority required for permit applications and reports under 40 CFR 270.11, to the following officer and manager positions:

> **Vice President, Southern Wood Piedmont Company,** an officer position currently served by Michael M. Bell, John J. Kublbock and Scott D. Winer.
>
> **Manager, Environmental Engineering, Rayonier TRS Holdings Inc. as service provider for Southern Wood Piedmont Company,** a manager position currently served by Warren Snyder.
>
> **Remediation Manager, Rayonier TRS Holdings Inc. as service provider for Southern Wood Piedmont Company,** a manager position currently served by Josh Patterson.

The designated officer and manager positions are each a "person(s) who performs ... policy - or decision making functions for the Corporation" under 40 CFR 270.11(a)(1)(i) when acting within the scope of the law and consistent with this delegation of authority for the Environmental Permitting Functions of the Corporation.

Pursuant to resolutions duly adopted by the Board of Directors of the Corporation on December 9, 2011, the officers to whom this authority is delegated continued or assumed policy-or decision making functions for the Corporation, including, but not limited to those listed above. Any corresponding changes to the site's post-closure contact information and/or list of emergency coordinators identified in the Site Contingency Plan prepared in accordance with the requirements of 40 CFR 264 Subpart D will be recorded in a proper amendment and written notification to all agencies and response personnel in accordance with 40 CFR 264.54.

Sincerely,

Michael R. Herman
President

March 24, 2010:

Meeting with Tom Augsperger, Ecologist, US Fish & Wildlife Svc.

RE: Southern Wood Piedmont, Wilmington
RI Sediment Cleanup Goals

Remediation Goals: Comparison to other sites with which US Fish & Wildlife has been involved

- APPROPRIATENESS of derivation
- REALISTIC – attainable
- PRECEDENT – other sites

Protection of terrestrial insectiviores (robin, shrew)
Sediment Remediation

Habitat Value – In the event that site cleanup remedy includes development of wetland
Wetland Development vs State ARAR 856-4520, x 21

If Capping Uplands (including Terrestrial Wetland) is considered a Reasonable Remedy, then what Compensatory/Restorative Measures would be indicated ?
Smart Design for Site Redevelopment

No "Right/Wrong":
Hanna Assefa and Sharon Thoms' comments are on target

Bioassay-Derived 10-day Test was a Red Herring:

- Eco Dioxin is generally driven by Top-level Predators (Pisciverous Birds, Mink).
- Eco PAH (conversely) driven by Benthic Invertebrates (not Heron).
- Health-based Dioxin (soil): 1 ppb, subject to change.

Focus on the DRIVERS

Hanna: Tell them to meet the numbers suggested by Tom Augsperger or developed by us.

- Uncertainty Analysis acknowledges Risk.
- SWP is NOT advocating No Further Action – they PLAN to Remediate.
- There is always a RANGE of Opinion at sites, in regard to Risk.
- Use TRVs that YOU are comfortable with.

Hanna: wants to propose, based on precedent: HH, 1ppb for Dioxin

Tom:

- Eco risk : Seasonal Use Factor is OK for a small site like this; lots of other habitat nearby.
- Area Use Factor used at Roanoke; could use here as well.
- Drainage Ditch "hot spots" are altered phragmites, with not much value.
- The cypress areas have much more value but are a relatively small area
- Well-characterized diversity – has Avian habitat, but not a great quality/quantity "value"
- Pisciverous bird and mammals will be there, but not a large habitat area.
- Size of site limits damage to wildlife, but it DOES have value

Remedial Alternatives: What produces a Hazard Index > 1 , and over what area ?
Clean Water Act: RI/RA – State Superfund site does *not* need Army Corps of Engineers review to remediate wetlands.

Tom A concludes:

- SWP does not ARGUE; they just OBFUSCATE, by doing something else !
- Subjectivity: Range is the NORM
- Normal Approach at sites vs THEIR Approach
  1) Not without merit, but Poor Use of Data
  2) But good characterization of site

Decision: Whether to use 1) Values derived from other sites, 2) Sharon Thoms' numbers. The SWP RGs disagree, because they are very high. Derived from 10-day test, not HH or predators.

Nile Testerman:
What language did regulators use to get happy with clean-up range at Roanoke River ?

Tom:

- Any areas left more contaminated than we like would leave them liable for Damages claims from Natural Resource Trustees.
- Less residual Risk = less potential liability
- Under CERCLA AND State: Ports is a RP

Jim Bateson: How to handle Risk via Site Design and Cleanup ???

Tom: to summarize:

1. Their clean-up numbers are too high.
2. Hanna and Sharon Thoms have numbers (ST: 1 ppb Dioxin from Roanoke).
3. Other sites have Precedent clean-up numbers.
4. Use #2 and #3 as a Target Range
5. Then Evaluate Options, to see what's left with a HI > 1; may be limited SWP and Ports need to 1) work out solution that frees SWP or 2) wait >.

Mr. Stuart Parker
North Carolina Department of Environment and Natural Resources
Division of Waste management
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Dear Mr. Parker

As you requested, I reviewed the recent history of ecological risk assessment at the former Southern Wood Piedmont site (NCD 058 517 467) in Wilmington, NC. The U.S Fish and Wildlife Service (Service) typically reviews only those solid and hazardous waste-site actions with the potential to affect resources within our management purview, such as National Wildlife Refuges, habitat for federally-listed threatened and endangered species, anadromous fish, or migratory birds. The former Southern Wood Piedmont site has a mix of mature forest and early successional habitats along the Cape Fear River and is expected to be used by a variety of birds; risk to avian receptors has been included in the previous site assessments. As such, I focused on avian issues as well as the derivation and protectiveness of the proposed remedial goals as you requested. I reviewed the following file material:

> Hanna Assefa's January 10, 2007 technical assistance comments on the August 2006 revision of the Supplemental Risk Evaluation for Insectivorous Birds;
>
> AMEC Earth & Environmental's April 16, 2007 Revised Baseline Ecological Risk Assessment (revised BERA)
>
> North Carolina Division of Waste Management's (DWM) February 27, 2008 review and comment on the revised BERA; and,
>
> Southern Wood Piedmont Company's May 5, 2008 response to DWM's review and comments on the revised BERA

I did not trace the site remedial investigation or risk assessment history further back than 2007. The file review was augmented with a spring 2009 field reconnaissance to assess site conditions relative to migratory bird use.

Site conditions

The former Southern Wood Piedmont site consists of 96-acres of predominantly cleared and re-vegetating land in Wilmington where wood treating operations occurred between the 1930s and 1980s. The contaminants of potential concern being evaluated in the remedial investigation and risk assessment documents include chromium, copper, arsenic, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated dibenzo-*p*-dioxins and

polychlorinated dibenzofurans (PCDDs/PCDFs). The site is bordered by the Cape Fear River to the west, Greenfield Creek to the south, a railroad spur paralleling Front Street to the to the east, and another industrial property to the north. Just south of Greenfield Creek is the active VOPAK bulk chemical storage facility.

A spring 2009 site reconnaissance confirmed the cover types defined in Figure 5 of the Revised BERA; the site is dominated by wet meadows and mowed fields in the north and forested wetlands and uplands in the south. Dense stands of phragmites occur along the drainage ditch that runs north to south in the eastern portion of the parcel. While less than 2-acres each in size, two stands of about 70-feet tall bald cypress occur in the eastern and western portions of the property. Greenfield Creek receives drainage from an upstream impoundment, Greenfield Lake, which had abundant green mats of algae. Greenfield Creek appears to have been channelized, being relatively straight (for a tidal creek) with steep banks. Mud crabs were abundant on the small intertidal flat near the only significant bend in the creek. Despite adequate forage and being open enough for herons, kingfishers, and other birds expected to use a tidal creek, a wood duck was only bird seen on the creek adjacent to Southern Wood Piedmont, and it was at the eastern edge of the site near the drainage ditch. A great egret and green heron were observed feeding near the bridge over Greenfield Creek upstream of the site. The few birds seen on the creek may be due to both the steep slopes and proximity of industrial operations to the south. Other birds seen or heard during the site visit are listed in Table 1.

Table 1. Birds seen or heard April 2009 at Southern Wood Piedmont Site, Wilmington, North Carolina.

Common name	Scientific name	Location(s)[1]
Double-crested Cormorant	*Phalacrocorax auritus*	T
Wood Duck	*Aix sponsa*	G
Great Blue Heron	*Ardea herodias*	T
Great Egret	*Ardea alba*	B
Little Blue Heron	*Egretta caerulea*	T
Green Heron	*Butorides virescens*	B
Killdeer	*Charadrius vociferous*	M, W
Gulls	*Larus* spp.	T
Red-bellied Woodpecker	*Melanerpes carolinus*	F
Eastern Wood-Pewee	*Contopus virens*	F
Eastern Kingbird	*Tyrannus tyrannus*	F
Red-eyed Vireo	*Vireo olivaceus*	F
Fish Crow	*Corvus ossifragus*	T
Northern Mockingbird	*Mimus polyglottos*	M
Northern Cardinal	*Cardinalis cardinalis*	F, M
Red-winged Blackbird	*Agelaius phoeniceus*	M, W

[1] Locations evaluated: B = Front Street bridge over Greenfield reek, F = mixed forested uplands, G = Greenfield Creek, M = mowed fields, T = Tide gate at confluence of Greenfield Creek and Cape Fear River, W = wet meadows

The smell of aromatic hydrocarbons was quite evident near the drainage ditch and phragmites marsh near the center of the eastern side of the parcel. The ditch sediments were stained black with an oily-appearing film on water at the edges of the ditch.

Evaluation of Preliminary Remedial Goals

Hanna Assefa's comments on recent versions of the risk assessment and those of Sharon Thoms are technically sound and appear appropriately focused on trying to resolve issues that drive site risk. Some of their suggestions still require resolution – most importantly that the proposed remediation goals do not address the extent of observed sediment toxicity, the remediation goals are high relative to risk-based estimates from other sites, and that complete avian risk pathways in the wetland call for derivation of preliminary remediation goals for terrestrial receptors. In general, we would not be comfortable with a 10-day sediment toxicity test as the foundation for risk assessment of PCDDs/PCDFs, and we do not agree with the way the limited sediment toxicity test data have been interpreted for the PAHs. Without re-running the risk assessment, we offer the following observations on a means to assess the reasonableness of the revised BERA's preliminary clean-up goals.

As a first cut, we would use consensus-based sediment quality guidelines for total PAHs or select a few individual PAHs as surrogates for the overall creosote contamination. It is a reasonable assumption that total PAHs could be used to represent the ecotoxicity of creosote, but we realize the value in also calculating remedial goals for individual PAHs. For evaluating toxicity to benthic macroinvertebrates, consider both of these two sediment benchmarks since the areas is tidal; the Effects Range – Median (Long et al. 1995) which is 35 ppm total PAHs for marine and estuarine waters, and the freshwater Probable Effect Concentration of 22.8 ppm total PAHs (MacDonald et al. 2000, already referenced the revised BERA). While these are screening benchmarks and the site-specific toxicity may be higher or lower depending on the specific types of PAHs present, these two concentrations are similar to a preliminary remediation goal for sediments of 27 ppm total PAHs developed for the Grand Calumet River Great Lakes Area of Concern in Indiana (MacDonald et al. 2005). Variations of those screening values have been adopted in MN (Crane and Hennes 2007), FL (MacDonald et al. 2003) and elsewhere. For example, Crane and Hennes (2007) use the term "Level 1 sediment quality target" to define a concentration below which adverse effects on benthic dwelling organisms should not occur (1.6 ppm total PAHs) and a "Level II sediment quality target" above which adverse effects are likely (23 ppm total PAHs).

Another driver for sediment clean-up goal derivation would be risk of liver tumors in fish because they can be exposed through ingestion and direct contact with sediments and through ingestion of invertebrates that bioaccumulate PAHs. PAHs have been associated with liver tumors in multiple fish species. Horness et al. (1998) used logistic regression to estimate a threshold for English sole of 2.8 ppm total PAH; while that's a Pacific species, it could be considered as a surrogate for untested local fish species. Above that concentration they stated that there was an increased prevalence of liver tumors. In brown bullheads, Pinkney et al. (2009) used a scatterplot of matched sediment and lesion

data for Chesapeake Bay tributaries to suggest that an inflection point occurred at about 15 ppm total PAHs.

Finally, a review of preliminary clean-up values for other hazardous wastes sites is informative. Table 2 is a compilation of sediment PAHs action levels from other creosote sites. These are drawn from RODs or action plan summaries, so consulting the ecological risk assessments for the sites would be advisable for more detail.

Table 2. References for comparison of PAH remedial action goals for sediment

Site	Action Level	Reference
VT, Pine Street Barge Canal, former coal gasification plant	21 ppm total PAHs	Ken Munney, FWS, pers. comm.
FL, Nocatee Hull Creosote Site, former wood treating site	10 ppm total PAHs (sediment) 35 ppm total PAHs (soil)	USEPA, 2008
ID, St. Maries Creosote Site former wood treating site	5.2 ppm LMW PAHs 17 ppm HMW PAHs	USEPA, 2007
DE, Koppers former wood treating	150 ppm total PAHs (bioassay derived)	USEPA, 2004

With regard to dioxin-related compound risk-based remedial goals, we will provide in hard copy reviews of remedial goals from other sites that ranged from 0.002 to 87 ppb TCDD-equivalents. These are also drawn from the literature and RODs or action plan summaries, so consulting the ecological risk assessments for the sites would be advisable for more detail. In our experience, risk derived preliminary remediation goals for dioxin have been used to frame site risks but have not been used as the ultimate remedial action goals; those have been driven by waste management agency policy or directives, such as the 1998 OSWER directive *Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites"* (EPA1998). In that regard, it would be advisable to stay abreast of the developments on the re-evaluation of that directive (USEPA 2009).

Conclusions and recommendations

The risk assessment advise you have been receiving from Hanna Assefa and passing along to site consultants is technically sound. Some suggestions still require resolution – most importantly that the proposed remediation goals do not address the extent of observed sediment toxicity, the remediation goals are high relative to risk-based estimates from other sites, and that complete avian risk pathways in the wetlands call for derivation of preliminary remediation goals for terrestrial receptors.

The proposed PAH and PCDD/PCDF sediment preliminary remediation goals are very high relative to those derived at other sites. We provided references which support DWM's contention that the preliminary remedial goals do not appear protective of ecological receptors. Also attached is a relatively recent overview of creosote as a pollutant (Melber et al. 2004); while it does not contain remedial action objectives, it does provide a synthesis of studies pertinent to human and ecological risk assessments for creosote for reference.

The Revised BERA's characterization of the property as within an industrial corridor is a bit misleading; from north to south along the river that is accurate but from east to west between Greenfield Lake and the opposite shoreline of the Cape Fear River, the area is relatively undeveloped. While sensitive to considerations that future site landuse is likely to be industrial, it seems appropriate to calculate risk to all the evaluated aquatic as well as terrestrial receptors since future site conditions are not a certainty. While more and better habitat conditions occur across the Cape Fear River with less human disturbance than at this site, it still has habitat value for migratory birds (as well as small mammals, reptiles, and amphibians).

We hope this review is helpful to your work on remedying contamination at this site. If you have any questions about our input, please give me a call (856-4520 x.21) or e-mail (tom_augspurger@fws.gov).

References:

Crane JL, Hennes S. 2007. Guidance for the use and application of sediment quality targets for the protection of sediment-dwelling organisms in Minnesota. MPCAA Document number tdr-gl-04. Minnesota Pollution Control Agency, St. Paul, MN.

Horness BH, Lomax DP, Johnson LL, Myers MS, Pierce SM, Collier TK. 1998. Sediment quality thresholds: estimates from hockey stick regression of liver lesion prevalence in English sole (*Pleuronectes vetulus*). *Environ Toxicol Chem* 17:872-882.

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MacDonald DD, Ingersoll CG, Smorong DE, Lindskoog RA, Sloane G, Biernacki T. 2003. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters. Florida Department of Environmental Protection. Tallahassee, FL.

MacDonald DD et al. 2005. Development and evaluation of risk-based preliminary remediation goals for selected sediment-associated contaminants of concern in the West Branch of the Grand Calumet River. Report to U.S. Fish and Wildlife Service, Bloomington, IN.

Melber C, Kielhorn J, Mangelsdorf I. 2004. Coal Tar Creosote. Concise International Chemical Assessment Document 62, World Heath Organization, Geneva.

Pinkney AE, Harshbarger JC, Rutter MA. 2009. Tumors in brown bullheads (*Ameiurus nebulosus*) in the Chesapeake Bay watershed: Analysis of survey data--1992 through 2006. *J. Aquatic Animal Health* 21: 71-81.

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USEPA. 2007. Record of decision, St. Maries Creosote Site. USEPA, Region 10, Seattle WA.

USEPA. 2008. Superfund proposed plan fact sheet: Nocatee Hull Creosote Site. USEPA, Region 4, Atlanta, GA.

USEPA. 2009. Public review draft: Draft recommended interim preliminary remediation goals for dioxin in soil at CERCLA and RCRA sites. OSWER 9200.3-56. USEPA, Office of Superfund Remediation and Technology Innovation, Washington, D.C.

Subject: Re: input on environmental cleanup at superfund site
From: Tom_Augspurger@fws.gov
Date: Thu, 8 Jan 2009 16:03:59 -0500
To: Stuart Parker <Stuart.Parker@ncmail.net>

Hi Stuart,

Thanks for your note. I was traveling over the holidays and am catching-up now, so I apologize for the delay in replying.

Sure, we will be glad to help. We have not worked at the Southern Wood Piedmont site in Wilmington; I've been to several other contaminated sites in the county but none near this one.

We can review / advise you on the remediation goals as well as offer our opinion on the habitat value and restoration potential of the site. It would be a shame to develop, as the remedy, an area with habitat value or potential (and inconsistent with the wetland conservation ARARs in the Superfund), but it would be good for me to understand the site better before thinking too much more about strategies. I can review the PRG / RG documentation (especially if you can point me to those derived for the COPCs that are drivers) and habitat characterization. I can also visit the site with you to get that perspective on its habitat value after reading whatever is available. I work with several biologists that know that area very well, and I can get their perspectives to augment mine.

You can send material to me or drop it by the office; we are near the Vet School / Fairgrounds at 551-F Pylon Drive.

Have a good rest of the week, and happy New Year,

Tom Augspurger

Tom Augspurger, PhD
Ecologist
U.S. Fish and Wildlife Service
551-F Pylon Drive
Raleigh NC 27606

T: 919/856-4520 x.21
F: 919/856-4556
E: tom_augspurger@fws.gov
http://www.fws.gov/raleigh/ec.html

Stuart Parker
<Stuart.Parker@ncmail.net>

12/19/2008 05:21 PM

To tom_augspurger@fws.gov

cc

Subject input on environmental cleanup at superfund site

Hello Tom

I work for the NC DWM, Superfund Section, overseeing remediation at the Southern Wood Piedmont (SWP) CERCLA site in Wilmington, NC.
The site is a former wood-treating facility, presently owned by the NC State Ports Authority. Soil, sediment and groundwater at the site have been contaminated by creosote constituents (PAH), and soil and sediment additionally contain elevated concentrations of dioxins/furans. The site was a candidate for the EPA National Priorities List, but has been deferred from listing and is undergoing Remedial Investigation (RI) by SWP consultants, with oversight by the Superfund Section.(lead agency) and EPA.

Completion of the RI report by SWP consultants is pending development of soil and sediment remediation goals (RGs) satisfactory to the overseeing parties. Our hope is to break the site up into Operable Units for remediation, conducting groundwater cleanup efforts while completing the risk assessment of independent environmental receptors. Two primary points of contention exist :

1) Computation of wetland soil RGs protective of terrestrial insectivores. One proposed "remedy" to the environmental exposure pathways is prospective site industrial development by the Ports Authority, which could eliminate the affected wetlands and make the site unattractive to receptors (the site is in an urban area, with petroleum terminals on two sides). An alternative proposal is active "hot-spot" remediation of wetland soil; however, the environmental impact of mobilization for such activity is also likely to be significant.

2) Development of realistic RGs for sediment in surface waterways adjacent to the site. The sediment RGs proposed by SWP are perceived as suspiciously high by both Section and EPA reviewers. However, upon researching other wood-treating sites (both in-house and on-line), I was surprised at how little specific information was available regarding site-specific RGs for the above contaminants.

During discussion with Hanna Assefa and other section staff, I was advised that you could probably provide useful input in regard to these issues. Not only assistance in developing realistic, but protective remediation numbers, but perhaps also in assessing the ecological "value" of the specific wetland areas in question.

I will be returning to my office on December 29th. I look forward to discussing these matters with you and appreciate any insight you could provide.

Sincerely,
Stuart Parker, Hydrogeologist
NC DWM, Superfund Section
919-508-8457

Subject: Re: State Ports development teleconference outline
From: Stuart Parker <Stuart.Parker@ncmail.net>
Date: Tue, 02 Dec 2008 13:24:54 -0500
To: Todd_Walton@ncports.com, Mark_Blake@ncports.com

Attached is the outline.

Stuart

Stuart Parker wrote:

> Figures are attached.
> Outline will be e-mailed shortly
>
> Thanks,
> Stuart Parker
> NC Superfund Section
>
> Todd_Walton@ncports.com wrote:
>
> > Stuart,
> >
> > I believe you will be calling us today at 2pm. Please use 910-251-5678.
> >
> > Thanks,
> >
> > Todd C. Walton
> > Environmental Supervisor
> > North Carolina State Ports Authority
> > 910-251-5678 (office)

SUMMARY SFP 11242008.doc	**Content-Type:** application/msword **Content-Encoding:** base64

SOUTHERN WOOD PIEDMONT CO. - WILMINGTON SITE
Proposed Site breakdown into Operational Units (OUs)

OU-1: DNAPL and PAH-contaminated Groundwater
OU-2: Contaminated Upland Surface Soil
OU-3: Contaminated Wetland Soil
OU-4: On-site Drainage Ditch
OU-5: Greenfield Creek and site waterfront

OU-1: DNAPL and PAH-contaminated Groundwater

Aquifers beneath site:

Surficial: Sand from 0 to ~ 15 ft, on top of 10-20 foot peat layer.
Intermediate: Sand from ~20 to ~ 40 ft, on top of tight clay layer. Clay pinches out in southwest portion of site.
Deep: Limestone bedrock, hydraulically connected to intermediate aquifer in southwest portion of site.

Dense Non-aqueous Phase Liquid (DNAPL):

Surficial: Approximately 2 acre area of DNAPL (creosote) at base of surficial aquifer, beneath former production area in central portion of site. DNAPL has been measured up to 5 feet thick in monitoring wells.
Intermediate: Thinner DNAPL on clay at base of intermediate aquifer, beneath portions of surficial aquifer DNAPL area.

Aqueous contamination:

Contaminant plumes exist in each aquifer, extending from DNAPL areas toward bounding surface water bodies (ditch, Greenfield Creek, Cape Fear River).
Principal contaminants are creosote constituents (SVOCs).
Aqueous concentrations drop off with increasing distance from DNAPL.

DNAPL Remedy:

Per EPA RI Guidance, DNAPLs are candidates for Early/Interim Action, prior to Remedial Investigation (RI) completion and Feasibility Study (FS) Remedy Selection.
Early action does not - and may not - preclude future remediation efforts.
Reduction of DNAPL volume would address major source of groundwater contamination and enhance final groundwater remedy.
Reduction of DNAPL area would increase options for site industrial development and benefit community.

Alternatives:
1) Containment: Sheet piling or slurry wall.
2) Removal/treatment:
   a) Dual-phase pump-and-treat (treated groundwater may be re-applied).
   b) In-situ treatment (e.g., heating) to enhance product recovery.
   c) In situ immobilization (eg, mixing aquifer material with cement dust).
   d) Ex-situ treatment (excavation and treatment)

Considerations:
Volume, depth and areal extent of contamination.
DNAPL exists in both surficial and intermediate aquifer.
Groundwater conditions [e.g., brackish] could limit applicable technologies

Implementation:
Under the Deferral Administrative Order on Consent (AOC), the Division is authorized to require additional Remedial Investigation Work Phases.

Groundwater Remedy:

Groundwater remediation effort is driven by State of NC groundwater regulations.

Alternatives:
1) Pump and treat.
2) Monitored Natural Attenuation

Considerations:
1) Success would likely be contingent upon DNAPL containment and/or mitigation.
2) Possible groundwater variance based on land-use restrictions.

OU-1 Suggested Strategy:

Direct SWP to:
1) Update determination of DNAPL location and thickness, using existing monitoring and recovery wells.
2) Begin DNAPL cleanup efforts as an Early Action, installing additional wells as needed.
3) Propose alternative/additional recovery methods in the event that pumping fails to sustainably recover DNAPL.

OU-2: Contaminated Upland Surface Soil

Soil Contamination:

PAH and PCDD/Furan contamination exists in former production, wood storage and soil landfarming areas in northern portion of site.

SWP's Proposed Upland Soil RGs:

1) SWP calculated site-specific human-health-based preliminary RGs for on-site soil.
2) SWP researched Region 9 protection-of-groundwater soil remediation goals (more conservative than NC Inactive Hazardous Sites RGs).
3) SWP advised against use of groundwater protection values, because:
   a) Groundwater occurs at shallow depth beneath most of site.
   b) Groundwater is already contaminated due to subsurface DNAPL.
4) Division does not agree with this rationale.

Upland Soil Remedy:

Alternatives:
1) Capping (SWP's preferred remedy)
2) In-situ immobilization.
3) Excavation and on-site treatment
   Presumptive Remedies (ex situ):
   a) Bioremediation.
   b) Thermal desorption.
   c) Incineration.
4) Excavation and removal (SWP's locally preferred remedy)

Considerations:
1) Future site construction:
   a) No pile-driving or deep excavation into capped areas.
   b) Ports Authority might add additional fill to raise Ports-developed areas above flood zone.
2) Applicability:
   a) In-situ immobilization works best for inorganic soil contamination; may be less effective with organics.
   b) Bioremediation is ineffective against PCDD/F and some PAH species.
   c) Incineration must be conducted properly to ensure no creation of additional PCDD.
   d) Public comment generally does not favor incineration in urban settings
   e) Thermal desorption and off-site soil disposal are often cost-prohibitive at larger sites.
3) Verification:
   a) Additional sampling will be required to better define the areas requiring soil remediation, especially given the limited PCDD/F data coverage.

OU-3: Contaminated Wetland Soil

PAH and PCDD/F contamination exists in terrestrial wetland soils (southern portion of site).

SWP's Proposed Wetland Soil RGs:

1) Based on ecological risk assessment, SWP has concluded no risk from PAH. in wetland soils.
2) SWP calculated that PCDD/F posed unacceptable risk to select (insectivorous) ecological receptors, but has *not* calculated protective RGs, contrary to Division request.

Wetland Soil Remedy:

Alternatives:
1) Excavation and removal.
2) Excavation and on-site treatment.
3) In-situ immobilization.
4) Capping.
5) "Hot Spot" remediation.
6) Monitored natural attenuation (SWP's preferred remedy)

Considerations:
1) Alternatives 1-4 are destructive of wetland habitat and are subject to wetland regulation outside Superfund..
2) Future site construction could potentially accomplish alternatives 3 or 4 but would be plan-specific.
3) Alternative 5 would require mobilization with potential impact within wetland environment.

OU-2 and OU-3 Proposed Strategies:

1) Direct SWP to:
   a) Calculate RGs protective of terrestrial wetland receptors.
   b) Further delineate RG exceedences in both upland and wetland soils, preparatory to remedy selection.

OU-4: On-site Drainage Ditch;
OU-5: Greenfield Creek and site waterfront:

Aqueous Contamination: Sampling to date has not detected site groundwater or soil contaminants in surface water.

Sediment Contamination: PAH and PCDD/F detected in on-site Drainage Ditch and Greenfield Creek sediment. Localized sediment contamination around Greenfield Creek tidal gate and in waterfront slip.

SWP's Proposed Sediment RGs:

1) RGs based on ecological risk assessment, including piscivorous bird (PAH) and benthic invertebrates (PCDD/F).
2) SWP proposed:
   a) 700 ppm total PAH,
   b) 70 ppm individual PAH and
   c) 59 ppb total PCDD/F
3) EPA and Division consider RGs to be suspiciously high and question several assumptions used in calculation.
4) SWP reports that PCDD/F results support remediation of entire drainage ditch and Greenfield Creek, but proposes active measures only in areas where short-term invertebrate ecotoxicity has been demonstrated .
5) Division has determined that lower RGs (70 ppm total PAH; 10 ppm individual PAH; 10-29 ppb total PCDD/F) would slightly increase the area to be remediated, including tidal gate area and waterfront slips.
6) Division will consult with EPA and Fish & Wildlife Service to determine
   a) appropriateness of SWP's proposed RGS
   b) potential alternative RGs

Surface Water (Sediment) Remedies:

Drainage Ditch Sediment Alternatives:
1) Bioremediation (in-situ).
2) Dredging.
3) Capping/immobilization (SWP's preferred remedy).
4) Channel redirection around contaminated sediment (SWP's preferred remedy).
4) Natural attenuation.

Greenfield Creek Alternatives:
1) Bioremediation (in-situ).
2) Dredging.
3) Capping/immobilization (SWP's preferred remedy at areas of higher contamination).
4) Monitored natural attenuation (SWP's preferred remedy at areas of higher contamination).

Subject: Re: State Ports development teleconference
From: Stuart Parker <Stuart.Parker@ncmail.net>
Date: Tue, 02 Dec 2008 12:42:49 -0500
To: Todd_Walton@ncports.com, Mark_Blake@ncports.com

Figures are attached.
Outline will be e-mailed shortly

Thanks,
Stuart Parker
NC Superfund Section

Todd_Walton@ncports.com wrote:

> Stuart,
>
> I believe you will be calling us today at 2pm. Please use 910-251-5678.
>
> Thanks,
>
> Todd C. Walton
> Environmental Supervisor
> North Carolina State Ports Authority
> 910-251-5678 (office)

CAPPING.pdf	**Content-Type:** application/pdf **Content-Encoding:** base64

PREFERRED SEDIMENT REMEDIAL.pdf	**Content-Type:** application/pdf **Content-Encoding:** base64

SWP DNAPL 1.pdf	**Content-Type:** application/pdf **Content-Encoding:** base64

Subject: Re: State Ports development discussion
From: Stuart Parker <Stuart.Parker@ncmail.net>
Date: Fri, 31 Oct 2008 10:47:20 -0400
To: Todd_Walton@ncports.com

Hello Todd,

The comments from Hanna are what I intend to send to SWP, with a simple cover letter containing minimal additional comment.
They can then discuss (not write) directly with us. I deliberately had the word "suggestions" deleted from the text of the comments.

I sent at your request so you could see what issues we see as unresolved, hopefully addressable as part of the Feasibility study.
Obviously, development of the affected wetlands would have major implications for the scope of remediation.
But I want SWP to have good eco numbers crunched and on the table (something that should take minimal time/effort), and not presuming that Ports will simply bulldoze their issues away.

I have also looked at the PDF you sent, and compared to SWP's maps of the extent of subsurface free product.

I will speak with Jim shortly and try to get a good window for you to shoot at.

Thanks,
Stuart

Todd_Walton@ncports.com wrote:

> Stuart,
>
> Can you give me a couple of times and days for a teleconference next week please.
>
> Thanks
>
> Todd C. Walton
> Environmental Supervisor
> North Carolina State Ports Authority
> 910-251-5678 (office)
>
> **Stuart Parker <Stuart.Parker@ncmail.net>**
>
> 10/30/2008 05:47 PM
>
> To Todd_Walton@ncports.com
> cc
> Subject Re: State Ports development discussion

Subject: Re: State Ports development discussion
From: Stuart Parker <Stuart.Parker@ncmail.net>
Date: Thu, 30 Oct 2008 10:56:09 -0400
To: Todd_Walton@ncports.com

Hello Todd,

I expect to e-mail a scanned copy of Ms Assefa's comments to you today.
Card copy mailing will follow.

My supervisor will be on annual vacation from November 8 through most of the month..
Would it be possible to teleconference next week, after you review the comments ?

Thanks,

Stuart

Todd_Walton@ncports.com wrote:

Stuart,

We would like to postpone our scheduled meeting until after we have seen Ms. Assefas response.

Thanks,

Todd C. Walton
Environmental Supervisor
North Carolina State Ports Authority
910-251-5678 (office)

Stuart Parker <Stuart.Parker@ncmail.net>

10/15/2008 10:01 AM

To Todd_Walton@ncports.com
cc
Subject Re: State Ports development discussion

Ms Assefa is experiencing extraordinary work commitments, which have delayed finalization of our response until next week

Date: October 29, 2008

To: Stuart Parker, Hydrogeologist
Superfund Section

From: Hanna Assefa
Environmental Toxicologist
Superfund Section

RE: Southern Wood Piedmont
Wilmington, New Hanover County

I have reviewed the AMEC's May 2008 response to DENR regarding the ecological risk assessment and remediation goals at the site. I offer the following comments.

1) Upland: If this area is completely developed the 1 ppb human health based soil remediation goal for dioxins and furans has to be met. Any undeveloped areas have to meet the lower of the 1 ppb human health based soil remediation goal or the protection of insectivorous bird (robin) and mammal (short tailed shrew) remediation goals. The shrew should not only be evaluated as food for the carnivorous bird, it also needs to be protected itself.

2) Wetlands: Unless developed, wetland soils have to meet the lower of the 1 ppb human health- based soil remediation goal for dioxin or the protection of insectivorous bird (robin) and mammal (shrew) remediation goals.

3) The sludge study conducted by Thiel et. al can be used as one line of evidence. However, since it is just one experiment conducted in 1989 it is not appropriate to use exclusively for decision making. Remediation goals have to be calculated using food chain models and acceptable TRV's.

4) Remediation goals for PAHs must be developed for the insectivorous bird and mammal in a similar manner as dioxin for both upland and wetland areas.

5) The insects that the eastern kingbird consumes are emergent insects; they are likely to have less contamination than the terrestrial worms/insects that the American Robin consumes. Therefore, using the eastern kingbird as a surrogate for the American Robin is not appropriate.

6) Greenfield Creek: We do not have a lot of comfort on the appropriateness of the sediment remediation goals. As EPA responded remediation goals for dioxins and PAHS are unprotective of birds that use the site all year round, eat submerged insects (benthic insectivore), and or use the whole area. Breeding populations on-site must also be

protected. The remediation goals proposed for both dioxins and PAHs are much higher than those required at other EPA sites with sediment contamination. Most sediment dioxin remediation goals are in the low parts per quadrillion range versus the 59 ppb proposed. A range of RGO's needs to be developed in the feasibility study and discussed relative to remediation possibilities. The range of RGO's should be protective of all the above described exposure scenarios for the birds. Also as Ms. Thoms points out, habitat change in the future should also be considered.

7) The ditch sediment needs to be addressed in a similar manner to Greenfield Creek sediment.

8) AMEC did not adequately address the comment USEPA's NCSC comment #7: Since the sediment toxicity was not tested at 700 ppm, that cannot be used as the target concentration to protect benthic invertebrates.

11/24/2008

SOUTHERN WOOD PIEDMONT CO. - WILMINGTON SITE
Proposed Site breakdown into Operational Units (OUs)

OU-1: DNAPL and PAH-contaminated Groundwater
OU-2: Contaminated Upland Surface Soil
OU-3: Contaminated Wetland Soil
OU-4: On-site Drainage Ditch
OU-5: Greenfield Creek and site waterfront

OU-1: DNAPL and PAH-contaminated Groundwater

Aquifers beneath site:

Surficial: Sand from 0 to ~ 15 ft, on top of 10-20 foot peat layer.
Intermediate: Sand from ~20 to ~ 40 ft, on top of tight clay layer. Clay pinches out in southwest portion of site.
Deep: Limestone bedrock, hydraulically connected to intermediate aquifer in southwest portion of site.

Dense Non-aqueous Phase Liquid (DNAPL):

Surficial: Approximately 2 acre area of DNAPL (creosote) at base of surficial aquifer, beneath former production area in central portion of site. DNAPL has been measured up to 5 feet thick in monitoring wells.
Intermediate: Thinner DNAPL on clay at base of intermediate aquifer, beneath portions of surficial aquifer DNAPL area.

Aqueous contamination:

Contaminant plumes exist in each aquifer, extending from DNAPL areas toward bounding surface water bodies (ditch, Greenfield Creek, Cape Fear River).
Principal contaminants are creosote constituents (SVOCs).
Aqueous concentrations drop off with increasing distance from DNAPL.

DNAPL Remedy:

Per EPA RI Guidance, DNAPLs are candidates for Early/Interim Action, prior to Remedial Investigation (RI) completion and Feasibility Study (FS) Remedy Selection.
Early action does not - and may not - preclude future remediation efforts.
Reduction of DNAPL volume would address major source of groundwater contamination and enhance final groundwater remedy.
Reduction of DNAPL area would increase options for site industrial development and benefit community.

Alternatives:
1) Containment: Sheet piling or slurry wall.
2) Removal/treatment:
   a) Dual-phase pump-and-treat (treated groundwater may be re-applied).
   b) In-situ treatment (e.g., heating) to enhance product recovery.
   c) In situ immobilization (eg, mixing aquifer material with cement dust).
   d) Ex-situ treatment (excavation and treatment)

Considerations:
Volume, depth and areal extent of contamination.
DNAPL exists in both surficial and intermediate aquifer.
Groundwater conditions [e.g., brackish] could limit applicable technologies

Implementation:
Under the Deferral Administrative Order on Consent (AOC), the Division is authorized to require additional Remedial Investigation Work Phases.

Groundwater Remedy:

Groundwater remediation effort is driven by State of NC groundwater regulations.

Alternatives:
1) Pump and treat.
2) Monitored Natural Attenuation

Considerations:
1) Success would likely be contingent upon DNAPL containment and/or mitigation.
2) Possible groundwater variance based on land-use restrictions.

OU-1 Suggested Strategy:

Direct SWP to:
1) Update determination of DNAPL location and thickness, using existing monitoring and recovery wells.
2) Begin DNAPL cleanup efforts as an Early Action, installing additional wells as needed.
3) Propose alternative/additional recovery methods in the event that pumping fails to sustainably recover DNAPL.

OU-2: Contaminated Upland Surface Soil

Soil Contamination:

PAH and PCDD/Furan contamination exists in former production, wood storage and soil landfarming areas in northern portion of site.

SWP's Proposed Upland Soil RGs:

1) SWP calculated site-specific human-health-based preliminary RGs for on-site soil.
2) SWP researched Region 9 protection-of-groundwater soil remediation goals (more conservative than NC Inactive Hazardous Sites RGs).
3) SWP advised against use of groundwater protection values, because:
   a) Groundwater occurs at shallow depth beneath most of site.
   b) Groundwater is already contaminated due to subsurface DNAPL.
4) Division does not agree with this rationale.

Upland Soil Remedy:

Alternatives:
1) Capping (SWP's preferred remedy)
2) In-situ immobilization.
3) Excavation and on-site treatment
   Presumptive Remedies (ex situ):
   a) Bioremediation.
   b) Thermal desorption.
   c) Incineration.
4) Excavation and removal (SWP's locally preferred remedy)

Considerations:
1) Future site construction:
   a) No pile-driving or deep excavation into capped areas.
   b) Ports Authority might add additional fill to raise Ports-developed areas above flood zone.
2) Applicability:
   a) In-situ immobilization works best for inorganic soil contamination; may be less effective with organics.
   b) Bioremediation is ineffective against PCDD/F and some PAH species.
   c) Incineration must be conducted properly to ensure no creation of additional PCDD.
   d) Public comment generally does not favor incineration in urban settings
   e) Thermal desorption and off-site soil disposal are often cost-prohibitive at larger sites.
3) Verification:
   a) Additional sampling will be required to better define the areas requiring soil remediation, especially given the limited PCDD/F data coverage.

OU-3: Contaminated Wetland Soil

PAH and PCDD/F contamination exists in terrestrial wetland soils (southern portion of site).

SWP's Proposed Wetland Soil RGs:

1) Based on ecological risk assessment, SWP has concluded no risk from PAH. in wetland soils.
2) SWP calculated that PCDD/F posed unacceptable risk to select (insectivorous) ecological receptors, but has *not* calculated protective RGs, contrary to Division request.

Wetland Soil Remedy:

Alternatives:
1) Excavation and removal.
2) Excavation and on-site treatment.
3) In-situ immobilization.
4) Capping.
5) "Hot Spot" remediation.
6) Monitored natural attenuation (SWP's preferred remedy)

Considerations:
1) Alternatives 1-4 are destructive of wetland habitat and are subject to wetland regulation outside Superfund..
2) Future site construction could potentially accomplish alternatives 3 or 4 but would be plan-specific.
3) Alternative 5 would require mobilization with potential impact within wetland environment.

OU-2 and OU-3 Proposed Strategies:

1) Direct SWP to:
   a) Calculate RGs protective of terrestrial wetland receptors.
   b) Further delineate RG exceedences in both upland and wetland soils, preparatory to remedy selection.

OU-4: On-site Drainage Ditch;
OU-5: Greenfield Creek and site waterfront:

Aqueous Contamination: Sampling to date has not detected site groundwater or soil contaminants in surface water.

Sediment Contamination: PAH and PCDD/F detected in on-site Drainage Ditch and Greenfield Creek sediment. Localized sediment contamination around Greenfield Creek tidal gate and in waterfront slip.

SWP's Proposed Sediment RGs:

1) RGs based on ecological risk assessment, including piscivorous bird (PAH) and benthic invertebrates (PCDD/F).
2) SWP proposed:
   a) 700 ppm total PAH,
   b) 70 ppm individual PAH and
   c) 59 ppb total PCDD/F
3) EPA and Division consider RGs to be suspiciously high and question several assumptions used in calculation.
4) SWP reports that PCDD/F results support remediation of entire drainage ditch and Greenfield Creek, but proposes active measures only in areas where short-term invertebrate ecotoxicity has been demonstrated .
5) Division has determined that lower RGs (70 ppm total PAH; 10 ppm individual PAH; 10-29 ppb total PCDD/F) would slightly increase the area to be remediated, including tidal gate area and waterfront slips.
6) Division will consult with EPA and Fish & Wildlife Service to determine
   a) appropriateness of SWP's proposed RGS
   b) potential alternative RGs

Surface Water (Sediment) Remedies:

Drainage Ditch Sediment Alternatives:
1) Bioremediation (in-situ).
2) Dredging.
3) Capping/immobilization (SWP's preferred remedy).
4) Channel redirection around contaminated sediment (SWP's preferred remedy).
4) Natural attenuation.

Greenfield Creek Alternatives:
1) Bioremediation (in-situ).
2) Dredging.
3) Capping/immobilization (SWP's preferred remedy at areas of higher contamination).
4) Monitored natural attenuation (SWP's preferred remedy at areas of higher contamination).

Subject: Re: drawing/meeting
From: Stuart Parker <Stuart.Parker@ncmail.net>
Date: Tue, 07 Oct 2008 10:28:29 -0400
To: Todd_Walton@ncports.com

2 PM on the 23rd sounds good to us.

Thanks,
Stuart

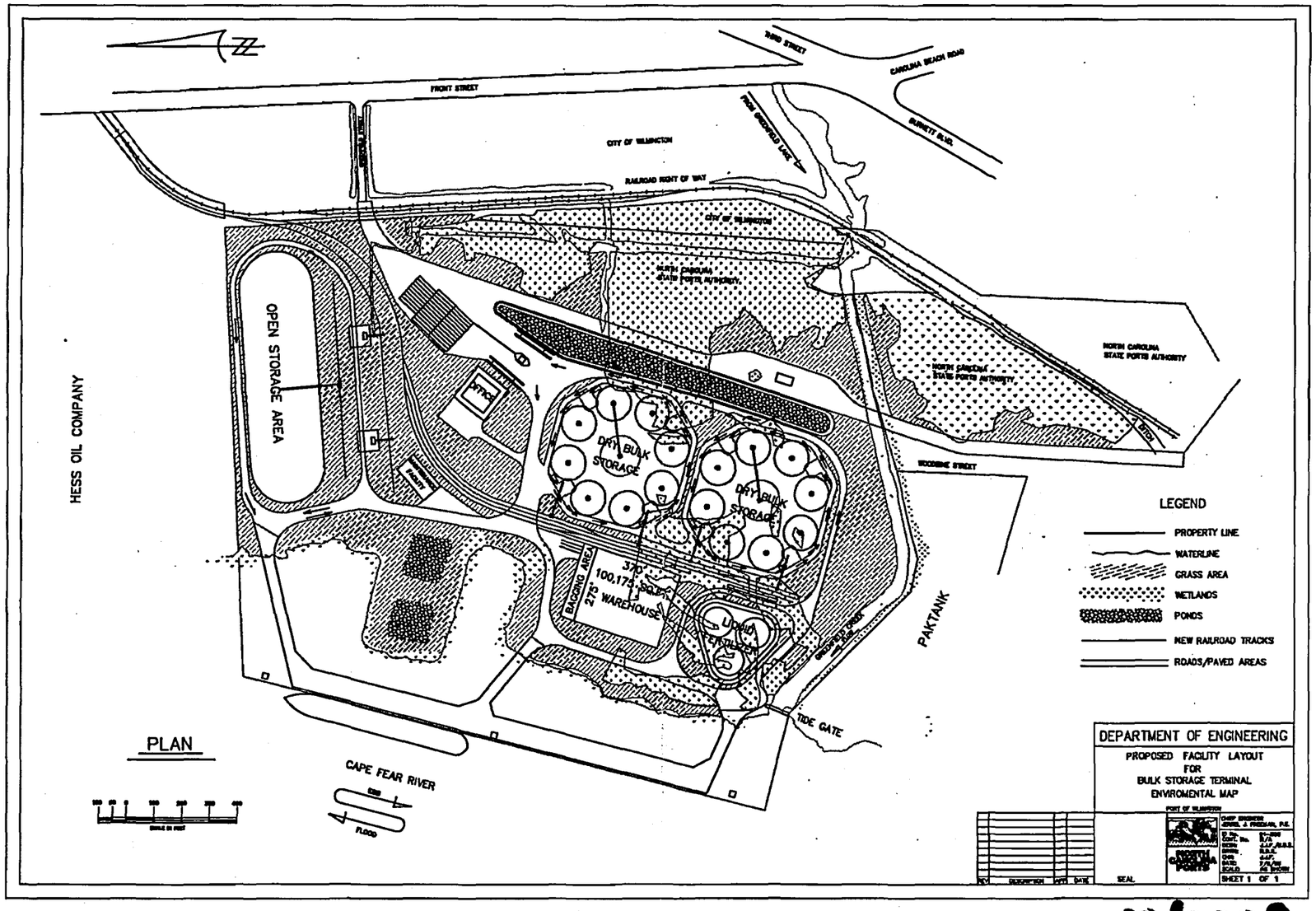
Todd_Walton@ncports.com wrote:

> Stuart,
>
> Here is a bulk facility layout that I believe you said you may have seen but wanted to forward it to you. What time on the 23 Oct would be best for you?
>
> Thanks,
>
> Todd C. Walton
> Environmental Supervisor
> North Carolina State Ports Authority
> 910-251-5678 (office)

ERROR: invalidrestore
OFFENDING COMMAND: restore

STACK:

-savelevel-



10/2008

Subject: State Ports site
From: Todd_Walton@ncports.com
Date: Wed, 17 Sep 2008 08:29:21 -0400
To: stuart.parker@ncmail.net

Stuart,

I am still working on getting a pdf of the possible proposed site development we talked about on Monday. The main outcome of a meeting would be for the Ports to understand what remediation efforts need to be completed so the property is once again viable. At this point, it is very difficult to market the property to perspective clients when we do not have an idea of what cleanup efforts would be acceptable, what type of development will be acceptable(pile supported buildings, spread footers, etc), and some idea of time line of when development might possibly be able to commence.

Please call when you and Jim Bateson determine a good date for a meeting. Anytime after Oct 13th would be good for us.

Thanks,

Todd C. Walton
Environmental Supervisor
North Carolina State Ports Authority
910-251-5678 (office)

7/23/08 **Discussion with Hanna Assefa**

SWP Submittal of 5/6/08

UPLAND:

1) If entirely developed, HHRA soil RGs would drive cleanup (1ppb dioxin, 1 ppm/pah spec)
2) If undevelopecd, EPA reqs that Ecol Cleanup Goals be developed and met
3) Groundwater protection soil RGs

TERRESTRIAL WETLANDS:

If Undeveloped:

1) Wetland soil/sediment RGs must be met
2) Human Health – frequency of human visits – if no trespassers, 1ppb RG is irrelevant
3) Ecological –

   SWP argues active remediation would be destructive.
   Insectivores (Shrew/Robin) generate HQ > 1.
   "Hot Spot" remediation possible.
   BUT per HA, still have to develop RGs protective of the insectivores
   Accessibility – how disruptive to access the wetlands

Generate protective numbers that will determine which areas need spot cleanup; to approve remedial decisions, need to know extent of exceedence of protective RGs

Proposed site redevelopments have included wetland development, but Hanna indicated that SPA cannot build on top of a wetland

DRAINAGE DITCH:

1) Sharon Thoms wrote that piscivorous mammal (Mink) not appropriate receptor due to its large range .
2) Hanna recalled that Jason Wells approved of mink as receptor. If so, not relevant at this point.
3) SWP pointed out that fish not present in ditch and that insectivorous birds are more sensitive indicators.
4) Groundwater Protection: TCLP comparison to GW standards. But is remediation of wetland sediment feasible for GW protection ? (ask Charlotte J)

GREENFIELD CREEK:

1) No consensus that evaluation was adequate for RG development.
   - Emergent Insect study does not protect benthic invertebrates.
   - Great Blue Heron eats fish, not mixed fish/benthic diet like other birds
   - Uncertainty of AUF /TUF, absence of other heron species, breeding season exposure
   - Only one TRV used, but SWP agreed to do sensitivity analysis in FS
   - How are RGs protective, and what range of RGs would protect insects, birds AND mammals ?
   - PAH concentrations correlate poorly with midge study mortality.
   - SWP points out that dioxin cleanup #s drive the cleanup of the waterway, including locations where midges died even without high PAH levels

2) Page 13/16 Comment NCSC #7:
   - Hanna had difficulty understanding their response.

3) New Table:
   - Low MW PAH (100 ppm) + High MW PAH (724 ppm) = Total PAH (825 PPM)
   - Based on Great Blue Heron, but S Thoms disagrees with receptor choice
   - GBH eats fish, which don't accumulate PAH (per EPA, not SCDM)
   - But we (Jason Wells) agreed on GBH as receptor.

4) Can SWP compute a goal(s) based on a Resident, Benthic-insectivorous bird ?
   - They have resisted.
   - SWP : PCDD/F goals would drive surface water cleanup.
   - 59 ppb sediment RG for TCDD/F seems excessively high; what about 1 ppb ?

End of Discussion

8/15/08

DRAINAGE DITCH:

1) SWP says they WILL remediate, so no matter so long as they deliver
2) Meet sediment remediation goals, or b) cap and redirect

TERRESTRIAL WETLANDS AND UPLANDS :

1) What is being protected ?
- Insectivorous mammal & bird risk unacceptable
- SWP argues they are unlikely to forage in terrestrial wetland
- I responded they need to support this assumption
- SWP cited dioxin TEQ study (sludge site) to argue that uptake was ~ to NOAEL levels
- But the 4 onsite samples TEQ exceeded the NOAEL for the study
- Both PAH and TCDD/F exceed HQ of 1 for both receptors
- SWP did not evaluate PAH because PAH did not exceed their calculated RGs

2) Wetland Cleanup
- If developed, must meet Human Health RGs (TCDD/F = 1 ppb)
- If not developed, calculate RGs for terrestrial insectivore receptors

GREENFIELD CREEK SEDIMENT:

1) Do We Accept RGs ?
- EPA indicates RGs not protective of birds with > TUF than GBHeron
- SWP used AUF and SUF, not TUF
- Hanna to look at uncertainty study to see how sensitive to see if AUF and RGs can be bracketed, i.e., how ridiculous are the SWP RGs

8/21/08

Hanna's Recommendations:

1) During FS, look at range of RG values due to:
   - Uncertainty: S Thoms questions about Tox and Time Factors, multiple bird ecologies and use of point estimates. SWP agrees to do quantitative uncertainty assessment in the FS
   - Unprotective/High RG values: Other sites have ppt dioxin and ppb PAH RGs
   - 59 ppb diox is based on NOAEL benthic invert toxicity
   - 700 ppm PAH is based on (100%) piscivorous bird (GB heron)
2) If undeveloped: Develop RGs protective of other aquatic carnivorous birds, and of terrestrial insectivores. If developed, use stricter HH RGs
3) Discuss relative to remediation methods
   - Non-disruption of Greenfield Creek flow
   - Non-destruction of wetland
4) Management decision: Protectiveness vs Reasonability/Feasibility

(undated)
Hanna: let them respond point-to-point to S Thoms remarks

1) Do we need them to recalc the RGs?
2) Basis: what # s are relevant
3) Does it make a difference ?

PCDDs RG (59 ppb) is driven by Benthic Invertebrate exposure scenario, *so no RG for Piscivorous Bird.* 59 ppb is sum of congeners, not TEQ: based on toxicity study, *not TUF*, so disregard. 59 ppb is "valid" for benthos

PAH RG (700 ppm total; 70 individual) is driven by Piscivorous Bird (100%) exposure scenario. HQ is 10, based on individual HQ of 1 for each of 10 PAH species. This is a Risk Management Decision, not guidance-based; EPA allows HQ up to 3 at some sites. [Note that table G1 lists 0.4, based on 6 PAH species] PROBLEM: 700ppm does *not* protect invertebrates; it exceeds the highest toxicity-producing sediment sample concentration.

SWP: Survival occurs in HIGH PAH seds. S Thoms: mortality occurs in LOW PAH seds
Have them respond to her comment in as much detail as possible

General comment 6: Mink
Should have been evaluated, but ditch will be remediated in any case

Specific Comment s:
3: PAH in GW : PAH Sed >>>PAH GW. Not seeping into surface water column
4: Aquatic Piscivorous birds: Heron eats 100% fish; other waders also eat benthic invertebrates
[Not talking about emergent or terrestrial insectivores]. Exposure underestimated
5: Bottom Line: WHERE did midge mortality occur
7: Table 18 lacking data: 3 samples at 7 locations, w/ no control sample. Only one High PAH point had midge survival. Data at only mortality points and not at survival points.
8: Acknowledge: SWP used 1, not 0.4, to derive PAH RG of 70.
Iron out discrepancies between Table G1 and the text to eliminate confusion.
PAH (indiv) of 70 appears high; based on GB heron study with HQ = 1; not protective of benthic insectivores.
No benthic insect data.
Uncertainty in choice of TRVs
9: Table/text discrepancies
10: RATIONALE ?

PAH RG playing with #s: HI = avg daily intake/TRV benchmark HQ = SUM of Ratios, not Ratio of Sums
SUM of (Ca/TRBa) + (Cb/TRBb)+(Cc/TRBc).....

No RG for terrestrial insectivore because assumed that site will be developed; PUT one ON the TABLE
1 PPB HHRG for perspective; will cleanup be needed ANYWAY ?

Subject: Fw: Emailing: CAPPING.pdf, PREFERRED SEDIMENT REMEDIAL.pdf, SEDIMENT PRG.pdf
From: William.Arrants@rayonier.com
Date: Mon, 31 Mar 2008 17:33:57 -0400
To: stuart.parker@ncmail.net
CC: Bill_Bennett@ncports.com, hanna.assefa@ncmail.net, James.Bateson@ncmail.net, Todd_Walton@ncports.com

Stuart,

We plan to discuss the attached drawings in the April 1call. They are forwarded for your reference.

Bill

William P. Arrants
President

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087 ----- Forwarded by William Arrants/RaySW/Rayonier on 03/31/2008 05:29 PM

"Gregory Kuntz" <gkuntz@schnabel-eng.com>
03/31/2008 04:37 PM

To <William.Arrants@rayonier.com>, "Samuelian, John H" <john.samuelian@amec.com>
cc
Subject FW: Emailing: CAPPING.pdf, PREFERRED SEDIMENT REMEDIAL.pdf, SEDIMENT PRG.pdf

<<CAPPING.pdf>> Hi <<PREFERRED SEDIMENT REMEDIAL.pdf>> B <<SEDIMENT PRG.pdf>> ill and John,

Attached are the drawings for the proposed teleconference tomorrow.

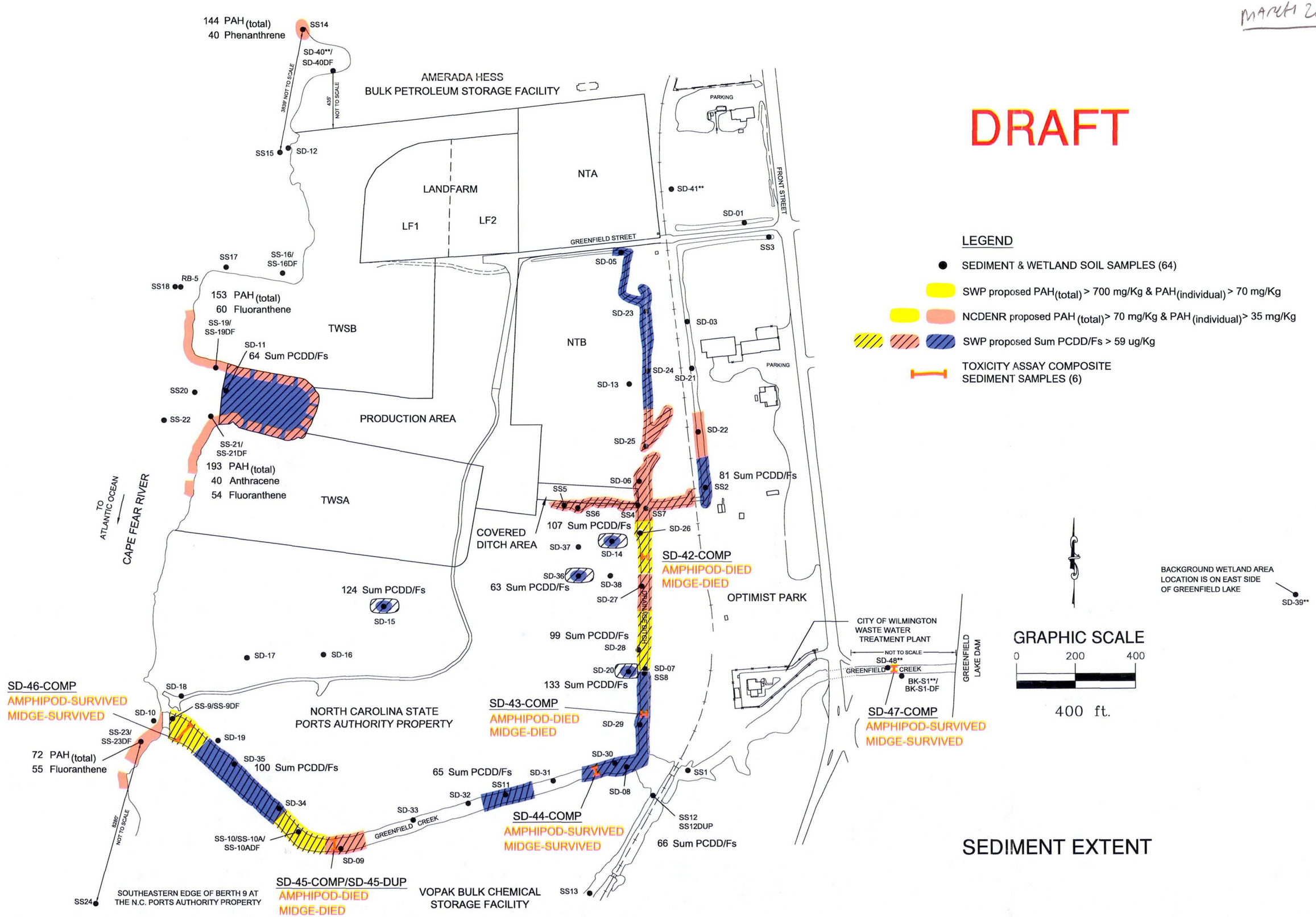
Thanks,

Greg

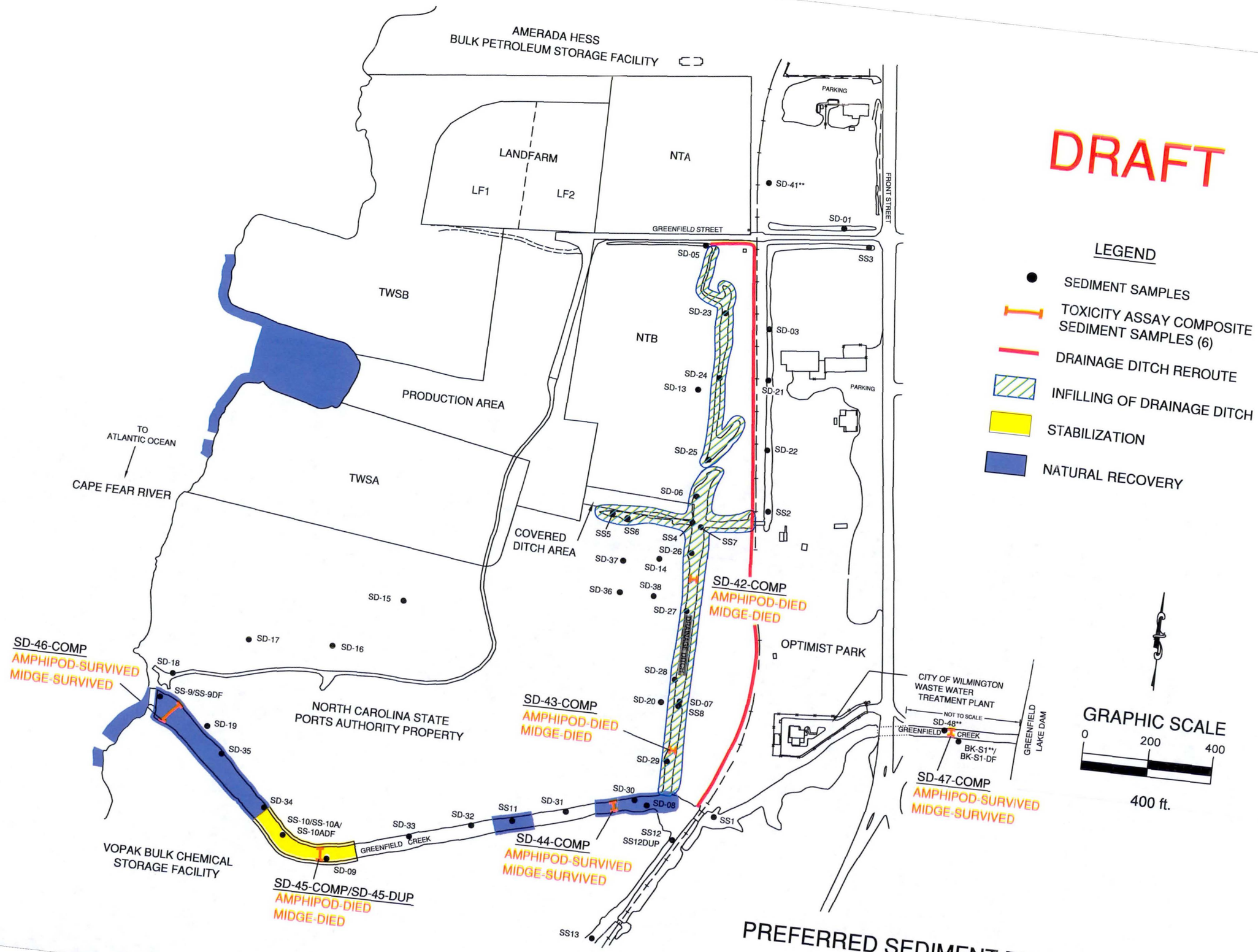
-----Original Message-----
From: Carol Butler

MARCH 2008

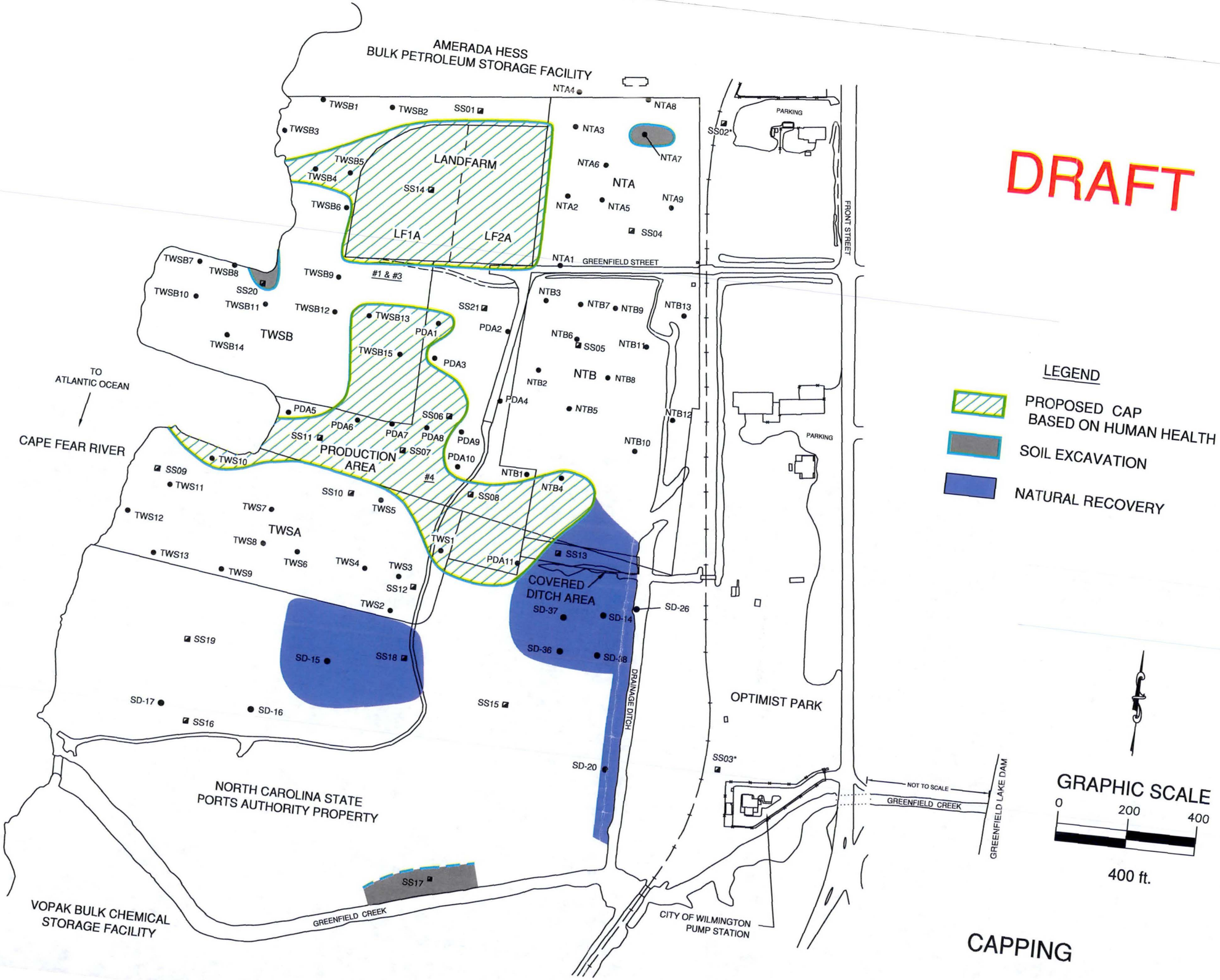
DRAFT



SEDIMENT EXTENT



PREFERRED SEDIMENT REMEDIAL ACTION



DRAFT

CAPPING

Subject: Re: Teleconference re the Southern Wood Piedmont Wilmington Site
From: Stuart Parker <Stuart.Parker@ncmail.net>
Date: Thu, 27 Mar 2008 17:11:08 -0400
To: Bill_Bennett@ncports.com
CC: William.Arrants@rayonier.com, Hanna Assefa <hanna.assefa@ncmail.net>, James Bateson <James.Bateson@ncmail.net>, Todd_Walton@ncports.com

Gentlemen:

Based on the most recent response from each party, teleconference is proposed for Tuesday April 1 at 2 PM.
Please acknowledge or notify me immediately if there are schedule conflicts. Thank you.

Sincerely,
Stuart Parker
Hydrogeologist,
NC Superfund Section

Subject: Re: Teleconference re the Southern Wood Piedmont Wilmington Site
From: Stuart Parker <Stuart.Parker@ncmail.net>
Date: Fri, 14 Mar 2008 17:13:54 -0400
To: Bill_Bennett@ncports.com
CC: William.Arrants@rayonier.com, Hanna Assefa <hanna.assefa@ncmail.net>, James Bateson <James.Bateson@ncmail.net>, Todd_Walton@ncports.com

Hello all,

There appear to be conflicts sufficient to warrant alternative scheduling, during the week March 31-April 4.
Please relate availability during that week.

SWP is granted a 30-day extension for its written response, due to the meeting logistics.

Sincerely,
Stuart Parker

Bill_Bennett@ncports.com wrote:

> That is a bad time for me. Our Board Meeting is in Greensboro on WED and THUR (26 and 27). I have an important meeting in Southport on Friday.
>
> We can be available Wedenedsy morning (26th) before 10 A.M. Does that work?
>
> Bill Bennett, P.E., M.P.A.
> Vice President, Planning and Development
> North Carolina State Ports Authority
> (W) 910-251-7071
> (M) 910-297-3118
>
> William.Arrants@rayonier.com
>
> 03/12/2008 01:07 PM
>
> To Stuart Parker <Stuart.Parker@ncmail.net>
> cc bill_bennett@ncports.com, Hanna Assefa <hanna.assefa@ncmail.net>, James Bateson <James.Bateson@ncmail.net>
> Subject Re: Teleconference re the Southern Wood Piedmont Wilmington Site

Subject: Teleconference re the Southern Wood Piedmont Wilmington Site
From: Stuart Parker <Stuart.Parker@ncmail.net>
Date: Wed, 12 Mar 2008 11:59:57 -0400
To: James Bateson <James.Bateson@ncmail.net>, Hanna Assefa <hanna.assefa@ncmail.net>, bill_bennett@ncports.com, William.Arrants@rayonier.com

Bill Arrants (Rayonier/Southern Wood Piedmont Co.) has requested a teleconference during the week beginning March 24. During the teleconference, we will discuss recently submitted NC DWM and EPA comments on the Revised Baseline Ecological Risk Assessment of the Wilmington Site
Please advise me of your availability to participate during that week.
Thank you.

Sincerely,
Stuart Parker, Hydrogeologist
Superfund Section
NC Division of Waste Management,
919-508-8469

NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

February 27, 2008

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

Mr. William P. Arrants
Manager of Environmental Affairs/Regulatory Compliance
Southern Wood Piedmont Company
P.O. Box 5447
Spartanburg, SC 29304

SUBJECT: Southern Wood Piedmont Site
NCD 058 517 467
Wilmington, New Hanover County, NC
Revised Baseline Ecological Risk Assessment;
Review and Comment

Dear Mr. Arrants:

The NCDENR Division of Waste Management (DWM) and the USEPA Region IV (EPA) have reviewed the report: "Revised Baseline Ecological Risk Assessment for the Former Southern Wood Piedmont Facility in Wilmington, North Carolina". This report was submitted by Southern Wood Piedmont Co. (SWP) on April 16, 2007 as part of the on-going Remedial Investigation (Consent Docket # 91-SF-117). The EPA Technical Services Section (TSS) has submitted extensive written comments (attached) and discussed them with the Division. Based on EPA and Division review, additional remediation goal evaluation will be required.

The Revised Baseline Ecological Risk Assessment (RBERA) was completed to address state and federal comment on the Draft BERA submitted by SWP in 2001, and to comply with revisions to EPA's 1997 Ecological Risk Assessment Guidance. The RBERA incorporated the Risk Evaluation for Insectivorous Birds, submitted by SWP in December 2005 and revised in September 2006. The insectivorous bird study involved sampling and testing of emergent aquatic insects at the site as an alternative to EPA and State recommended sediment bioaccumulation testing using a benthic invertebrate (*Lumbriculus variegatus*).

In January 2007, based on review of the revised Insectivorous bird study, the Division recommended that SWP evaluate remediation goals protective of contaminant receptors additional to those identified in the BERA. The Division's emphasis was to identify the assessment endpoint that would ultimately drive site remediation efforts, the goal being to expedite completion of the Remedial Investigation. The Revised BERA was completed on April 16, 2007.

Attached are comments on the RBERA by EPA TSS reviewer Sharon Thoms and Division Industrial Hygiene Consultant Hanna Assefa. Some of the content is discussed below. However, SWP is directed to respond to the attached comments as listed.

I. Aquatic Sediment Remediation goals:

Hazard Quotients (HQ) and PAH Remediation Goals (RGs) listed in RBERA Table G-1 did not match those proposed in RBERA Section 8.1.2 (pages 88-89). The discrepancy caused some confusion as to how the RGs were derived (EPA Specific Comment 8). Section 8.1.2 argued for a $PAH_{(total)}$ RG of 700 mg/kg, as an alternative to the $PAH_{(individual)}$ RG of 70 mg/kg. However the justification (as worded) for the higher RG was unclear to the reviewers.

SWP's proposed PAH sediment RGs were based on a Time Use Factor (TUF) = 0.5. The EPA and Division recommend TUF = 1, which would halve the $PAH_{(individual)}$ RG from 70 mg/kg to 35 mg/kg.

The Division compared the proposed and revised PAH RGS to sediment concentrations (Table 8-1; Table 8-5). $PAH_{(individual)}$ exceeded 35 mg/kg and $PAH_{(total)}$ exceeded 70 mg/kg in sediments from the Covered Ditch Area, most of the Drainage Ditch, the Greenfield Creek "elbow" and tidal gate and the Cape Fear Riverfront (slip margin and tidal gate). In contrast, SWP's proposed $PAH_{(individual)}$ and $PAH_{(total)}$ RGS were exceeded only sporadically in the ditch and creek. Areas not exceeding SWP's RGs included several locations where lab testing had indicated ecotoxicity.

The EPA also commented that the proposed RG did not identify all areas of sediment ecotoxicity. In Table 18, PAH data were included only at one biota survival and two 2 biota mortality locations. Other variables that could potentially affect the correlation between concentration and ecotoxic effect were not discussed.

SWP's proposed RGs were discussed with representatives of the Division's Superfund Section Federal Remediation Branch, which oversees cleanup of NPL and Superfund Alternative sites in NC. Although $PAH_{(total)}$ was used as an RG at the Cape Fear Wood Preserving site, the Federal Remediation Branch currently requires that Remedial Investigations develop RGs for individual PAH.

As the RBERA noted, $PCDD/F_{(total)}$ concentrations exceeded SWP's proposed RG (59 ug/kg) in the majority of waterway sediment samples, including the Drainage Ditch, Covered Ditch, Greenfield Creek and the Riverfront. This PCDD/F RG was not TUF-dependant.

II. Wetland/Upland Soil Contaminants and Terrestrial Receptors:

SWP compared proposed sediment-based PAH RGs to soil concentrations in on-site terrestrial wetlands. The average and maximum $PAH_{(total)}$ concentration did not exceed SWP's proposed RG values, and SWP therefore concluded that no detailed assessment of the PAH RGs' suitability for the wetland was indicated. Note the above comments regarding Time Use Factor and use of individual PAH RGs.

In terrestrial wetlands near the contaminated ditch areas and Greenfield Creek, soil PCDD/F concentrations exceeded the 59 ug/kg sediment-derived RG. SWP acknowledged that the sediment RG would be non-protective of insectivorous terrestrial receptors, but argued that the receptor species were unlikely to forage in the wetlands. Further documentation of the receptor habitat and ecology will be required to support the conclusion that no exposure pathway exists.

SWP and EPA sampling detected PCDD/F in soils at the upland Landfarm and Production areas, where pentachlorophenol was detected. EPA testing also detected low levels of PCDD/F at southern site locations where PCP was non-detect. Although the presence of insectivore receptors in the site's terrestrial wetlands has been questioned, these species are anticipated to inhabit upland areas where soil $PCDD/F_{(Total)}$ concentrations also exceed 59 ug/kg.

The NC State Ports Authority (NCSPA) intends to redevelop the site to expand its operations. SWP has maintained that future site industrial development would likely interrupt the contaminant exposure pathway (through habitat destruction) for insectivorous terrestrial receptors. However, no specific construction design or timeline exists to support this assumption. SWP noted that control measures to prevent insectivore exposure could be integrated into future industrial site development plans. However in May 2007, the NCSPA reiterated the position that protective site remediation efforts by SWP must stand alone, rather than rely upon NCSPA expenditures:

"A potential reduction of site contaminant impacts on terrestrial species as a result of port/industrial site development is a logical conclusion. However, the development of this site will be a market driven decision and the use of "near future" may infer an immediate timeline. To sustain the approach of an "incomplete terrestrial exposure pathway", SWP must consider their engineered measures as part of the site's soil, sediment, surfaceand groundwater remedial approach rather than on a presumed timeline and layout of an industrial site development."

Conclusions:

1) The Division agrees with EPA's assessment: that the Revised BERA Report is generally well organized and well prepared.

2) Additional clarity is required in the development of proposed sediment remediation goals. The proposed 700 mg/kg RG based on total PAH is of particular concern. SWP's proposed RGs cover a higher concentration range - and imply a lesser extent of aquatic sediment remediation - than do more conservative RGs proposed by reviewers. SWP's RGs also do not address the extent of observed sediment ecotoxicity.

3) SWP's sediment-derived RG for PCDD/F is exceeded both in aqueous sediment and in soil samples from proximal terrestrial wetlands. SWP is directed to calculate dioxin/furan RGs that would be protective of the insectivorous terrestrial receptors. The exposure pathway from wetland to receptor cannot be dismissed based on the prospect of future site development. Implementation/adherence to RGs will be addressed during the Feasibility Study.

Southern Wood Piedmont is directed to address the attached comments within 30 days. No additional sampling activity is expected to be needed to this end. The Division wishes to expedite completion of the RI, and is available for scheduled teleconferences to clarify and resolve issues. If you have any questions, please call me at (919) 508-8469.

Sincerely,

Stuart F. Parker, Hydrogeologist
NC Superfund Section

Attachments.

cc: James Bateson
Jennifer Wendel (EPA Region IV)
William Bennett (NC Ports Authority)
Hanna Assefa
file

October 26, 2007

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Assessment and Remediation Branch
Superfund Section

From: Hanna Assefa
Environmental Toxicologist
Superfund Section

RE: Southern Wood Piedmont
Ecological Risk Assessment
Wilmington, New Hanover County

After having reviewed the subject document, and comments from the September 12, 2007 memorandum by Sharon Thoms of USEPA Region IV Technical Services Section I offer the following comments. I request AMEC respond both to Ms. Thoms's comments and mine below. Tables and revisions can be submitted as an addendum to the Ecological Risk Assessment.

1. It is understood that soil in the wetlands has to meet protection of groundwater goals and also human health remediation goals. At this time the cleanup level for dioxin in soil protective of human health in North Carolina is 1ppb. Risk posed to insectivorous birds like American Robin, and insectivorous mammals from the contaminated soil has been determined to be unacceptable. There have been discussions that future developments at the site would likely result in capping of certain areas which would further reduce the areas of concern. The wetland soil contamination should be discussed within the context of concrete future development plans for the site which at this time should be clearly identified.

2. Contamination must be addressed at natural areas of the site where future development is unlikely. Remediation goals at these locations must be calculated to protect both the insectivorous bird and insectivorous mammals.

3. In specific comment # 4 Ms.Thoms cited the example of other piscivorous birds (Little Blue Heron) at the site that may have a larger proportion of insects in their diet. Please discuss the uncertainty of the risk estimate to all wading birds.

4. Ms. Thoms's comments indicate the risk assessment is under protective of the insectivorous bird. This is due in part to the use of a time use factor of 0.5, which is only appropriate for chemicals that build up in the body or cause a latent adverse health effect. The risk assessment is also under protective of those birds that stay at the site year round or breed at the site. Tables should also be provided with risk and remediation goals calculated using a time use factor of 1.

5. Despite repeated collection efforts, a limited sample number and sample mass of emergent aquatic insects was obtained for the bioaccumulation study. Therefore, remediation goals (for the insectivorous Eastern Kingbird) should be calculated using literature (BTF) in order to bracket the worst case exposure scenario.

6. Data summary tables include human health remediation goals. This is not appropriate for an ecological risk assessment.

7. Expand on the three discussion bullets on page 99. Based on the remediation goal determination, discuss the possible cleanup and extent scenarios for 1) the contaminated wetlands; 2) the contaminated drainage ditch and 3) Greenfield Creek. Discussion should include cleanup feasibility in the context of state and federal regulations, including those restricting development or other physical alteration of wetlands.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

September 12, 2007

4SD-SSB

MEMORANDUM

SUBJECT: Risk review comments for ecological aspects of the Revised Baseline Ecological Risk Assessment for the Former Southern Wood Piedmont Facility

FROM: Sharon R. Thoms, Life Scientist
Technical Services Section
Superfund Support Branch
Superfund Division

THRU: Scott Sudweeks, Chief
Technical Services Section
Superfund Support Branch
Superfund Division

TO: Jennifer Wendel, Remedial Project Manager
Superfund Remedial & Site Evaluation Branch
Superfund Division

Per your request on July 10, I have reviewed the **Revised Baseline Ecological Risk Assessment (BERA) for the Former Southern Wood Piedmont Facility in Wilmington, North Carolina.** The report was dated April 2007. My comments provided below would normally be divided into comments for you the RPM and comments for the responsible party. I have addressed all of my comments to you and the State of North Carolina Department of Natural Resources. Direction to PRPs on the project should come from the state. To facilitate the verbatim conveyance, I will be pleased to provide a copy of this memorandum via e-mail.

GENERAL COMMENTS TO THE RPM:

1. The report is thorough and well prepared. The revised BERA has addressed input EPA provided to the state on the *Supplemental Risk Evaluation for Insectivorous Birds* report (AMEC, 2006).

2. The document appears technically sound within the set of assumptions it makes, which were made in agreement with the state. I have made comments that might suggest there could have been another way to approach the site. These comments are primarily intended to be sent to the state to assist them in their review of the PRP's report. Sending comments to the state will prevent EPA's comments from contradicting the state's direction.

3. The risk assessment contained sufficient uncertainty that could make it difficult to support a cleanup value other than EPA's policy number for dioxin of 1 part per billion for sediments (USEPA 1998).

COMMENTS TO BE CONVEYED TO THE NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES (NCDNR):

GENERAL COMMENTS:

1. Although there might have been a good reason, no explanation is provided in the report for why it was assumed that the piscivorous bird will only forage in the western portion of Greenfield Creek where there is open water (Figure 7). The results for the piscivorous bird (great blue heron) are greatly dependent on this assumption. The assumption reduces the foraging area to 40 percent of the total area of Greenfield Creek and decreases the risk estimate by 40 percent. It is unclear why only the western portion is suitable habitat for piscivorous birds. It does not appear conservative to assume that birds will only forage in creek bordered by mixed forested wetland. In the future the habitat could change. Also, there are other piscivorous birds besides the great blue heron that are potentially at risk. It is important to note the reasons, because if contamination is left on the site above levels that allow for unlimited use and unrestricted exposure, the action will be subject to five year review.

2. The rationale for the PAHs in wetland soils, whereby the remedial goal options for sediments were compared to average concentrations in wetland soils, might be adequate to address ecological risk, as long as the property is likely to be redeveloped as industrial land use. The RGOs for sediment have some limitations, so this comment refers to the principle and does not recommend adoption of specific numbers. Application of sediment goals to soils would only apply to ecological risk. Some degree of remedy will probably be necessary to protect industrial workers from the elevated levels of PAHs and dioxins/furans in wetland soils. Leaching to groundwater might also not be protected by the RGOs. According to the report, most of the soils with elevated dioxin levels are located near the covered bridge area.

3. The RGOs appear high. Basically there is sediment toxicity along most of the creek and drainage ditch in the vicinity of the site. The proposed cleanup goals of 59 ppb of dioxin/furan TEQ and 700 mg/kg of total PAHs do not appear to identify all of the toxic sediments identified in the risk assessment for remediation. The RGOs do not appear to identify the high concentrations at SS-9 that are immediately adjacent to the

Cape Fear River or actually in the Cape Fear River at SS-19. The risk assessment would conclude that the drainage ditch was not a habitat for heron or mink and hence there would be less risk associated with leaving contamination in place. The risk assessment does not address how leaving principal threat source material in place could impact downstream receiving waters, such as migration of contamination from the drainage ditch to Greenfield Creek or migration of contamination from Greenfield Creek to the Cape Fear River.

4. The determination of the remedial goal option (RGO) for PAHs in sediments was based on exposure to the piscivorous bird. However, PAHs do not accumulate to any degree in fish, such that exposure to the piscivorous bird is only from 1 percent of the diet, i.e., the percentage made up of benthic invertebrates. The exposure pathway of greatest concern historically on this project has always been the benthic insectivore. The current RGO for PAHs in sediments does not appear to be protective because it did not look at a realistic exposure scenario.

5. The insectivorous bird (Eastern kingbird) assessment endpoint was assumed to feed on emergent insects. The results for the Eastern kingbird might underestimate realistic exposures, because concentrations in emergent insects would be expected to be lower than concentrations in benthic invertebrates and insects living as larvae in sediments. The Eastern kingbird model was applied in a less than protective manner, because exposure was halved by assuming a time use factor of 0.5. The time use factor is only appropriate for constituents that build up in the body over a long exposure period or for constituents having a latent effect, such as cancer. It would not be appropriate to use a time use factor for birds exposed to PAHs, because they are metabolized and rapidly cleared from the body, such that any exposure at the target organ reflects recent dietary exposure. Also, nesting season occurs while the bird is on the site, so breeding populations would not be protected by this assumption. The results for the Eastern kingbird underestimate the risk to birds living at the site year round and birds that breed at the site.

6. The assessment of the piscivorous mammal (mink) used a model receptor with a large home range relative to the size of the site. PAHs do not accumulate to any degree in fish relative to prey items found in the sediments. Results for the piscivorous mammal underestimate exposures for mammals having a closer affinity to the site. The mink also is assumed not to forage in the drainage ditch. Risk to mammals that potentially use the drainage ditch was not assessed.

7. The RGOs are given as a point estimate and do not reflect the uncertainty in the model assumptions or the toxicity. Three different sources were used for the toxicity reference values (TRVs) for PAHs and birds. Only one TRV, however, is carried forward in the RGO determination.

SPECIFIC COMMENTS:

1. *Executive Summary Section E.8 and Tables ES-1 & 2.* The remedial goals described apply to protection of ecological risk. Other more restrictive remedial goals could apply to protection of human health or leaching to groundwater.

2. *Section 2.2 Summary of the SLERA, Page 7.* The risk assessment stated its purpose as expanding the evaluation to terrestrial receptors, however, no screening of chemicals of potential concern (COPCs) in soil is provided in Table 7.

3. *Section 2.2 Summary of the SLERA, Page 7 and Section 4.0, Problem Formulation.* The site does not appear to have screened the chemicals of potential concern detected in groundwater. No groundwater COPCs appear in Table 7. The Conceptual Site Model in Figure 11 does not include ground-water transport as a potential mechanism for contaminant migration, although the drainage ditch is partially fed by groundwater infiltration. Long-term effectiveness might be lower if sediments become re-contaminated by discharges from groundwater. The problem formulation discussion did not justify excluding the groundwater pathway. Creosote has been known at other sites to discharge from banks of streams and re-contaminate waterways.

4. *Section 6.1.3, Assessment Endpoint No. 3 (Piscivorous Birds), Page 68.* The text indicated that the piscivorous bird (great blue heron) was at risk from PAHs in sediments and modeled accumulation in aquatic invertebrates. However, only 1 percent of the diet of the great blue heron was assumed to be comprised of aquatic invertebrates. The other 99 percent of the diet was assumed to be zero, because PAHs were not observed to accumulate to any degree in fish tissue. Other receptors, such as the pied-billed grebe (*Podilymbus podiceps*), willet (*Catoptrophorus semipalmatus*), or little blue heron (*Egretta caerulea)* have a larger proportion of benthic invertebrates in their diet, have a smaller home range, and may reside at the site year round. The Carolina wren (*Thryothorus ludovicianus*), a resident insectivorous bird, is another example of an avian model receptor that would yield a lower remedial goal option for total PAHs. The discussion in the report is very specific to the model receptors used in the risk assessment and does not explain how other birds, not specifically evaluated, will be protected. The remedial goal for PAHs in sediment does not appear adequate protect of birds and mammals exposed to infaunal invertebrates. PAHs do not accumulate to any degree in fish tissues, so developing a remedial goal based on protection of a piscivore, while assuming zero exposure for 99 percent of the diet, is not protective of all birds and mammals that could use the site.

5. *Section 6.*3, Weight of Evidence, Page 82. There is considerable uncertainty in the interpretation of the toxicity test results for midges. According to a recent paper by Hawthorne et al. (2007), total PAH concentration can have little relationship to sediment toxicity. This comment was written because, according to Figure 12, most of the sediment stations sampled in Greenfield Creek and the

drainage ditch in the vicinity of the site were toxic to either the midge or amphipod. Stations upstream of the site or further downstream were not toxic. Sediment toxicity could be associated with PAHs as well as dioxins/furans. There might not be a clear relationship between toxicity and concentration of total PAHs. Moreover, Table 18 where the relationship between toxicity and concentration is evaluated contains missing information for half of the samples. Lack of strong evidence of a chemical causing the toxicity appears to have been a result of a lack of data. Lack of causation is not a strong line of evidence because data to support causation is missing.

6. *Section 6.2.1 EPC Calculations for Surface Water, Sediments, Wetland Soils, and Biota, Page 75.* The text indicated that the exposure point concentrations for dioxin toxicity equivalents (TEQs) were calculated by assuming a surrogate concentration of zero for the non-detected dioxin/furan congeners. The high-resolution analytical method for dioxin (EPA Method 1613) yields the sample-specific estimated detection limit (EDL). The EDL is a nonzero value that is usually very close to the actual *minimum* concentration able to be detected. In other words, the EDL is a true minimum detection limit, unlike the Reporting Limit (RL) obtained for standard resolution methods, which leads to significant overestimation of TEQ concentrations for nondetect data. The EDL is an estimate of what really could have been there and not detected.

7. *Section 8.1.1, Remedial Goals for Benthic Invertebrates, Page 87.* A RGO of 700 mg/kg of total PAHs, derived to protect the piscivorous bird, does not appear to protect benthic invertebrates, because the highest concentration of total PAHs tested for toxicity in sediment was 357 mg/kg according to Table 18. Zero survival was observed for SD-43 at 19.9 mg/kg of total PAHs and SD-45 at 118 mg/kg of total PAHs.

8. *Section 8.1.2, Remediation Goals for Heron Exposure in Greenfield Creek, Page 88.* The HQ_{NOAEL}–based remedial goals in the in-text table do not match the values in Table G-1. Table G-1 provided a RGO of 28 mg/kg for the individual PAHs and 70 mg/kg for total PAHs, not 70 mg/kg for individual PAHs and 700 mg/kg for total PAHs as in text on Pages 88 and 89. Remedial goals should be the same for PAHs with the same biotransfer factor. The value an individual PAH with a representative biotransfer factor would apply to total PAHs. That is, one would not have an individual goal of 70 mg/kg and a goal for total of 700 mg/kg. If anything, since the report used a target hazard quotient for 0.4 for individual PAHs and a target hazard quotient of 1 for total PAHs, an RGO for individual PAHs of 70 mg/kg becomes 175 mg/kg for total PAHs. However, an apparent mistake in the calculation, identified in this comment, might invalidate the 70 mg/kg number for individual PAHs.

9. *Table D-17, Great Blue Heron - Evaluation of Potential Ecological Risks from Greenfield Creek.* The concentration of Dioxin TEQ (avian) in fish given in Table D-17 does not match the concentrations in fish provided in Table D-7c.

10. *Appendix E., Supporting Information for TRV Derivation.* The toxicity reference values for the mink exposed to dioxin were originally obtained from Murray et al. (1979). Application of a body weight correction for the mink caused the No Observable Adverse Effects Level (NOAEL) to go from 1E-06 mg/kg-day to 7.69E-07 mg/kg-day and the Lowest Observable Adverse Effects (LOAEL) to go from 1E-05 mg/kg/day to 3.38E-04 mg/kg/day. The body weight correction has added a couple orders of magnitude uncertainty to the calculation of risk.

REFERENCES:

AMEC Earth and Environment (AMEC). 2006. *Revised Supplemental Risk Evaluation for Insectivorous Birds at the Former SWP Facility in Wilmington, North Carolina.* Prepared for the Southern Wood Piedmont Company. August 2006.

Murray, F.J.; Smith, F. A.; Nitschke, K. D.; Humiston, C. G.; Kociba, R. J.; and B. A. Schwetz. 1979. Three-generation reproductive study of rats given 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in the diet. *Toxicol. Appl. Pharmacol.* 50: 241-252.

USEPA 1998. Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites. Letter from Timothy Fields, Jr., Acting Director of EPA's Office of Solid Waste and Emergency Response, to the Director of the Office of Site Remediation and Restoration and Regional Division Directors. OSWER Directive 9200.4-26. April 13, 1998.

If you should have any questions please feel free to contact me at 2-8666.

Subject: Re: Revised BERA Review, Southern Wood Piedmont
From: Thoms.Sharon@epamail.epa.gov
Date: Thu, 29 Nov 2007 16:42:17 -0500
To: Stuart Parker <Stuart.Parker@ncmail.net>
CC: Hanna Assefa <hanna.assefa@ncmail.net>, Wendel.Jennifer@epamail.epa.gov

I cannot comment on what the rationale might have been for what was done in the amec risk assessment. My comment is pointing out an apparent discrepancy between Table G1 and the text. In Table G1 the approximately 28 value is based on a target HQ of 0.4 for benzo(a)pyrene. The value of 70 for total PAHs I used in my comment is equal to 28 divided by 0.4 and corresponds to a HI of 1. The value of 700 is the 724 in Table G1 and has something to do apparently with a target HI of 2.5. As the comment recommending the 70 for total PAHs what it essentially means is that the target HI should be 1 and not 2.5. Since I am only checking the document and did not write it, I do not know exactly amec came up with the numbers and whether or not the target HI explains the discrepancy. I am not recommending the 70 mg/kg number, because in my comments I indicate that many of the assumptions were less than conservative. My comment is just that given the set of assumptions used in the document, the 70 number would be more accurate than the 700 number.

Sharon Thoms, Ph.D.
Ecological Risk Assessor
USEPA Region 4
(404) 562-8666

Stuart Parker
<Stuart.Parker@n
cmail.net>

11/29/2007 04:00
PM

To
Sharon Thoms/R4/USEPA/US@EPA

cc
Hanna Assefa
<hanna.assefa@ncmail.net>

Subject
Revised BERA Review, Southern
Wood Piedmont

Hi Sharon,

Hanna Assefa is out of the country for another week, but I had a couple of questions about your comments on this document, which you submitted a couple of months ago.
Please bear with my ignorance of the mechanics of RG calculation:

SWP presented a table (G-1) in which they calculated NOAEL-based RGs for selected PAH species in sediment, to produce a HQNOAEL of 1
Your comments indicated there was an error in their calculations, and that their individual and total PAH RG s should be revised from 70 to 28 mg/kg and from 700 to 70 mg/kg, respectively.

The BERA text (pp 88-89) states that a HQNOAEL of 1 was used to derive individual PAH RGs of.70 mg/kg.

Subject: Revised BERA Review, Southern Wood Piedmont
From: Stuart Parker <Stuart.Parker@ncmail.net>
Date: Thu, 29 Nov 2007 16:00:25 -0500
To: thoms.sharon@epa.gov
CC: Hanna Assefa <hanna.assefa@ncmail.net>

Hi Sharon,

Hanna Assefa is out of the country for another week, but I had a couple of questions about your comments on this document, which you submitted a couple of months ago.
Please bear with my ignorance of the mechanics of RG calculation:

SWP presented a table (G-1) in which they calculated NOAEL-based RGs for selected PAH species in sediment, to produce a HQNOAEL of **1**
Your comments indicated there was an error in their calculations, and that their individual and total PAH RG s should be revised from 70 to 28 mg/kg and from 700 to 70 mg/kg, respectively.

The BERA text (pp 88-89) states that a HQNOAEL of **1** was used to derive individual PAH RGs of.**70** mg/kg.
However, Table G-1 lists Target HQNOAELs at **0.4** (Column 6) and the Sediment concentrations at **28** mg.kg (Column 14).
Multiplying the respective G-1 values by 2.5 appears to proportion out the discrepancy.
Is it possible SWP simply misstated which respective numbers were presented in the table, after adjusting the values for the text ?

As for their 700 mg/kg total PAH RG, I do not see where that came from, unless it is the 7.24 e +2 mg/kg concentration for total H-PAH near the end of column 14.
I also don't understand how you calculated a revised value of 70 mg/kg for total PAH.

I appreciate any assistance you can give, esp since you are undoubtedly occupied with other work.

Thanks,
Stuart Parker
NC Superfund Section

Subject: Fw: Final comments on Southern Wood Piedmont Revised ERA
From: Wendel.Jennifer@epamail.epa.gov
Date: Tue, 16 Oct 2007 14:09:56 -0400
To: stuart.parker@ncmail.net

Hi Stuart. I have not had the time to be a propoer project manager on this site, so I wanted to send you sharon's comments. I belevie she and Hannah have spoken about a number of the issues that she identified. Let me know if there is more we can do from here. jennifer
----- Forwarded by Jennifer Wendel/R4/USEPA/US on 10/16/2007 02:08 PM -----

Sharon Thoms/R4/USEPA/US 09/12/2007 01:13 PM	To Jennifer Wendel/R4/USEPA/US@EPA cc Scott Sudweeks/R4/USEPA/US@EPA, Subject Final comments on Southern Wood Piedmont Revised ERA

Jennifer,

I made a small correction to the draft memo I copied you on yesterday per Scott's comment. I have attached the final memo with the change as a Word file and a pdf file. I am printing it out and putting it in Scott's box for his signature.

Fortunately, I found a transfer error in the ERA report between Table G-1 in the appendix and the main text to explain the high clean up goal of 700 mg/kg of total PAHs. The cleanup goal for total PAHs would be 70 mg/kg with this correction.

Sharon

(See attached file: 0912 SWP BERA.311.doc)(See attached file: 070809_ST_ Draft rev cmts for S Wood Pied.pdf)

Sharon Thoms
Life Scientist
USEPA Region 4
(404) 562-8666

0912 SWP BERA.311.doc	**Content-Type:** application/msword **Content-Encoding:** base64

070809_ST_ Draft rev cmts for S Wood Pied.pdf	**Content-Type:** application/pdf **Content-Encoding:** base64

Subject: NC Ports
From: Layton_Bedsole@ncports.com
Date: Fri, 12 Oct 2007 08:11:51 -0400
To: stuart.parker@ncmail.net, gkuntz@schnabel-eng.com, William.Arrants@rayonier.com

Good Morning All,

Just a quick note, as of 11-1, I will no longer be with the Authority. I have taken a job with Dial Cordy and Associates here in Wilmington. Once I get settled I will touch base with all. Please include Bill Bennett 910 251 7071 in all future correspondences regarding the former Wilmington SWP site.

Take Care

layton

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

September 12, 2007

4SD-SSB

MEMORANDUM

SUBJECT: Risk review comments for ecological aspects of the Revised Baseline Ecological Risk Assessment for the Former Southern Wood Piedmont Facility

FROM: Sharon R. Thoms, Life Scientist
Technical Services Section
Superfund Support Branch
Superfund Division

THRU: Scott Sudweeks, Chief
Technical Services Section
Superfund Support Branch
Superfund Division

TO: Jennifer Wendel, Remedial Project Manager
Superfund Remedial & Site Evaluation Branch
Superfund Division

Per your request on July 10, I have reviewed the **Revised Baseline Ecological Risk Assessment (BERA) for the Former Southern Wood Piedmont Facility in Wilmington, North Carolina.** The report was dated April 2007. My comments provided below would normally be divided into comments for you the RPM and comments for the responsible party. I have addressed all of my comments to you and the State of North Carolina Department of Natural Resources. Direction to PRPs on the project should come from the state. To facilitate the verbatim conveyance, I will be pleased to provide a copy of this memorandum via e-mail.

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2. The document appears technically sound within the set of assumptions it makes, which were made in agreement with the state. I have made comments that might suggest there could have been another way to approach the site. These comments are primarily intended to be sent to the state to assist them in their review of the PRP's report. Sending comments to the state will prevent EPA's comments from contradicting the state's direction.

3. The risk assessment contained sufficient uncertainty that could make it difficult to support a cleanup value other than EPA's policy number for dioxin of 1 part per billion for sediments (USEPA 1998).

COMMENTS TO BE CONVEYED TO THE NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES (NCDNR):

GENERAL COMMENTS:

1. Although there might have been a good reason, no explanation is provided in the report for why it was assumed that the piscivorous bird will only forage in the western portion of Greenfield Creek where there is open water (Figure 7). The results for the piscivorous bird (great blue heron) are greatly dependent on this assumption. The assumption reduces the foraging area to 40 percent of the total area of Greenfield Creek and decreases the risk estimate by 40 percent. It is unclear why only the western portion is suitable habitat for piscivorous birds. It does not appear conservative to assume that birds will only forage in creek bordered by mixed forested wetland. In the future the habitat could change. Also, there are other piscivorous birds besides the great blue heron that are potentially at risk. It is important to note the reasons, because if contamination is left on the site above levels that allow for unlimited use and unrestricted exposure, the action will be subject to five year review.

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Cape Fear River or actually in the Cape Fear River at SS-19. The risk assessment would conclude that the drainage ditch was not a habitat for heron or mink and hence there would be less risk associated with leaving contamination in place. The risk assessment does not address how leaving principal threat source material in place could impact downstream receiving waters, such as migration of contamination from the drainage ditch to Greenfield Creek or migration of contamination from Greenfield Creek to the Cape Fear River.

4. The determination of the remedial goal option (RGO) for PAHs in sediments was based on exposure to the piscivorous bird. However, PAHs do not accumulate to any degree in fish, such that exposure to the piscivorous bird is only from 1 percent of the diet, i.e., the percentage made up of benthic invertebrates. The exposure pathway of greatest concern historically on this project has always been the benthic insectivore. The current RGO for PAHs in sediments does not appear to be protective because it did not look at a realistic exposure scenario.

5. The insectivorous bird (Eastern kingbird) assessment endpoint was assumed to feed on emergent insects. The results for the Eastern kingbird might underestimate realistic exposures, because concentrations in emergent insects would be expected to be lower than concentrations in benthic invertebrates and insects living as larvae in sediments. The Eastern kingbird model was applied in a less than protective manner, because exposure was halved by assuming a time use factor of 0.5. The time use factor is only appropriate for constituents that build up in the body over a long exposure period or for constituents having a latent effect, such as cancer. It would not be appropriate to use a time use factor for birds exposed to PAHs, because they are metabolized and rapidly cleared from the body, such that any exposure at the target organ reflects recent dietary exposure. Also, nesting season occurs while the bird is on the site, so breeding populations would not be protected by this assumption. The results for the Eastern kingbird underestimate the risk to birds living at the site year round and birds that breed at the site.

6. The assessment of the piscivorous mammal (mink) used a model receptor with a large home range relative to the size of the site. PAHs do not accumulate to any degree in fish relative to prey items found in the sediments. Results for the piscivorous mammal underestimate exposures for mammals having a closer affinity to the site. The mink also is assumed not to forage in the drainage ditch. Risk to mammals that potentially use the drainage ditch was not assessed.

7. The RGOs are given as a point estimate and do not reflect the uncertainty in the model assumptions or the toxicity. Three different sources were used for the toxicity reference values (TRVs) for PAHs and birds. Only one TRV, however, is carried forward in the RGO determination.

SPECIFIC COMMENTS:

1. *Executive Summary Section E.8 and Tables ES-1 & 2.* The remedial goals described apply to protection of ecological risk. Other more restrictive remedial goals could apply to protection of human health or leaching to groundwater.

2. *Section 2.2 Summary of the SLERA, Page 7.* The risk assessment stated its purpose as expanding the evaluation to terrestrial receptors, however, no screening of chemicals of potential concern (COPCs) in soil is provided in Table 7.

3. *Section 2.2 Summary of the SLERA, Page 7 and Section 4.0, Problem Formulation.* The site does not appear to have screened the chemicals of potential concern detected in groundwater. No groundwater COPCs appear in Table 7. The Conceptual Site Model in Figure 11 does not include ground-water transport as a potential mechanism for contaminant migration, although the drainage ditch is partially fed by groundwater infiltration. Long-term effectiveness might be lower if sediments become re-contaminated by discharges from groundwater. The problem formulation discussion did not justify excluding the groundwater pathway. Creosote has been known at other sites to discharge from banks of streams and re-contaminate waterways.

4. *Section 6.1.3, Assessment Endpoint No. 3 (Piscivorous Birds), Page 68.* The text indicated that the piscivorous bird (great blue heron) was at risk from PAHs in sediments and modeled accumulation in aquatic invertebrates. However, only 1 percent of the diet of the great blue heron was assumed to be comprised of aquatic invertebrates. The other 99 percent of the diet was assumed to be zero, because PAHs were not observed to accumulate to any degree in fish tissue. Other receptors, such as the pied-billed grebe (*Podilymbus podiceps*), willet (*Catoptrophorus semipalmatus*), or little blue heron (*Egretta caerulea)* have a larger proportion of benthic invertebrates in their diet, have a smaller home range, and may reside at the site year round. The Carolina wren (*Thryothorus ludovicianus*), a resident insectivorous bird, is another example of an avian model receptor that would yield a lower remedial goal option for total PAHs. The discussion in the report is very specific to the model receptors used in the risk assessment and does not explain how other birds, not specifically evaluated, will be protected. The remedial goal for PAHs in sediment does not appear adequate protect of birds and mammals exposed to infaunal invertebrates. PAHs do not accumulate to any degree in fish tissues, so developing a remedial goal based on protection of a piscivore, while assuming zero exposure for 99 percent of the diet, is not protective of all birds and mammals that could use the site.

5. *Section 6.*3, Weight of Evidence, Page 82. There is considerable uncertainty in the interpretation of the toxicity test results for midges. According to a recent paper by Hawthorne et al. (2007), total PAH concentration can have little relationship to sediment toxicity. This comment was written because, according to Figure 12, most of the sediment stations sampled in Greenfield Creek and the

drainage ditch in the vicinity of the site were toxic to either the midge or amphipod. Stations upstream of the site or further downstream were not toxic. Sediment toxicity could be associated with PAHs as well as dioxins/furans. There might not be a clear relationship between toxicity and concentration of total PAHs. Moreover, Table 18 where the relationship between toxicity and concentration is evaluated contains missing information for half of the samples. Lack of strong evidence of a chemical causing the toxicity appears to have been a result of a lack of data. Lack of causation is not a strong line of evidence because data to support causation is missing.

6. *Section 6.2.1 EPC Calculations for Surface Water, Sediments, Wetland Soils, and Biota, Page 75.* The text indicated that the exposure point concentrations for dioxin toxicity equivalents (TEQs) were calculated by assuming a surrogate concentration of zero for the non-detected dioxin/furan congeners. The high-resolution analytical method for dioxin (EPA Method 1613) yields the sample-specific estimated detection limit (EDL). The EDL is a nonzero value that is usually very close to the actual *minimum* concentration able to be detected. In other words, the EDL is a true minimum detection limit, unlike the Reporting Limit (RL) obtained for standard resolution methods, which leads to significant overestimation of TEQ concentrations for nondetect data. The EDL is an estimate of what really could have been there and not detected.

7. *Section 8.1.1, Remedial Goals for Benthic Invertebrates, Page 87.* A RGO of 700 mg/kg of total PAHs, derived to protect the piscivorous bird, does not appear to protect benthic invertebrates, because the highest concentration of total PAHs tested for toxicity in sediment was 357 mg/kg according to Table 18. Zero survival was observed for SD-43 at 19.9 mg/kg of total PAHs and SD-45 at 118 mg/kg of total PAHs.

8. *Section 8.1.2, Remediation Goals for Heron Exposure in Greenfield Creek, Page 88.* The HQ_{NOAEL}–based remedial goals in the in-text table do not match the values in Table G-1. Table G-1 provided a RGO of 28 mg/kg for the individual PAHs and 70 mg/kg for total PAHs, not 70 mg/kg for individual PAHs and 700 mg/kg for total PAHs as in text on Pages 88 and 89. Remedial goals should be the same for PAHs with the same biotransfer factor. The value an individual PAH with a representative biotransfer factor would apply to total PAHs. That is, one would not have an individual goal of 70 mg/kg and a goal for total of 700 mg/kg. If anything, since the report used a target hazard quotient for 0.4 for individual PAHs and a target hazard quotient of 1 for total PAHs, an RGO for individual PAHs of 70 mg/kg becomes 175 mg/kg for total PAHs. However, an apparent mistake in the calculation, identified in this comment, might invalidate the 70 mg/kg number for individual PAHs.

9. *Table D-17, Great Blue Heron - Evaluation of Potential Ecological Risks from Greenfield Creek.* The concentration of Dioxin TEQ (avian) in fish given in Table D-17 does not match the concentrations in fish provided in Table D-7c.

10. *Appendix E., Supporting Information for TRV Derivation.* The toxicity reference values for the mink exposed to dioxin were originally obtained from Murray et al. (1979). Application of a body weight correction for the mink caused the No Observable Adverse Effects Level (NOAEL) to go from 1E-06 mg/kg-day to 7.69E-07 mg/kg-day and the Lowest Observable Adverse Effects (LOAEL) to go from 1E-05 mg/kg/day to 3.38E-04 mg/kg/day. The body weight correction has added a couple orders of magnitude uncertainty to the calculation of risk.

REFERENCES:

AMEC Earth and Environment (AMEC). 2006. *Revised Supplemental Risk Evaluation for Insectivorous Birds at the Former SWP Facility in Wilmington, North Carolina.* Prepared for the Southern Wood Piedmont Company. August 2006.

Murray, F.J.; Smith, F. A.; Nitschke, K. D.; Humiston, C. G.; Kociba, R. J.; and B. A. Schwetz. 1979. Three-generation reproductive study of rats given 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in the diet. *Toxicol. Appl. Pharmacol.* 50: 241-252.

USEPA 1998. Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites. Letter from Timothy Fields, Jr., Acting Director of EPA's Office of Solid Waste and Emergency Response, to the Director of the Office of Site Remediation and Restoration and Regional Division Directors. OSWER Directive 9200.4-26. April 13, 1998.

If you should have any questions please feel free to contact me at 2-8666.

Subject: Reassessment sampling
From: Stuart Parker <Stuart.Parker@ncmail.net>
Date: Thu, 26 Jul 2007 16:01:27 -0400
To: Wendel.Jennifer@epamail.epa.gov

Hi Jennifer:

1) I plan to sample 6 domestic wells on Monday (30th) as part of the Reassessment of the National Pin site in Wilson County. I have the OK from Jim to use the State Lab to do the analyses (Voa+Semi+Metals).

2) Anything more on the Southern Wood Piedmont RA report I sent ?

Thanks,
Stuart

Subject: Re: NC Ports Authority, Former SWP
From: "STUART.PARKER@ncmail.net" <STUART.PARKER@ncmail.net>
Date: Mon, 11 Jun 2007 17:12:14 -0400 (EDT)
To: <Layton_Bedsole@ncports.com>, <William.Arrants@rayonier.com>

EPA is reviewing the ERA report (forwarded, on disc). There have been personnel changes there and the individuals previously commenting on the work are now elsewhere.
However, I have impressed upon my EPA contact our need to expedite the review completion, and expect to hear from them shortly. The internal review by our Industrial Hygienist is essentially complete, however she is out of the office this week.

Sincerely,
Stuart

From: Layton_Bedsole@ncports.com
Date: May 2, 2007 15:51
To: <William.Arrants@rayonier.com>, <stuart.parker@ncmail.net>
Cc:
Subject: Revised BERA, NCSPA Comments
Attachments: NCSPA Comments Revised BERA 4-25-07.doc (40 KB)

Good Afternoon,

This document was much easier to read, follow and interpret. I have attached our comments to be considered as the project moves from the investigative phase into the remedial alternatives phase. If you have any questions, please call. 910 251 7072

thanks!

(See attached file: NCSPA Comments Revised BERA 4-25-07.doc)

Close Window

W.P. Arrants
General Manager
Southern Wood Piedmont Company

EMAIL TRANSMITTAL

Stuart F. Parker
Hydrogeologist
North Carolina, Inactive Superfund Section

Re: Revised Baseline Ecological Risk Assessment
Former SWP Site, Wilmington, N.C.
North Carolina State Ports Authority, Comments & Concerns

Please accept the following comments for consideration as the project moves into the Remedial Alternatives Analysis. All North Carolina State Ports Authority comments are underlined.

- In future documents, please refer to AMEC or others as "agents of the Southern Wood Piedmont Company".

- "These terrestrial receptors were not included in the risk characterization since the property is to be developed as an industrial ports facility in the near future. Development of the site will likely result in incomplete terrestrial exposure pathways at the site."

  A potential reduction of site contaminant impacts on terrestrial species as a result of port/industrial site development is a logical conclusion. However, the development of this site will be a market driven decision and the use of "near future" may infer an immediate timeline. To sustain the approach of an "incomplete terrestrial exposure pathway", SWP must consider their engineered measures as part of the site's soil, sediment, surface and groundwater remedial approach rather than on a presumed timeline and layout of an industrial site development.

- ".... suitability to be protective of other species that may inhabit the wetlands adjoining the creek or ditch."

  Not all site wetlands are adjoining the creek or the ditch and may be influenced by fluctuating groundwater levels rather than surface water alone. This groundwater influence and potential carrier of sub surface contaminants must be considered in SWP's remedial alternatives analysis.

- "Such approaches may be accomplished, in part, as an integrated part of the industrial development of the property."

  SWP's remedial techniques must be engineered and implemented to meet the site's remedial targets and timelines and not presumed as elements of a future port/industrial site development.

- In Table ES-1. Summary of Ecological Risk Assessment Results, Site–Wide impacts are "NA" or "NSR". These rankings must be based on SWP's proposed remedial solutions and not future port/industrial development.

- " ...and associated wetlands which are less likely to be developed for port or industrial uses."

  SWP's remedial alternatives analysis must assume the Authority's complete site accessibility and unrestricted property use.

- "Potential risks from PAH exposure in river sediments were predominately attributed to direct contact and ingestion of sediments by benthic organisms."

  SWP's remedial alternatives analysis must include the management, removal and/or isolation of contaminated riverside potential dredge material.

- "For purposes of BERA, groundwater data were not included in the evaluation as a potential exposure pathway."

  SWP's remedial alternatives analysis must consider groundwater contamination moving vertically within wetland areas and horizontally into shallow water riverine and creek sediments. Those alternatives must ensure the Authority's maximum versatility in construction methodology both land and waterside. The NCSPA thinks Table 7. should include those COPCs found on site in surficial, intermediate and deep groundwater aquifers.

- "(1) runoff from the jetty area and from the western portion of the Site to the Cape Fear River via the southern boat slip; and (2) small runoff area located along the northern property boundary of the site." "Vertical diffusion of COPCs from the sediments to the overlying water is reduced due to the presence of organic matter and debris. The AVS/SEM results also indicated reduced bioavailability of divalent metals form the sediments."

  SWP's remedial alternatives analysis must include the management, removal and/or isolation of contaminated riverside potential dredge material.

- " Benthic invertebrates are exposed to both sediments and the overlying water, so comparisons are made to both sediment and surface water regulatory values for this evaluation."

  SWP's remedial alternatives analysis must address groundwater contamination moving vertically within wetland areas and horizontally into shallow water riverine sediments.

- " Cape Fear River Sediments Adjoining the Site:"

  SWP's remedial alternatives analysis must include the management, removal and/or isolation of contaminated riverside potential dredge material.

- "For the wetland areas adjoining the creek and ditch, protective measures may be required to ensure that terrestrial receptors have reduced potential to contact residues that may remain in these areas. This effort would need to be coordinated with the site development plan in order to ensure proper implementation of these controls."

  SWP's remedial alternatives analysis must include those SWP engineered measures needed to meet remedial requirements for open areas, riverine, creek and ditch sediments, surface and groundwater contamination as part of the site's remedial approach rather than on a presumed coordination condition of industrial site development.

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

April 16, 2007

RECEIVED
APR 18 2007
SUPERFUND SECTION

Mr. Stuart F. Parker
North Carolina Department of Environment and Natural Resources
1646 Mail Service Center
Raleigh, NC 27699-1646

RE: Revised Baseline Ecological Risk Assessment
For the Former SWP – Facility in Wilmington, North Carolina
USEPA I.D. # NCD058517467
AOC Docket No. 97-SF-117

Dear Mr. Parker,

The enclosed document, prepared by Southern Wood Piedmont Company's risk evaluation consultant, AMEC, is a revision to the October 19, 2001 Baseline Ecological Risk Assessment (submitted as Reference 9 of the October 30, 2001 Supplemental Remedial Investigation document) and the August 31, 2006 Revised Supplemental Risk Evaluation For Insectivorous Birds (a revision to the December 9, 2005 "Supplemental Risk Evaluation For Insectivorous Birds at the SWP Facility in Wilmington, NC"). This revision addresses comments received in your January 11, 2007 letter to me, titled "Supplemental Risk Evaluation Review and Comment, Recommendations for Further Investigation" as well as a February 15, 2007 letter from Ms. Hanna Assafa in which addressed Southern Wood Piedmont's February 6, 2007 comments to the January 11, 2007 letter.

The additional field data, calculations and associated text, figure and table revisions included herein provide a thorough assessment of ecological risk at the facility. Thank you for your consideration of the revised report.

Please contact me at 864-599-1070, extension 103 if you have questions or comments.

Sincerely,

W. P. Arrants
General Manager

Enclosure

cc: G. B. Kuntz – Schnabel
J. H. Samuelian – AMEC
H. L. Bedsole – NC Ports Authority
C. E. Yetter - Rayonier

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

RECEIVED
MAR 14 2007
SUPERFUND SECTION

March 13, 2007

Mr. Stuart F. Parker
North Carolina Department of Environment
and Natural Resources
1646 Mail Service Center
Raleigh, NC 27699-1646

RE: Southern Wood Piedmont – Wilmington
NCD058 517467
NCDENR January 11, 2007 Supplemental
Risk Evaluation Review and Comment
Recommendation for Further Investigative Letter – 30-Day Extension

Dear Mr. Parker:

This letter confirms an extension of 30 days for submission of the revised baseline Ecological Risk Assessment for the former SWP facility in Wilmington, NC. The submission deadline of March 16, 2007 agreed to in my letter of February 6, 2007 to your attention will now be set for April 13, 2007. This extension request was agreed to by Mr. Jim Bateson in a March 13, 2007 telephone discussion. The additional 30 days will provide time to more adequately review, assess and report assessment data.

If you have any questions please do not hesitate to contact me at 864-599-1070, extension 103.

Sincerely,

William P. Arrants/ek

William P. Arrants
General Manager

cc: C. E. Yetter
G. B. Kuntz – Schnabel
J. H. Samuelian – AMEC
H. L. Bedsole – NC Ports Authority
J. Bateson – NCDENR

070313 NCDENR 30-Day Extension

NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT

MICHAEL F. EASLEY, GOVERNOR
WILLIAM G. ROSS, JR., SECRETARY
DEXTER R. MATTHEWS, DIRECTOR

NCDENR

FAX TRANSMITTAL RECORD

DATE: 2/15/07

TO: H LAYTON BEDSOLE JR

FAX #: 910 790 2334

FROM: Stuart Parker, Superfund Section

RE: Southern Wood Piedmont correspondence

Number of pages (including cover) 4

Comments: SWP had comments on our 1/11/07 letter concerning the RAs: Here is a copy, plus our toxicologist's response.

[signature]
919 508 8469

Confirm receipt of document(s):

_____, Superfund Section (919) 733-2801, ext. _____

Sent 2/15

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DATE,TIME	02/15 16:58
FAX NO./NAME	919107902334
DURATION	00:00:00
PAGE(S)	00
RESULT	BUSY
MODE	STANDARD

BUSY: BUSY/NO RESPONSE

NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT

MICHAEL F. EASLEY, GOVERNOR
WILLIAM G. ROSS, JR., SECRETARY
DEXTER R. MATTHEWS, DIRECTOR

NCDENR

FAX TRANSMITTAL RECORD

DATE: 2/15/07

TO: H LAYTON BEDSOVE JR

FAX #: 910 790 2334

FROM: Stuart Parker, Superfund Section

RE: Southern Wood Piedmont correspondence

Number of pages (including cover) 4

Comments: SWP had comments on our 1/11/07 letter concerning the RAs: Here is a copy, plus our toxicologist's response.

Thanks

February 15, 2007

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Evaluation and Removal Branch

From: Hanna Assefa
Environmental Toxicologist
Inactive Hazardous Sites Branch

RE: Southern Wood Piedmont
Response to January 11, 2007 letter
Wilmington, New Hanover County

I have reviewed the February 6, 2007 letter from Southern Wood Piedmont Company. I would like to point out that in the past terrestrial receptors like American Robin and Short tailed Shrew were not evaluated. The reason was we understood that most of the contaminated terrestrial areas were slated for redevelopment, and therefore would be filled and graded, resulting in incomplete exposure pathways for the terrestrial species. Recent conversations I have had with you indicate that those plans are not definite, and may not encompass all the contaminated terrestrial areas. If these species are not to be evaluated then Southern Wood has to demonstrate that future development of the site will render the exposure pathways incomplete. This showing has to be in the form of a land use restriction document that prescribes such actions. The evaluation of both aquatic and terrestrial receptors where exposure pathways are complete is a requirement of the USEPA. I concur with the rest of the letter.

Post-it® Fax Note 7671	Date 2/16/07 # of pages ▶ 1
To WILLIAM PARMANTS	From STUART PARKER
Co./Dept. SWP	Co. NC SUPERFUND
Phone #	Phone # 919 508 8469
Fax # 864 599 1087	Fax #

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

RECEIVED
FEB - 8 2007
SUPERFUND SECTION

February 6, 2007

Mr. Stuart F. Parker
North Carolina Department of Environment and Natural Resources
1646 Mail Service Center
Raleigh, NC 27699-1646

RE: Southern Wood Piedmont – Wilmington
NCD058 517467
NCDENR January 11, 2007 Supplemental
Risk Evaluation Review and Comment
Recommendation for Further Investigative Letter

Dear Mr. Parker,

In a follow up to our telephone conversation of January 26, 2007, I am forwarding in this letter comments to your January 11, 2007 letter concerning the Revised Supplemental Risk Assessment for the Insectivorous Bird for Southern Wood Piedmont Company's (SWP) Wilmington facility. SWP agrees with NCDENR's desire to minimize the time required to complete the Remedial Investigation (RI) by determining the Assessment Endpoint that will ultimately drive the remediation effort at this site. The purpose of these comments is to provide our recommendations for moving forward with the completion of the RI .

We agree that the preparation of a site map showing habitats would be beneficial to the Baseline Ecological Risk Assessment (BERA) and to assist in the risk management decisions for this site. Therefore, we are proposing that a field ecologist walk the site, use a GPS to mark the habitat boundaries to produce polygons of these habitats, and then use this information to produce overlays of the site base map. We are anticipating that the field work for this activity can be performed in mid- to late-February 2007.

A remediation goal for sediment that is protective of piscivorous birds (hazard quotient less than 1) for the chemicals or chemical groups that have a hazard quotient greater than 1 will be evaluated using site specific biota to sediment accumulation factors (BSAF) from the site where available. Literature derived BSAF values will be used to evaluate uncertainty and to provide a bounding estimate for the remediation goals. In the same sense, a remediation goal for the insectivorous bird will also be calculated using the site-specific BSAF and the literature BSAF.

It was requested that remediation goals be calculated for terrestrial receptors such as, an insectivorous bird like the American Robin and an insectivorous mammal like the Short-tailed Shrew. These two receptors were not evaluated in the draft BERA because, as indicated in the Supplemental RI Work Plan from 2000, the receptor selection followed the recommendation from the Screening Level Ecological Risk Assessment (SLERA). The BERA focused on those receptors that would likely use the drainage ditch, Greenfield Creek, and adjoining onsite wetlands. Both the shrew and robin are unlikely to come in contact with the sediments and

would also utilize upland areas that are outside of the waterways and associated wetlands. Including them as additional receptors in the risk characterization, as well as the lack of site-specific empirical data to assess their exposures (e.g., COPEC earthworm concentrations), will likely overstate the potential risks to these receptors. Therefore, they are not ideally representative receptors for assessing the media of concern (sediments and wetland soils) at this site.

That said, we are proposing to add these two additional receptors, not in the risk characterization *per se*, but as part of the remediation goal evaluation to determine how protective the remediation goals derived for our existing receptors are in also protecting the shrew and robin. The proposed approach would be to forward calculate the potential risks to the shrew and robin based on these goals, weighing these results with the uncertainty in their risk estimates stated in the preceding paragraph.

Tables can be included for calculation of dioxin TEQ for all media/receptors in the revised BERA as requested However, we propose to include them as MS-Excel and PDF files on a CD provided as an appendix. The rationale for this is that, in contrast to the Supplemental ERA for the Insectivorous Bird that focused only on a few insect composite samples (and where similar backup calculations were provided), the BERA analytical database includes many more samples which would result in an excessive number of printed pages. The MS-Excel files will show the intermediate steps generated by the database query, the individual TEQ calculations by sample and media, and the EPC value.

Field effort to truth site physical characteristics along with the added information required for report preparation will extend the time required to produce the final report beyond the 30-day turnaround requested in NCDENR's letter. As requested and agreed to in our telephone conversation, SWP will provide the revised report within 60 days of receipt of the letter. The letter was received on January 17, 2007 so the report will be provided by March 16, 2007

It would be appreciated if NCDENR would provide their agreement with our proposed activities. SWP welcomes further discussion of these issues via a teleconference, if desired by NCDENR.

Sincerely,

W. P. Arrants
General Manager

CC: C. E. Yetter
G. B. Kuntz – Schnabel
J. H. Samuelian – AMEC
H. L. Bedsole – NC Ports Authority

NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

January 11, 2007

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

Mr. William P. Arrants
Manager of Environmental Affairs/Regulatory Compliance
Southern Wood Piedmont Company
P.O. Box 5447
Spartanburg, SC 29304

SUBJECT: Southern Wood Piedmont Site
NCD 058 517 467
Wilmington, New Hanover County, NC
Supplemental Risk Evaluation Review and Comment;
Recommendations for Further Investigation

Dear Mr. Arrants:

Attached please find comments and directives by Hanna Assefa (NC Superfund Section Environmental Toxicologist) in response to Southern Wood Piedmont's August 31, 2006 revision to its Supplemental Risk Evaluation of the Wilmington NC site. These technical directives were addressed to AMEC Earth and Environmental but are routed to your attention as previously requested.

The focus of the attached directives is twofold: 1) to address inconsistencies and omissions in the Baseline Ecological Risk Assessment; 2) to prescribe further calculation of remediation goals protective of the receptors identified in the ERA.

Insect collection and testing to characterize risk to insectivorous birds by bioaccumulation of site contaminants has met with mixed results; the attachment prescribes additional calculation methods to augment the risk assessment. The Superfund Section's present emphasis is to correctly determine which Assessment Endpoint will ultimately drive anticipated remediation efforts at this site. The goal is to minimize additional time required to complete the Remedial Investigation.

Southern Wood Piedmont is directed to complete the attached directives within thirty (30) days of receipt of this letter. Upon satisfactory completion of these tasks, the Superfund Section will confer with Southern Wood and the State Ports Authority, both to expedite RI completion and to discuss potential remedies and their compatibility with intended site redevelopment.

If you have any questions or require additional completion time please call me at (919) 508-8469. For technical discussion specific to the risk assessment, contact Ms. Assefa at (919) 508-8445.

Sincerely,

Stuart F. Parker, Hydrogeologist
NC Superfund Section

Attachments

cc: James Bateson
Jennifer Wendel (EPA Region IV)
H. Layton Bedsole (NC Ports Authority)
Hanna Assefa
file

January 10, 2007

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Evaluation and Removal Branch

From: Hanna Assefa HA
Environmental Toxicologist
Inactive Hazardous Sites Branch

RE: Southern Wood Piedmont
Exposure Assessment for Insectivorous Birds
Southern Wood Piedmont
Wilmington, New Hanover County

I have reviewed the August 31st 2006 revision of the Supplemental Risk Evaluation for Insectivorous Birds prepared by AMEC Earth and Environmental. Based on my discussions with you and Jim Bateson I request the following from AMEC Earth and Environmental:

1. Provide a site map showing the habitats that are relevant to the receptors of interest. Provide a complete list of samples used for each assessment endpoint identified in the Baseline Ecological Risk Assessment (BERA) including sampling date. Provide a site map or maps that show where each sample used in the calculation of risk for each assessment endpoint is located. Separate maps for aquatic and terrestrial receptors would be preferred.

2. Conduct QC review on all the BERA tables to make sure that there are no errors. The 2001 BERA omitted risk to ecological receptors from dioxin by error, where dioxin is clearly present in fish tissue and sediment. We understand the correction has been done since. Please provide revised BERA spreadsheets for the food chain model (calculations not just final table).

3. Calculate a remediation goal for sediment that is protective of piscivourous birds (Hazard Quotient less than 1) for the chemicals or chemical groups that have a hazard quotient greater than 1. The BERA indicates that the risk to piscivourous birds is driven by the modeled insect concentrations and not the fish. The calculations can be done using site specific biota to sediment accumulation factors for insects from the site where available. But should be accompanied by remediation goals calculated using conservative literature BSAFs for the insects in the diet of the piscivourous bird. For all chemicals calculate a remediation goal for sediment based on both NOAEL and LOAEL.

4. Calculate remediation goals to protect the carnivourous bird the Red Tailed Hawk for those chemicals that show a hazard quotient greater than 1.

5. Calculate sediment remediation goals for the protection of the insectivorous bird using both site specific and literature BSAF for chemicals that have a hazard quotient greater than 1.

6. The BERA only considered the Red Tailed Hawk as a terrestrial receptor. Evaluate an insectivourous bird like the American Robin and an insectivourous mammal like the Short tailed shrew using modeled values for prey intake. Calculate remediation goals for chemicals with a hazard quotient greater than 1.

7. Determine sediment remediation goals for the protection of benthic invertebrates.

8. Provide spreadsheets for the remediation goal calculation not just the final table.

9. Include tables for calculation of dioxin TEQ for all media/receptors.

Compare the remediation goals and determine the assessment endpoint that is the driver for sediment remediation. Also propose remediation goals. This would be a good starting point for a discussion of cleanup feasibility of the ditch and Greenfield Creek. The data generated from the preceding steps will also be incorporated into the revised BERA after review. The reason this approach is recommended is not because we think that the insect sampling results were adequate to predict risk for the insectivorous bird but rather to direct the focus to the assessment endpoint that will likely drive the cleanup of Greenfield Creek, the ditch, and the terrestrial areas.

Please also not that the revised human health remediation goal calculations are also still outstanding.

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

September 1, 2006

RECEIVED
SEP 05 2006
SUPERFUND SECTION

Mr. Stuart F. Parker, Jr.
NCDENR
1646 Mail Service Center
Raleigh, NC 27699-1646

Re: Revised Supplemental Risk Evaluation
For Insectivorous Birds at the Former
SWP Facility in Wilmington, NC
USEPA I.D. No. NCD058517467
AOC Docket No. 97-SF-117

Dear Mr. Parker:

The enclosed document prepared by Southern Wood Piedmont Company's (SWP) risk evaluation consultant, AMEC, provides additional supporting information and evaluation of potential ecological risks to insectivorous birds at the Wilmington facility. The revision considers data previously evaluated and presented in the December 9, 2005 draft "Supplemental Risk Evaluation for Insectivorous Birds at the SWP Facility in Wilmington, NC" along with additional data generated from sampling events conducted in May and June 2006. The report reflects responses to NCDENR comments dated March 21, 2006 and a teleconference with NCDENR and USEPA on April 21, 2006 as were referenced in SWP's May 25, 2006 Response to NCDENR and EPA comments to the "Draft Insectivorous Bird Ecological Risk Assessment" for the facility.

It is our hope that the additional data generated from the 2006 sample event, combined with previously generated data presented in the revised report with a more comprehensive data package will address the Department's concerns for completion of this study. Thank you for your consideration of this revised report.

Please contact me at 864-599-1070, extension 103 if you have questions or comments.

Sincerely,

William P. Arrants
General Manager

Enclosure

cc: G. D. Kuntz
J. H. Samuelian
H. Layton Bedsole

060831 Revised Supplemental Risk Evaluation

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

September 1, 2006

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SEP 05 2006
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Please contact me at 864-599-1070, extension 103 if you have questions or comments.

Sincerely,

William P. Arrants
General Manager

BOUND (BLUE) SEPARATELY (2 COPIES)

Enclosure

cc: G. D. Kuntz
J. H. Samuelian
H. Layton Bedsole

060831 Revised Supplemental Risk Evaluation

amec

RECEIVED
SEP 0 5 2006
SUPERFUND SECTION

REVISED SUPPLEMENTAL RISK EVALUATION FOR INSECTIVOROUS BIRDS AT THE FORMER SWP FACILITY IN WILMINGTON, NORTH CAROLINA

Submitted to:

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303

Submitted by:

AMEC Earth & Environmental
Portland, Maine 04101

Draft: 2 December 2005
Revised: 31 August 2006

EXECUTIVE SUMMARY

AMEC has prepared this report to summarize the results from the supplemental field collections of emergent aquatic insects and the assessment of the potential ecological risks to a representative insectivorous bird (the Eastern Kingbird) at the former Southern Wood Piedmont (SWP) facility located in Wilmington, North Carolina. This report supplements the draft *Baseline Ecological Risk Assessment Report* (BERA) for the SWP Wilmington facility prepared in 2001 (AMEC, 2001). This revised supplemental report reflects responses to North Carolina Department of Environment and Natural Resources (NCDENR) comments dated 21 March 2006 to the draft *Supplemental Risk Evaluation for Insectivorous Birds Report* (AMEC, 2005) and prior discussions since the submission of the BERA in 2001 regarding the insectivorous bird exposure pathway.

The primary objectives of this project were:

- To summarize the analytical results from the collection of emergent aquatic insects from the SWP facility; and
- Assess the potential ecological risks to an insectivorous bird.

To satisfy the stated objectives, composite samples of the emergent aquatic insects were collected from several locations within Greenfield Creek (2005 and 2006)[1], the Drainage Ditch (2005 only), and an upstream reference area (2005 only) that were sampled as part of previous field investigations. These samples were analyzed for polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/Fs), and percent lipid to support this assessment.

E.1 Field Collection Summary and Analytical Results

The 2005 emergent aquatic insect samples were collected from 23 through 27 May 2005. The 2006 samples were collected in two separate events: from 15 through 17 May 2006 and from 30 May through 1 June 2006. Two events were required for 2006 to accommodate hatching rates and weather conditions.

Insects were collected using a portable, battery-operated UV attractant trap (Universal Black Light trap; BioQuip Products, Rancho Dominguez, California). The light traps were deployed at the sampling locations before dusk. For the sampling effort in 2005 and the first portion of the 2006 sampling, the samplers were accessed the following morning, the insects were enumerated to the order level (e.g., Trichoptera) and the aquatic insects were placed in the appropriate sample containers for shipment to the analytical laboratory. For the second portion of the 2006 sampling, the samplers were accessed the following morning, stored cold and shipped to AMEC for enumeration, segregation of terrestrial from emergent aquatic insects, and frozen for subsequent shipping to the laboratory. Composite samples were collected representing insects collected from three stations along Greenfield Creek in 2005, one station from Greenfield Creek in 2006, four stations along the Drainage Ditch, and from an upstream (off-site) location in Greenfield Creek that served as a background (reference) area (Figure 2) Composites were prepared to ensure sufficient sample mass for chemical analysis. All

[1] Additional emergent aquatic insect samples were collected from the area near GC-2 in May and June 2006 to supplement the 2005 dataset.

chemical analyses were performed by Paradigm Analytical Laboratories (recently renamed SGS Laboratories), located in Wilmington, North Carolina.

PCDD/F congeners and PAHs were detected in the emergent aquatic insect composites. All 17 PCDD/F congeners were detected in the Greenfield Creek sample from 2005, 15 of the 17 PCDD/F congeners were detected in the Drainage Ditch sample from 2005, 13 of the 17 PCDD/F congeners were detected in the reference area sample from 2005, and five of the 17 PCDD/F congeners were detected in the 2006 Greenfield Creek sample. The largest avian TEQ concentration in the emergent aquatic insect composites was calculated for the Drainage Ditch sample (18.4 ng/Kg_{ww}), followed by the Greenfield Creek from 2005 (7.5 ng/Kg_{ww}) and the reference area (1.1 ng/Kg_{ww}) sample. For all of the 2005 emergent aquatic insect samples, substituting the non-detect results with either a zero value or one-half the reported detection limit did not dramatically change the calculated TEQs. For the 2006 sample collected from one station on Greenfield Creek (GC-2), substitution of the non-detect results with zero or one-half the reported detection limit yielded widely differing avian TEQ values (0.4 and 7.4 ng/Kg_{ww}, respectively), due principally to the low detection frequency of PCDD/F congeners in this composite sample.

All 16 PAHs were detected in the 2005 Drainage Ditch sample, 14 of the 16 PAHs were detected in the 2005 Greenfield Creek sample, and 5 of the 16 PAHs were detected in the 2005 reference area sample. The largest total PAH concentration was reported in the Greenfield Creek sample (1.86 mg/Kg_{ww}), followed by the Drainage Ditch (0.64 mg/Kg_{ww}) and the reference area (0.47 mg/Kg_{ww}).

Four additional PAHs (carbazole, dibenzofuran, 1-methylnaphthalene and 2-methylnapthalane) were included in the 2006 PAH analyte list. Eleven of the 20 PAHs were detected in the composite collected from station GC-2 in 2006. The total PAH concentration of this sample (1.49 mg/Kg_{ww}) was similar to that for the Greenfield Creek sample composite collected in 2005 (1.86 mg/Kg_{ww}).

The wet weight percent lipid contents of the emergent aquatic insect composites collected from the Drainage Ditch, Greenfield Creek, and reference area were 2.11, 2.55, and 2.72%, respectively. Percent lipid data were not available for the 2006 sample composite due to limited sample mass.

E.2 Selection of Receptor of Interest (Eastern Kingbird)

The selection of an appropriate insectivorous bird that may be exposed to prey items that had contact with sediments from Greenfield Creek or the Drainage Ditch was based on the selection criteria specified in USEPA (1997). Several insectivorous bird species were evaluated, including tree swallows, the marsh wren, and the Eastern kingbird. Following presentation of the relevant information to NCDENR concerning these different receptors, NCDENR approved the use of the Eastern kingbird as a representative receptor for insectivorous birds that would inhabit the environmental settings of Greenfield Creek and the Drainage Ditch.

E.3 Exposure Point Concentrations

Composite samples of emergent aquatic insects were collected (to ensure sufficient mass for chemical analysis) from the Drainage Ditch and Reference Area in 2005. Therefore, single values for the PAH and PCDD/F concentrations were used as Exposure Point Concentrations (EPCs) for the prey of the insectivorous bird from these two areas.

For Greenfield Creek, emergent aquatic insect composites were available for two sampling events (2005 and 2006). For this area, the EPCs were evaluated three ways:

- Using the 2005 emergent aquatic insect composite results;
- Using the 2006 emergent aquatic insect composite results; and
- Using a combination of the 2005 and 2006 emergent aquatic insect composite results, with the results weighted by the number of stations where samples were originally collected.

The latter was done for conservatism since three stations contributed to the composite sample from Greenfield Creek in 2005 (GC-1, GC-2 and GC-3) compared to the 2006 composite (GC-2 only). The weighting of the combined 2005-2006 emergent aquatic insect result for Greenfield Creek assumed 75% from the 2005 result and 25% from the 2006 result.

For the surface water and sediment samples, and consistent with the draft BERA (AMEC, 2001), the EPCs were calculated as the arithmetic mean of the data, setting any non-detect results to one-half the reported quantitation limit. EPCs were not calculated if all of the samples that were relevant to the receptor's exposure from a given exposure medium were not detected.

Since the composite emergent aquatic insect concentrations of chemicals other than the PAHs or PCDD/Fs were not available, the emergent aquatic insect concentrations were assumed to be the same as the sediment concentrations. This approach assumes that all of the measured chemical concentrations in the sediments is available for uptake by the insects.

E.4 Exposure Assumptions for the Eastern Kingbird

For the Eastern kingbird, potential exposure to COPCs via ingestion of constituents in the food chain was evaluated through food web modeling. Potential exposure via this route is a function of COPC concentration in the diet, dietary intake rate, receptor body weight, and factors describing the fraction of the receptor's diet that originates from the Site. The Eastern kingbird could be exposed to COPCs at the Site through the consumption of emergent aquatic insects and the incidental ingestion of surface water. The exposure inputs were derived based on literature values for this species (e.g., CWS, 2002) or based on allometric equations (e.g., Nagy, 1987).

E.5 Risk Characterization

Potential risks to the Eastern kingbird were estimated using the hazard quotient (HQ) method. In this method, the estimated exposure (the average daily dose; ADD) is compared to the

toxicity benchmark (the toxicity reference value, TRV). TRVs were derived for both NOAEL and LOAEL endpoints (TRV_{NOAEL} and TRV_{LOAEL}, respectively).

When the HQ_{NOAEL} is less than 1.0, the estimated potential exposure is less than the TRV_{NOAEL}, indicating that a potential risk likely does not exist. When the HQ_{NOAEL} is greater than 1.0, the estimated potential exposure exceeds the TRV_{NOAEL} and a potential risk may exist. HQ_{NOAEL} values above one but less than 10 will typically be less than the TRV_{LOAEL}. Therefore, when the HQ_{NOAEL} is above the highest no-effect level benchmark, but below the LOAEL benchmark, population-level effects are unlikely to occur. HQ_{NOAEL} values in excess of 10 suggest the potential for a population-level effect.

HQ values based on the TRV_{NOAEL} (HQ_{NOAEL}) and TRV_{LOAEL} (HQ_{LOAEL}) values were calculated for individual chemicals, the L-PAH, H-PAHs, and Total PAHs. The HQ values for the L-PAHs, H-PAHs and Total PAHs were the sum of the HQ values from their respective PAH compounds. In addition, the Hazard Index (HI), which is the sum of the individual chemical HQ values, was also calculated.

The HI values are summarized in the table below for each evaluated area. Values shown in bold are greater than one. The HI values are typically calculated only for like endpoint or target organ impacts (USEPA, 2001a). However, for conservatism the individual HQ values were summed independent of the toxicological endpoint.

Parameter	Hazard Indices				
			Greenfield Creek		
	Reference Area	Drainage Ditch	2005 Emergent aquatic insect Results	2006 Emergent aquatic insect Results	2005&2006 Emergent aquatic insect Results
HI_{NOAEL}	**2.3E+00**	**1.1E+01**	**7.5E+00**	**6.0E+00**	**6.3E+00**
HI_{LOAEL}	3.2E-01	**1.2E+00**	8.5E-01	7.0E-01	7.3E-01

The HI_{NOAEL} values exceeded one for all evaluated areas, but the HI_{LOAEL} value was above one only for the Drainage Ditch sample. To determine the potential risk drivers, the HQ_{NOAEL} values were also calculated for the L-PAHs, H-PAHs and Total PAHs, and are summarized in the table below. The values shown in parentheses are the relative contribution to the HI values.

COPC	HQ_{NOAEL} Values (%HI Values)				
			Greenfield Creek		
	Reference Area	Drainage Ditch	2005 Emergent aquatic insect Results	2006 Emergent aquatic insect Results	2005&2006 Emergent aquatic insect Results
L-PAHs	2.3E-01 (10.0%)	**7.1E+00 (64.7%)**	**1.4E+00 (18.7%)**	4.1E-01 (6.9%)	2.8E-01 (4.4%)
H-PAHs	8.8E-02 (3.7%)	1.3E-01 (1.2%)	9.8E-01 (13.2%)	5.0E-01 (8.4%)	9.2E-01 (14.6%)
Total PAHs	3.2E-01 (13.7%)	**7.2E+00 (65.9%)**	**2.4E+00 (31.8%)**	9.1E-01 (15.3%)	**1.2E+00 (19.0%)**

None of the L-PAH, H-PAH and Total PAH HQ_{LOAEL} values exceeded one for any of the evaluated areas.

The table below summarizes the HQ_{NOAEL} values that were greater than one (shown in bold) at one or more locations for individual chemicals.

	HQ_{NOAEL} Values (%HI Values)				
			Greenfield Creek		
COPC	Reference Area	Drainage Ditch	2005 Emergent aquatic insect Results	2006 Emergent aquatic insect Results	2005&2006 Emergent aquatic insect Results
Aluminum	5.9E-01 (24.9%)	**2.3E+00 (20.9%)**	**3.5E+00 (47.3%)**	**3.5E+00 (59.1%)**	**3.5E+00 (56.3%)**
2-methyl naphthalene	7.4E-02 (3.2%)	**1.2E+00 (11.3%)**	3.7E-01 (5.0%)	1.2E-03 (0.02%)	1.2E-03 (0.02%)
Dibenzofuran	6.2E-02 (2.6%)	**4.9E+00 (44.3%)**	5.6E-01 (7.4%)	3.4E-02 (0.6%)	3.4E-02 (0.5%)

The HQ_{LOAEL} values for each of the chemicals shown in this table were below one.

Aluminum, which is not a Site-related chemical, had HQ_{NOAEL} values greater than one for the Drainage Ditch and Greenfield Creek samples. Although the HQ values for these two areas were greater than the HQ calculated for aluminum in the reference area (HQ = 0.59), the latter was based on a single sample result (2,700 mg/Kg). The reference area aluminum concentration fell within the range of aluminum observed in the Drainage Ditch (1,600 to 28,000 mg/Kg; 6 samples) and Greenfield Creek (650 to 11,000 mg/Kg; 3 samples). Perhaps more importantly, the Eco-SSL document for aluminum (USEPA, 2005b) states that aluminum is of toxicological concern only when the soil pH is less than 5.5 (i.e., aluminum toxicity is pH-dependent). Since the sediment pH values ranged from 6 to 7.2 (mean: 6.9) at this Site, aluminum is unlikely to pose risks to any of the insectivorous birds at the Site.

Two individual PAHs had HQ_{NOAEL} values greater than one in the Drainage Ditch samples only. These PAHs had HQ_{NOAEL} values below one for the Greenfield Creek samples. As noted previously, both 2-methylnapthalene and dibenzofuran are PAHs but were not target analytes for the SIM mode analysis of PAHs performed in 2005. Consequently, their concentrations in the prey items were conservatively assumed to be the same as the concentration in the sediment. As shown in the table above (see also Table B-5) when these two PAHs were included in the 2006 analyte suite for Greenfield Creek emergent aquatic insect collections the HQ_{NOAEL} values were well below one for these chemicals, and were lower than the calculated HQ_{NOAEL} values from the 2005 Greenfield Creek samples where the emergent aquatic insect concentration was assumed to be the same as the sediment concentration for these two PAHs. Therefore, the HQ_{NOAEL} values calculated for 2-methylnapthalene and dibenzofuran based on the 2005 datasets are likely over-estimated.

E.6 Uncertainty Assessment

Uncertainty assessments of the potential risks was also performed to examine the following: (1) EPC calculation method for weighting the combined 2005 and 2006 emergent aquatic insect datasets, (2) selection of an alternate, over-conservative, PAH TRVs, (3) conservatively assuming an area use factor of one, (4) a combined assessment of conservative values for AUFs and TRVs, and (5) the representativeness of the insect collection method. This assessment is briefly summarized below:

- When the 2005 and 2006 emergent aquatic insect composite results from Greenfield Creek were combined the results were weighted by the number of stations where samples were originally collected. This was done to obtain a more conservative estimate of the average emergent aquatic insect concentration since three locations contributed to the composite sample from Greenfield Creek in 2005 compared to the single location (GC-2) for the 2006 composite. Use of the simple average of the two years of data, or a weighting scheme of 75% 2005 to 25% 2006 did not yield dramatically different results for total PAHs or Dioxin-TEQ. Therefore, this was not a major source of uncertainty in the risk estimates when these datasets were combined for the Greenfield Creek evaluation.

- The use of an overly conservative TRV derived from egg yolk-injection studies increased the HQ values from all of the evaluated areas for the PAHs, including those from the reference area. However, these risks are likely artificially inflated since avian species are known to rapidly metabolize PAHs (Näf et al., 1992; Malcolm and Shore, 2003). Therefore, it is more appropriate to utilize studies that involve oral exposure to chemicals of interest for the derivation of TRVs. Furthermore, EPA recommends that studies that report results for non-oral exposures should not to be used to establish TRVs (USEPA, 2005a).

- At the request of NCDENR, an AUF of one was evaluated as part of the uncertainty assessment for the Eastern Kingbird, using all of the PAHs and Dioxin-TEQ (as examples). Replacing the Site-specific AUFs with one resulted in the following:

    - For the reference area samples, none of the PAHs or Dioxin-TEQ had HQ_{NOAEL} values greater than one using a realistic AUF. Setting the AUF to one yielded HQ_{NOAEL} values greater than one for three of the PAHs. None of these HQ_{NOAEL} values were greater than 10.

    - For the Drainage Ditch samples two of the PAHs had HQ_{NOAEL} values greater than one using a realistic AUF. Setting the AUF to one yielded HQ_{NOAEL} values greater than one for three of the PAHs were greater than one. None of the HQ_{NOAEL} values were greater than 10.

    - None of the HQ_{NOAEL} values from the 2005, 2006 or combined 2005&2006 Greenfield Creek datasets exceeded one when a realistic AUF was used. Setting the AUF to one yielded HQ_{NOAEL} values greater than one 6, 3, and 2 of

the PAHs using the 2005, 2006 or combined 2005&2006 datasets, respectively. None of the HQNOAEL values were greater than 10.

Although AUFs of one are often assumed for screening assessments, it is more appropriate to reflect the organisms' likely exposure potential from the evaluated areas since areas outside of these exposure areas are also used for forage. For Greenfield Creek and the Drainage Ditch, which are small areas relative to the home range of the Eastern kingbird, AUFs less than one would be more appropriate to use for quantitative assessment of potential risks from these areas.

- At the request of EPA and NCDENR (2005; see Appendix G), an additional uncertainty assessment was performed by setting the AUF to one and using the most conservative TRVs for the PAHs (derived from Brünstrom et al., 1991). This conservative approach resulted in the following:

  - For the reference area none of the PAHs or Dioxin-TEQ had HQ_{NOAEL} values greater than one under realistic AUFs and TRVs. The combined use of an AUF of one and conservative TRVs resulted in HQ_{NOAEL} values greater than one for 18 of the 20 PAHs. Five of the HQ_{NOAEL} values were also greater than 10.

  - For the Drainage Ditch samples two of the PAHs had HQ_{NOAEL} values greater than one under realistic AUFs and TRVs. The combined use of an AUF of one and conservative TRVs resulted in HQ_{NOAEL} values greater than one for 19 of the 20 PAHs. Eleven of the HQ_{NOAEL} values were also greater than 10.

  - None of the HQ_{NOAEL} values from the 2005, 2006 or combined 2005&2006 Greenfield Creek datasets exceeded one when realistic AUFs and TRVs were used. The combined use of an AUF of one and conservative TRVs resulted in HQ_{NOAEL} values greater than one for 18, 12 and 16 of the 19 PAHs from the 2005, 2006 or combined 2005&2006 Greenfield Creek datasets, respectfully. Of these, 12, 10 and 13 of the HQ_{NOAEL} values were also greater than 10 for the 2005, 2006 or combined 2005&2006 Greenfield Creek datasets, respectfully.

  The combined use of an AUF of one and unrealistic TRVs do not represent realistic exposure pathways for insectivorous birds at this site. In addition to the prior discussions concerning the relevance of this approach, its over-conservatism is supported by the calculation of several HQ_{NOAEL} values greater than one for the reference area samples. Since these samples were collected from an area that was not historically impacted by any site-related activities, the results would indicate that this conservative combination of exposure conditions should be weighted less heavily in any risk management decisions.

- The UV-light insect collection equipment is "non-specific" and will also collect terrestrial insects. However, to ensure the predominant collection of emergent aquatic insects, the following approaches were implemented during these collections: (1) Samplers were set up as close to the Drainage Ditch and Greenfield creek as possible; (2) Sampling occurred in the spring (May 2005, and May and June 2006) when insects associated with more aquatic environments would be predominant and available for collection; and (3) Any co-collected terrestrial insects were sorted and removed from the samples prior

to packing for chemical analysis. Furthermore, since the avian insectivore would not prey exclusively on emergent flying insects, preferentially biasing the sampling and analysis towards this group of insects would yield a conservative estimate of the potential risks to avian insectivores.

E.8 Conclusions

The evaluation of the insectivorous bird exposure pathway showed no risks to this receptor from food-chain transfer of individual COPCs from sediments to emergent aquatic insects. Aggregating the individual PAH results as L-PAHs or Total PAHs resulted in HQ_{NOAEL} values greater than one for some of the evaluated areas, but these may not be representative since surrogate values for insect concentrations for some of the PAHs (e.g., dibenzofuran sediment results for the 2005 Drainage Ditch samples) were used in the absence of empirical data. These results will be integrated into the revision of the draft BERA (AMEC, 2001) to be submitted under separate cover.

Subject: Re: FW: SWP Site - NC contact information
From: James Bateson <james.bateson@ncmail.net>
Date: Thu, 31 Aug 2006 10:34:44 -0400
To: "Waylett, Kathleen" <kwaylett@ncdoj.gov>
CC: Jack Butler <jack.butler@ncmail.net>, STUART PARKER <STUART.PARKER@ncmail.net>

Kathleen,

Three different choices for SWP AOC amendment:

1. As suggested by Stuart Parker, SWP may be intending to pursue contributions only from Amoco, which has some historical petroleum releases next door which could be argued to have contributed to SWP's groundwater plume and related surface water contamination. We could test this with SWP's reaction to our inclusion of indemnification of the State Ports Authority and the City of Wilmington in a draft amended AOC.

2. We amend the AOC without indemnifications. SWP may intend to pursue contributions from the State Ports Authority in order to engender delays and gain leverage. No fun. Maybe no cleanup progress and then eventual NPL listing.

3. We refuse to amend the AOC. SWP becomes even more intransigent in their delaying ways. We and EPA agree to proceed with listing the site on the NPL. Should we consider doing this sooner rather than later? It is possible that SWP would want the site to be listed on the NPL in order to gain contribution rights and further delay, anyway.

Let's talk. We might also consider discussing the situation with the Ports Authority before moving (or not) on this.

Jim Bateson

Waylett, Kathleen wrote:

> Fyi.
> -----Original Message-----
> From: Waylett, Kathleen Sent: Wednesday, August 30, 2006 5:01 PM
> To: 'Wolfson, Timothy C.'
> Subject: RE: SWP Site - NC contact information
>
> The agency is looking at the issue in the context of all of its existing deferral AOCs. They know they need to get back to me.
>
> -----Original Message-----
> From: Wolfson, Timothy C. [mailto:twolfson@bccz.com] Sent: Wednesday, August 30, 2006 4:50 PM
> To: Waylett, Kathleen
> Subject: RE: SWP Site - NC contact information
>
> Any update?
> -----Original Message-----
> From: Waylett, Kathleen [mailto:kwaylett@ncdoj.gov] Sent: Tuesday, August 08, 2006 5:12 PM
> To: Wolfson, Timothy C.
> Subject: RE: SWP Site - NC contact information
>
> Sorry, I have not been back in touch with you. The agency had some issues they wanted to discuss. I will touch base with them and get back to you.
>
> -----Original Message-----
> From: Wolfson, Timothy C. [mailto:twolfson@bccz.com]

From: Wolfson, Timothy C. [mailto:twolfson@bccz.com]
Sent: Tuesday, August 08, 2006 3:34 PM
To: Waylett, Kathleen
Subject: RE: SWP Site - NC contact information

Not to be too much of a pest, BUT, any update on ETA of the proposed revised AOC?
-----Original Message-----
From: Waylett, Kathleen [mailto:kwaylett@ncdoj.gov]
Sent: Monday, July 10, 2006 3:12 PM
To: Wolfson, Timothy C.
Cc: James Bateson
Subject: RE: SWP Site - NC contact information

Tim, we have completed the research and drafted additional language. We are making changes to the AOC now. Once the revised AOC has been approved by DWM's Superfund Section, I will send it to you for your review. I hope to be able to get you the draft by the end of this week.

Kathleen
-----Original Message-----
From: Wolfson, Timothy C. [mailto:twolfson@bccz.com]
Sent: Monday, July 10, 2006 2:17 PM
To: Waylett, Kathleen
Cc: Floyd.Tanya@epamail.epa.gov
Subject: RE: SWP Site - NC contact information

Kathleen - just another friendly request for a status update.
-----Original Message-----
From: Wolfson, Timothy C. Sent: Wednesday, May 24, 2006 10:08 AM
To: kwaylett@ncdoj.com
Cc: Calland, Dean; 'Floyd.Tanya@epamail.epa.gov'
Subject: RE: SWP Site - NC contact information

Good morning, Kathleen.
Can you give me an update on the status of your draft amendment to the AOC for the former Southern Wood Piedmont Wilmington facility?
Thanks.
Timothy C. Wolfson
Babst Calland Clements & Zomnir, PC
Two Gateway Center
Pittsburgh, PA 15222
412-394-6536 (office)
412-848-8558 (mobile)
412-586-1058 (direct fax)
412-586-1312 (direct conference)
412-486-0182 (home)
twolfson@bccz.com
www.bccz.com

-----Original Message-----
From: Floyd.Tanya@epamail.epa.gov [mailto:Floyd.Tanya@epamail.epa.gov]
Sent: Wednesday, May 03, 2006 10:57 AM
To: Wolfson, Timothy C.; Calland, Dean
Cc: kwaylett@ncdoj.com; Lucas.Ken@epamail.epa.gov; Campbell.Richard@epamail.epa.gov
Subject: SWP Site - NC contact information

Tim and Dean,

Kathleen Waylett, counsel for NC, will be the lead contact on NC AOC amendment issues. Please see cc line above for her email address. Her phone number is: 919-716-6975.

Thanks,
Tanya

Tanya Floyd
Associate Regional Counsel
U.S. Environmental Protection Agency
Region 4
Sam Nunn Federal Center
61 Forsyth Street, S.W.
Atlanta, Georgia 30303

Phone: (404) 562-9813
Fax: (404) 562-9486
Email: floyd.tanya@epa.gov

--

Jim Bateson james.bateson@ncmail.net

Site Evaluation and Removal Branch Head
Superfund Section, Division of Waste Management
NC Department of Environment and Natural Resources
401 Oberlin Road
Raleigh, NC 27605
Phone (919) 508-8447
Fax (919) 733-4811

Subject: Re: Port of Wilmington, SWP Remedial Investigation
From: Lucas.Ken@epamail.epa.gov
Date: Wed, 02 Aug 2006 12:45:02 -0400
To: Stuart Parker <stuart.parker@ncmail.net>
CC: Campbell.Richard@epamail.epa.gov

Stuart:

I did not solicited formal comments on SWP's response from our TSS Section. We will want to look at the results of the most recent insect sampling when they have finished analyzing the data.

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
Sam Nunn - Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303

phone: 404-562-8953
fax : 404-562-8788

Stuart Parker
<stuart.parker@n
cmail.net>

08/02/2006 12:26
PM

To
Ken Lucas/R4/USEPA/US@EPA
cc
Subject
Re: Port of Wilmington, SWP
Remedial Investigation

I sent you a copy of their latest submittal (May), attempting to address

our earlier comments.
Any further evaluation from your end ?

Stuart

Lucas.Ken@epamail.epa.gov wrote:

> Stuart:
>
> Thanks for the heads up.
>
> Kenneth A. Lucas
> Remedial Project Manager
> Superfund Remedial Site Evaluation Branch
> U. S. Environmental Protection Agency, R4
> Sam Nunn - Atlanta Federal Center
> 61 Forsyth Street
> Atlanta, GA 30303

NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

June 5, 2006

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

Mr. William P. Arrants
Manager of Environmental Affairs/Regulatory Compliance
Southern Wood Piedmont Company
P.O. Box 5447
Spartanburg, SC 29304

SUBJECT: Invoice and Cost Summary
Federally Funded State Deferral oversight costs
Southern Wood Piedmont Site
Wilmington, New Hanover County, NC
USEPA ID#: NCD 058 517 467

Dear Mr. Arrants:

My invoice letter of February 6, 2006 inadvertently contained two quarters' cost summaries for another site. Our Department had already cashed your company's check for $184.25 by the time I discovered my error. I apologize for any inconvenience.

Please then find enclosed correct cost summaries for oversight costs incurred by federally-funded NCDENR staff for the period from July 1, 2005 through December 31, 2006. The total for these two quarters of $551.49, minus $184.25, leaves an unpaid balance of $367.24.

Please also find enclosed a cost summary for the period from January 1, 2006 through March 31, 2006. The total for this quarter is $718.58.

Oversight activities specific to the subject site were conducted pursuant to the Consent Order (Docket # 91-SF-117) between the Division of Waste Management and Southern Wood Piedmont Company effective May 24, 1999. As discussed above, the total remaining costs incurred during this time period were $1,085.82. This letter serves as our invoice for those costs.

Pursuant to paragraph V. B. of the Consent Order, we hereby request full payment of the attached costs to the Division within sixty (60) days of receiving this invoice. Payment should be by certified or cashier's check payable to "NC DENR" and mailed to the address listed below.

Division of Waste Management
Attn: James Bateson
Superfund Section
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605-1350

Failure by Southern Wood Piedmont Company to make full and timely payment of the requested amount to the Division will make the Company subject to any and all remedies available to the Division.

Thank you in advance for your attention to this matter. If you have any questions, please call me at (919) 508-8447.

Sincerely,

Jim Bateson

Jim Bateson, Head
Site Evaluation and Removal Branch
NC Superfund Section

attachment

cc: Carolyn Poole, NC Superfund
Stuart Parker, NC Superfund
File

Bank of America

Cashier's Check

No. 0259715

VOID AFTER 90 DAYS

Banking Center: WHITE ROCK OFFICE

7310461 00006 00079471

SOUTHERN WOOD PIEDMONT

Remitter (Purchased By):

Pay: **ONE HUNDRED EIGHTY FOUR DOLLARS AND 25 CENTS** $ *184.25*

To The Order Of: **NC DENR**

Authorized Signature

Bank of America N.A.
San Antonio, Texas

70-14-3774 TX 02-2003

⑈0259715⑈ ⑆114000019⑆ 00164100027 2⑈

THE ORIGINAL DOCUMENT HAS REPLICATED WATERMARK ON THE BACK

THE ORIGINAL DOCUMENT HAS REPLICATED WATERMARK ON THE BACK

COST SUMMARY
STATE DEFERRAL SITE
Southern Wood Piedmont
Wilmington
EPA ID: NCD058517467

I. Personnel & Fringe Benefits

Date of Work	Hours Worked	Annual Salary	Salary/hr. Rate	Total Cost
Jan-06	1.5	$63,311.32	35.17	52.76
Feb-06	7	$63,311.32	35.17	246.19
Mar-06	11	$63,311.32	35.17	386.87
Total Hours	19.5			

II. Travel

Lodging -

Subsistence -

III. Laboratory Analysis : Lab Samples

IV. Equipment 0.00

V. Supplies 0.00
Photo -

VI. Contractual 0.00

VII. Other

VIII. Indirect 32.76

TOTAL COST RECOVERY: **718.58**

*Mileage .30 per mile
*Hourly Salary was figured on 1800 hours worked a year

Fringes: July 1, 2005- June 30, 2006

Social Security	7.65%
Retirement	6.820%
Medical Insurance	$3,748.00
Indirect	5.80%

COST SUMMARY
STATE DEFERRAL SITE
Southern Wood Piedmont
Wilmington
EPA ID: NCD058517467

I. Personnel & Fringe Benefits

Date of Work	Hours Worked	Annual Salary	Salary/hr. Rate	Total Cost
Dec-05	3	$63,311.32	35.17	105.51
		$63,311.32	35.17	0.00
Total Hours	3			

II. Travel

Lodging -

Subsistence -

III. Laboratory Analysis : Lab Samples

IV. Equipment 0.00

V. Supplies 0.00
Photo -

VI. Contractual 0.00

VII. Other

VIII. Indirect 5.04
Indirect

TOTAL COST RECOVERY: 110.55

*Mileage .25 per mile
*Hourly Salary was figured on 1800 hours worked a year

Fringes:	July 1, 2005- June 30, 2006	
	Social Security	7.65%
	Retirement	6.820%
	Medical Insurance	$3,748.00
	Indirect	5.80%

COST SUMMARY
STATE DEFERRAL SITE
Southern Wood Piedmont
Wilmington
EPA ID: NCD058517467

I. Personnel & Fringe Benefits

Date of Work	Hours Worked	Annual Salary	Salary/hr. Rate	Total Cost
July, 2005	4	$63,311.32	35.17	140.68
August, 2005	2	$63,311.32	35.17	70.34
Sept., 2005	0			

II. Travel	124.64
Lodging -	64.70
Subsistence -	30.50
III. Laboratory Analysis : Lab Samples	
IV. Equipment	0.00
V. Supplies	0.00
Photo -	
VI. Contractual	0.00
VII. Other	
VIII. Indirect	3.36
Indirect	6.72
TOTAL COST RECOVERY:	440.94

*Mileage .25 per mile
*Hourly Salary was figured on 1800 hours worked a year

Fringes: July 1, 2005- June 30, 2006

Social Security	7.65%
Retirement	6.820%
Medical Insurance	$3,748.00
Indirect	5.80%

CHRONOLOGY OF CORRESPONDENCE RELATED TO
STATE DEFERRAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY:
SOUTHERN WOOD PIEDMONT – WILMINGTON NC SITE

DATE:	DOCUMENT/REPORT:
6/24/99	Report by Schnabel: REMEDIAL INVESTIGATION / RISK ASSESSMENT
	Superfund Response: Review and Comment
10/8/99	Schnabel: SUPPLEMENTAL RI WORKPLAN
1/07/00	Aquatic Toxicology Unit (ATU) Memo Re: Review of Supplemental RI Workplan
1/2000	S F Parker Review and Comment Draft RI Workplan
5/23/00	Schnabel: Draft 2.0 SUPPLEMENTAL RI WORKPLAN
11/09/00	Schnabel FAX: Field Summary for DNAPL Extent Determination
1/16/01	S F Parker Letter to NCDWQ re: Fish Tissue Sampling
3/22-23/01	S F Parker E-correspondence on Fish Tissue Split Sampling
10/30/01	Schnabel: SUPPLEMENTAL RI / RISK ASSESSMANT REPORT
7/29/02 Report	S F Parker fax to Sandra Moore ATU: AMEC 2/2001 AQUATIC TOXICOLOGY
	Text, Figs, Appendices
7/31, 8/02/02	ATU: Review and Comment on Aquatic Toxicology Report
8/5/02	Hanna Assefa Review and Comment on the SUPPLEMENTAL RI BERA and HHRA.
8/6/02	S F Parker submittal of Review and Comment on 1) SUPPLEMENTAL RI; 2) SRI BERA/HHRA; 3) Aquatic toxicology Report
8/26, 9/04/02	S F Parker E-mail correspondence on groundwater issues
10/9/02	Schnabel: Response to Comments on Supplemental RI, BERA/HHRA, and Aquatic Toxicology Report.
10/14/02	Layton Bedsole E-mail: Brief comments.
12/4/02	S F Parker Letter: Additional Groundwater/ DNAPL issues at the site
1/06/03	ATU Memorandum: Review of (Schnabel) Response to Comments.
1/21/03	Schnabel: Proposal for ADDITIONAL DNAPL AND GROUNDWATER DELINEATION

(continued)

1/27/03	Hanna Assefa: Review of (Schnabel/AMEC) Response to Comments on BERA/HHRA
1/29/03	S F Parker Letter: Review of Proposed ADDITIONAL DNAPL & GW DELINEATION
3/17/03	Ken Lucas assigned RPM status for SWP Wilmington Deferral
3/3-5/31/03	(Additional DNAPL and Groundwater Delineation Field Investigation)
3/14/03	S F Parker Letter: Follow-up comments on HHRA/BERA
3/17/03	Ken Lucas replaces Luis Flores as EPA RPM for SWP Wilmington Deferral
7/09/03	Report on analytical results from split groundwater samples collected by S F Parker
7/09, 7/23/03	S F Parker E-correspondence re: Data Treatment
7/31/03	Schnabel: ADDITIONAL DNAPL AND GROUNDWATER DELINEATION REPORT
9/5/03	S F Parker: E-Mail comments on Additional DNAPL Report
10/14/03	Hanna Assefa reports EPA concurs not to re-do Forward Risk Calculation.
10/15/03	Schnabel: Letter Response to Comments on Additional DNAPL Report
10/17/03	Ken Lucas E-mail: General comments
11/24/03	S F Parker: Letter on 1) EPA comment on ADDITIONAL DNAPL & GW DELINEATION 2) Prospective Geophysical Exploration on site 3) Risk Calculation requirements Attached: Hanna's 1/27/02 and ATU's 1/6/03 Reviews of Responses to comments
2/11/04	Schnabel responses to 11/24/03 reviews. Attachments

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

May 25, 2006

RECEIVED
MAY 30 2006
SUPERFUND SECTION

Mr. Stuart F. Parker, Jr.
North Carolina Department of Environment
and Natural Resources
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Re: SWP - NCD058517467, Wilmington, New Hanover County, NC
Supplemental Risk Evaluation Review, Comment and Recommendation
For Further Investigation – Your letter of March 21, 2006

Dear Mr. Parker:

The attached response document prepared by Southern Wood Piedmont Company's (SWP) risk evaluation consultant, AMEC, addresses the comments and recommendations for further evaluation included in your March 21, 2006 letter regarding the "Supplemental Risk Evaluation for Insectivorous Birds at the SWP Facility in Wilmington, NC" submitted by SWP on December 9, 2005. This response also reflects the discussion from the teleconference call between SWP, AMEC, Schnabel Engineering, NCDENR and EPA Region IV that was held on April 21, 2006.

The response has been divided into two parts to maintain consistency with the format of your May 21 letter. Part I provides a response to the NCDENR comments and Part II provides a response to the USEPA comments. A checklist of agency comments and proposed changes for the revised insectivorous bird ERA report is included as Table 1 for summary reference.

As you know, sampling of flying insects is underway and a revised report, conforming with these comments, will be submitted. Thank you for consideration of these comments.

Please contact me at 864-599-1070, extension 103 if you have any questions or comments.

Sincerely,

William P. Arrants
General Manager

BOUND SEPARATELY

cc: G. D. Kuntz
J. H. Samuelian
H. Layton Bedsole – NC Ports Authority

060525 SWP Response to March 21, 2006 Ltr.

amec

COPY

RECEIVED
MAY 30 2006
SUPERFUND SECTION

25 May 2006

William P. Arrants
General Manager
Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303

RE: Response to NCDENR and EPA Comments to the Draft Insectivorous Bird Ecological Risk Assessment the Former Southern Wood Piedmont Facility in Wilmington, North Carolina

Dear Bill:

We have attached our responses to the NCDENR and USEPA comments (correspondence dated 21 March 2006 and received on 26 March 2006 at SWP) to the Draft Insectivorous Bird Ecological Risk Assessment the Former Southern Wood Piedmont Facility in Wilmington, North Carolina. These responses reflect many of the discussions from the teleconference call between SWP, their consultants, NCDENR and USEPA Region IV, that was held on 21 April 2006.

The responses have been divided into two parts for consistency with the format used in the correspondence from NCDENR. Part I provides of the response to the NCDENR comments and Part II provides the responses to the USEPA comments. The comments from NCDENR were also enumerated for clarity. We have also provided an annex containing the insect analytical results.

If you have any questions about this document please do not hesitate to contact me in the Portland office.

Sincerely,

John H. Samuelian, Ph.D.
Senior Environmental Scientist/
Project Manager

WB

AMEC Earth & Environmental, Inc.
15 Franklin Street
Portland, ME 04101
Tel (207) 879-4222
Fax (207) 879-4223
www.amec.com

Part I: Responses to NCDENR Comments

The comments provided by NCDENR (letter dated 21 March 2006 and received on 26 March 2006 at SWP) were enumerated to facilitate clarity in this response document. These responses reflect the discussions from the teleconference call between SWP, their consultants, NCDENR and USEPA Region IV, on 21 April 2006.

NCDENR Comment No. 1: Insect sampling efforts met with limited results. Adverse weather conditions delayed significant insect hatching until late in the week. The traps, while functional, captured a combination of target and non-target species, requiring separation of the latter. After several days of limited harvest, SWP contractors consolidated sample locations along each respective waterway to ensure adequate sample mass for laboratory analysis.

> ***Response***: The insect collection method was originally proposed to NCDENR in letter correspondence to NCDENR on 28 September 2004. Following the start of the sampling in May 2005, EPA voiced concern that there would be "dilution" of the chemical results by the mixing of aquatic-derived (e.g., midges, dragonflies) and terrestrial-derived insects (e.g., moths), despite their likely use as dietary items by the insectivorous birds. In response to this concern (see correspondence dated 17 June 2005; AMEC, 2005), AMEC agreed to segregate the aquatic-derived from the terrestrial-derived insects, and to perform chemical analysis only on the aquatic-derived insects.
>
> Compositing of insect collections from multiple sample locations is a common occurrence in field programs to meet the minimum sample size requirements of the analytical methods. For example, for the ecological assessment of the Centredale Manor Superfund site in Rhode Island, EPA contractors collected insects using multiple samplers and composited them for chemical analysis. Composites were performed for the subareas (ponds) at that site. Similarly, we composited insects from several stations along the subareas of the SWP site – Greenfield Creek, the drainage ditch, and the reference area.
>
> Although we agree that it is desirable to collect sufficient sample mass to characterize particular narrow areas of sediment contamination, this may not always be possible, since the biota sampling is at the mercy of insect abundance at the time.

NCDENR Comment No. 2: The EPA Region IV Technical Services Section (TSS) has completed a technical review of the December 9 report, and their comments are attached. Following extensive discussion, the EPA and Division have agreed upon the following general conclusions:

[1] The report has numerous quality, presentation and clarity issues which would require extensive revision to be properly addressed.

Response: As will be seen in the responses to the specific comments provided by EPA (*Part II: Responses to USEPA/ILS Comments*), we have identified our proposed approaches, and the minor and simple changes needed to improve the transparency and accuracy of the revised document. Many of the USEPA/ILS comments were repetitive in nature and we therefore disagree that "extensive" revisions would be needed to finalize this document.

[2] Supporting laboratory data – from both insect and (prior) sediment analysis – were not included in support of risk calculations. Neither were Toxicity Reference Values (TRVs) or Hazard Quotients (HQ) for several contaminants of potential concern (COPCs).

Response: The insect analytical results (samples and methods blanks) provided by the laboratory were not included in the draft report since this report will be part of the Baseline Ecological Risk Assessment (BERA), which in turn is part of the Remedial Investigation Report that includes the laboratory reports. However, as requested by the EPA Commenter we have attached the insect results provided by the laboratory to this response document (Annex 1) and will also include it as an attachment to the revised Insectivorous Bird ERA report.

The EPA Commenter also requested inclusion of the sediment analytical results. These were originally provided to NCDENR as Tables 8-1 through 8-5 in the Supplemental Remedial Investigation Report (Schnabel, 2001). These tables will also be provided as part of the revised Insectivorous Bird ERA report for completeness.

The EPA Commenter was also concerned with the absence of TRVs for four PAHs (carbazole, fluoranthene, naphthalene, and pyrene). These were labeled with "NR" (i.e., not required) in Table B-4 of the draft report since they were not included as biota COPECs in the BERA (AMEC, 2001). This was not clearly stated in Section 4.1 of the draft report. For completeness, these can be added to the revised Insectivorous Bird ERA report.

[3] Several data errors/inconsistencies were present. Among examples cited: (i) mis-matched data results between on-site and background samples, and between different report data tables; and (ii) exposure point concentration units which erred by orders of magnitude.

Response: We will re-examine the summary tables and ensure their consistency. Any changes will be provided in the revised Insectivorous Bird ERA report.

Concerning the use of incorrect exposure point concentration units, the units shown in Tables 1 and 2, and the risk calculation tables (Table B-5 through B-7) are all correct, as can be seen when reviewing the laboratory results for the insect composite samples presented in Annex 1. The incorrect units were shown for the insect results in Tables B-3a, B-3b and B-3c. These will be corrected in the revised Insectivorous Bird ERA report.

Following review of EPA Comment No. 17c it appears that the EPC values from Greenfield Creek were inadvertently used as the input for the Reference Area calculations. Table B-5 (and other associated tables), and the discussion from the draft report will be adjusted to reflect this corrected value in the revised Insectivorous Bird ERA report.

Some confusion may have also risen with the units shift between the text tables and the risk calculation tables. The concentration units for the PAHs and PCDD/F results from the insects in Table 1 were reported as µg/Kg and ng/Kg (respectively) but these were converted to mg/Kg in the risk calculation tables (Tables B-5 though B-7) since the TRV was in units of mg/Kg-day. The wet weight results also had to be converted to a dry weight basis to use the (dry-weight normalized) ingestion rate. No text changes are required, except for the aforementioned changes to Tables B-3a, B-3b and B-3c.

[4] Sample data quantity was limited by the limited sizes of the insect harvests and by sample consolidation into composites from each pathway segment. Consolidation also negated any location correlation between insect samples and pre-existing sediment data.

Response: Compositing was required to ensure the collection of sufficient sample mass for chemical analysis. This is a commonly encountered issue when collecting biota samples as part of field investigations. As was presented in our response to NCDENR Comment No. 1, compositing of insect samples has also occurred on Superfund projects. Compositing was also performed using insects collected across the lengths of either the drainage ditch and Greenfield Creek, which included samples collected near areas that exhibited elevated chemical results as well as toxicity.

The presumption that the compositing somehow negated the spatial correlation between the emergent insects and sediments is not well founded. First, depending upon the species, the larval life stages of insects can be fairly mobile (e.g., predaceous dragonfly nymphs), while others are more sedentary (e.g., Trichoptera larvae). Therefore, a single discrete sample, even when taken in bulk for sediment toxicity testing, may not be representative of the exposure conditions of the insect larvae. Second, both Greenfield

Creek and the drainage ditch are fairly small[1] aquatic systems, which have been well characterized from a chemical residue perspective. Therefore, the compositing generates the average insect chemical concentration for purposes of the risk assessment. The aforementioned Centredale Manor Restoration Superfund site also calculated BSAFs based on the ratio of the composited insect results and the geometric mean sediment concentration.

[5] The study described only a "realistic" risk scenario, despite low weight of supporting evidence. EPA TSS noted that a conservative risk scenario is also required to make a sound management decision.

Response: Bounding estimates of the potential risks were discussed in the uncertainty assessment of the draft report. Estimates of exposure assumptions (e.g., AUFs) and toxicity to ecological receptors (e.g., TRVs) are identified as components of the uncertainty analysis for ERAs (see Section 7.4 of USEPA, 1997). The two key items identified by the EPA commenter were the use of an AUF of one, which was evaluated in Section 6.2.2 and Table 8 of the draft report, and the use of conservative TRVs for PAHs, which were evaluated in Section 6.2.1 and Table 7 of the draft report. Therefore, this comment has been considered and addressed.

NCDENR Comment No. 3: In summary, the Division and EPA's shared consensus is that the December 2005 report and data fail to demonstrate that the site poses minimal ecological risk. Data generated are insufficiently specific, not only to the areas of potential remediation, but also for calculation of sediment cleanup goals. In light of these data issues, EPA opined that even extensive report revision would be unlikely to address the deficiencies of the study.

Response: See response to NCDENR Comment No. 1. Also, it should be noted that the draft report focused only on a single receptor and will be integrated into the revised BERA. The draft BERA (AMEC, 2001) included (1) the assessment of benthic invertebrates (comparison to benchmarks, community assessment, COPC bioavailability assessment, and sediment toxicity testing), (2) assessment of potential effects on fish populations (comparison to water benchmarks and critical body burden benchmarks), (3) assessment of potential effects on piscivorous birds (Great Blue Heron), (4) assessment of potential effects on carnivorous birds (Red-Tailed Hawk), and (5) assessment of potential effects on piscivorous mammals (Mink). The evaluation of *all* of the risk assessment results for these different assessment and measurement endpoints will define what a suitable sediment cleanup goal will be, and not necessarily solely the results from the insectivorous bird assessment.

---

[1] Greenfield Creek has an average width of 54-ft, and is widest near the juncture with the Cape Fear River. The drainage ditch has an average width of 19-ft, and its downstream section has the greatest width.

We have tabulated the number of revisions in Table 1. Although the EPA comments appeared to be extensive, they were in fact highly repetitive, and can be rectified with simple changes. Therefore, we disagree that an extensive report revision would be required.

NCDENR Comment No. 4: The EPA has proposed two alternative approaches to supplement (or replace) the insect bioaccumulation study. The first alternative would be collection of additional location-specific sediment samples for *Lumbriculus* (sp.) bioaccumulation testing, as previously recommended. The second alternative would be the use of Biotic Sediment Accumulation Factors (BSAFs) to calculate risk.

Response: We have been unable to locate any regulatory guidance or documents from the published literature that would support using the *Lumbriculus* bioaccumulation test as a surrogate for adult emergent insects when empirical data on the latter are readily available. If NCDENR or EPA can provide examples from the peer-reviewed literature that support this approach, then we would welcome the opportunity to assess the appropriateness of this method.

Consistent with ERA guidance (see Section 4.2.1 of USEPA, 1997) the insect collection study was performed to measure contaminant concentrations in foods consumed by the species associated with the assessment endpoint. The collection of empirical data over modeled data provides the most representative exposure potential for the receptor of interest.

As an alternative to replacing the observed insect BTFs with BSAFs derived from the *Lumbriculus* bioaccumulation test, we would propose to compare the site-specific BTFs to literature values. Although the adult insect literature dataset is anticipated to be more limited than datasets derived from specific bioaccumulation tests, it is more realistic to the comparisons relevant to this project. Therefore, we are proposing the following for the BTF literature assessment:

- Review the peer-reviewed literature, and other studies that are available and retrievable in the public domain, that have chemical data for adult life stage insects and associated sediments. This effort will focus on PCDD/Fs and PAHs, although data concerning PCBs can also be relevant to the PCDD/Fs due to their similarities in environmental behavior.
- Compile the key results of these studies in tables to allow calculation of BTFs by chemical.
- Develop statistical summaries of the BTFs, where possible.

- Compare the literature-derived BTFs to the observed BTFs from the three evaluated areas of the Site.

In addition, we are proposing to add the evaluation of representative values for the literature-derived BTFs as part of the Uncertainty assessment for the revised Insectivorous Bird ERA report.

NCDENR Comment No. 5: Southern Wood Piedmont has repeatedly and adamantly declined to conduct a *Lumbriculus* study. SWP questioned the applicability and cost-effectiveness of the (laboratory) *Lumbriculus* method, versus (field) collection of emergent insects. However, results of the subsequent insect study are unsatisfactory and therefore not applicable or cost-effective. The *Lumbriculus* method remains the standard by which EPA conducts risk assessments.

Response: The NCDENR comment captures some of the concerns that AMEC and SWP have on using the *Lumbriculus* bioaccumulation results as a surrogate for the measured emergent insect collections. In addition to the issues identified in our response to NCDENR Comment No. 4, the collection of the emergent insects proximal to the sediments that contain the chemical residues has less uncertainty than using the *Lumbriculus* bioaccumulation test. The chief sources of uncertainty in the latter include the following:

- *Lumbriculus* has less capability to metabolize chemicals such as the PAHs than insects (e.g., Verrengia-Guerrero et al, 2002). This is one of the reasons why it is a desirable test organism for bioaccumulation since simple partitioning models and kinetics can be used to estimate uptake. However, any measured chemical residues would overestimate the concentrations in the emergent insects which have a greater capability to metabolize the PAHs.

- *Lumbriculus* does not pupate or undergo metamorphosis, which has been shown to reduce chemical residues in insects (see discussion in our correspondence dated 17 June 2005; AMEC, 2005).

- The 28-day *Lumbriculus* bioassay does not have the same exposure duration as the larval stages of the some emergent insects. Although this period would be sufficient for the larval stages for chironomids that lasts about 15 days (Charles et al., 2004), it is inadequate for larger insects, such as larval mayflies (ranges from 35 to 230 days; Johnson al, 2000), or the multiple months for larval damselflies (Johansson et al., 2001) to multiple years for dragonflies (Corbet, 1962).

These factors all contribute to a greater uncertainty to using the *Lumbriculus* bioassay results to predict concentrations in the insects when the chemical residue data are available. As stated in ERA guidance (see Section 4.2.1 of USEPA, 1997): "*[t]he purpose of a field tissue residue study usually is to measure contaminant concentrations in foods consumed by the species associated with the assessment endpoint. This measurement minimizes the uncertainty associated with estimating a dose (or intake) to that species, particularly in situations in which several media and trophic levels are in the exposure pathway.*"

We do not disagree that the *Lumbriculus* bioaccumulation assay is a useful tool to estimate the potential to transfer chemical residues from sediments to organisms associated with sediments. However, this is already supported by the empirical data from the insects that showed the presence of PAH and PCDD/F residues in their tissues derived from their exposure at the larval stage to the sediments containing these chemicals. It is also not accurate to assume that the *Lumbriculus* bioaccumulation test is a "*standard by which EPA conducts risk assessments*" since this bioassay would only be performed when it is a relevant measurement endpoint, such as for the assessment of dredged spoil disposal.

In order to provide further support of the use of the emergent insect data, AMEC performed an additional evaluation of the insect capture success from 2005 (see Table A-1 of the draft report) to identify potential data gaps. Insects were collected from three locations along the drainage ditch and from three locations on Greenfield Creek. As shown in Table A-1, the largest insect collections from the drainage ditch was at station FLY-DD1-2 (98% of total mass collected from this area); and the largest insect collections from Greenfield Creek was at station FLY-GC-3 (~83% of total mass collected from this area). Therefore, due to their large contribution as sources for uptake by insects, these sample locations could be used to "bound" the insect residue data (and uptake factor calculations). The average total PAHs from sediments associated with FLY-DD1-2 was ~1,000 mg/Kg, and represents the upper bound exposure. The lower bound exposure would be represented by the sediments associated with FLY-GC-3, where the average total PAH concentrations in sediments was ~19 mg/Kg. This is a wide range of corresponding sediment concentrations, but the average total PAH concentration for sediments near FLY-GC-2 (elbow) is somewhat higher (~1,600 mg/Kg). Insect samples collected from the elbow area of Greenfield Creek in May 2005 (station FLY-GC-2) had only about 6% of the total collected insect mass from Greenfield Creek. Therefore, since the total PAH concentration in sediments from this location is somewhat outside of the "bounding" range it would be helpful to collect an additional insect sample from station FLY-GC-2 to supplement the current insect residue dataset. Therefore, additional samples will be collected from FLY-GC-2 in May 2006 to supplement the existing dataset.

Part II: Responses to USEPA/ILS Comments

The comments provided by ILS to USEPA were divided into two parts: *Comments to the RPM* and *Specific Comments to the Preparer*. We are only addressing the latter in this response document since the former was likely unintentionally included in the correspondence provided to NCDENR, but were also addressed in *Part I: Responses to NCDENR Comments*.

Specific Comments to the Preparer:

EPA Comment No. 1: Transparency and accuracy are major factors in ecological risk assessments. Much of the risk presentation in this document is not transparent (lack of verifiable information). Data mismatch errors were detected and potentially unacceptable risks may have been overlooked.

> ***Response***: The responses below will identify our proposed approaches to improve the transparency and accuracy of the revised document.

EPA Comment No. 2: Since this was a "stand-alone" document, additional analytical data should have been included with this document. The analytical report from the laboratory that processed the captured insects was not included with this document for review and verification of the data that were presented by SWP. Surface water and sediment concentration data and the physical attributes of the sediments (organic carbon content) for individual samples were not included in this report. Many calculations performed in the risk assessment were based on data that were not presented. This made independent verification of those calculations presented by the preparer impossible.

> ***Response***: As discussed in *Part I: Responses to NCDENR Comments* and in our subsequent responses to follow, tables compiling the analytical results for the sediments were originally provided as Tables 8-1 through 8-5 in the Supplemental Remedial Investigation Report (Schnabel, 2001). These tables will also be provided as part of the revised Insectivorous Bird ERA report for completeness.

EPA Comment No. 3: ILS cannot concur at this time with the statement "The evaluation of the insectivorous bird exposure pathway showed no risks to this receptor from food-chain transfer of COPCs from sediments to emergent aquatic insects." This document should be heavily revised and resubmitted for review. The following comments will illustrate these shortcomings.

> ***Response***: As the EPA Commenter will note, the discussion in our subsequent responses will identify our proposed approaches, as well as the minor and simple changes to improve the transparency and accuracy of the revised document.

<u>EPA Comment No. 4</u>: Page 3, Section 2.2, Results from Previous Studies:

(a) Please include a table of the historical PAH and PCDD/F media contaminant concentrations and physical attributes (specifically, organic carbon content) for individual samples from the three areas used in this report. This is necessary to verify the calculations presented in this report.

<u>Response:</u> Tables compiling the analytical results for the sediments were originally provided as Tables 8-1 through 8-5 in the Supplemental Remedial Investigation Report (Schnabel, 2001). These tables will also be provided as part of the revised Insectivorous Bird ERA report.

(b) Please include a figure or figures of the locations of the media sampling locations with the locations of the insect traps. This would be extremely helpful when verifying which media concentrations are associated with the insect traps (Table A-3 – Calculation of Sediment Weighting Factors Base on Insect Collection Success from Different Samples Areas).

<u>Response:</u> We concur with this statement and will revise Figure 2 to show the insect collection stations, as well as the historical sediment sampling locations.

We will also include additional backup for the calculation of the biota transfer factors (BTFs) as a new appendix for the revised Insectivorous Bird ERA report. This will clarify the interpretation of the information presented in Tables B-1a, B-1b, B-1c, B-2a and B-2b.

<u>EPA Comment No. 5</u>: Page 3, Section 3.0 Field Collection Summary and Analytical Results:

Please include (as an attachment or appendix) the laboratory report from Paradigm Analytical Laboratories (PAL) for all of the analyses of the emergent insect samples.

This is very valuable information that enables the reviewer to verify the data presented by SWP. Data consistency problems were detected in some of the tables presented by SWP (see additional comments); referring to the laboratory report would have enabled this reviewer to make recommendations for correction.

<u>Response</u>: The insect analytical results (samples and methods blanks) provided by the laboratory were not included in the draft report since this report will be part of the BERA, which, in turn, is part of the Remedial Investigation Report that includes the laboratory reports. However, as requested by the Commenter, we have attached the insect results provided by the laboratory to this response document (Annex 1) and will also include it as an attachment to the revised Insectivorous Bird ERA report.

EPA Comment No. 6: Toxicity Reference Values (TRVs) – Page 15 Section 5.2 Ecological Effects Evaluation, Table 6 Conservative and Bounding PAH Toxicity Reference Values for Avian Wildlife Receptors of Interest, Table B-4 Toxicity Reference Values for Wildlife Receptor of Interest:

(a) TRVs for all of the COPCs evaluated in this report should be well described. Tables should be constructed with the following information: Chemical name, test organism, body weight of test organism, duration of exposure, reported endpoint(s), reported concentration effect level (e.g., NOAEL, LOAEL, LD_{50}), citation of the study, and the final chosen NOAEL and LOAEL used for hazard analysis. If NOAEL or LOAEL values are not reported, then the uncertainty factor applied to derive the NOAEL and/or LOAEL for the cited value must be included. For the PAH hazard analysis used in this study, TRVs from both the ingestion study (Realistic Scenario – Schaefer et al. 1983) and the egg injection study (Conservative Scenario – Brunström et al. 1991) should be used to bracket the uncertainty related to selection of TRVs for PAHs since the confidence in the TRVs gleaned from both studies is low.

Response: All of the TRVs used in this assessment were NOAEL-based. This is consistent with the approach taken in the BERA (AMEC, 2001). Details concerning the derivation of TRVs as noted in the comment were provided in the BERA (AMEC, 2001). LOAEL-based TRVs can also be developed and the hazard quotients (HQs) and hazard indices (HIs) presented in the draft report will be supplemented with the LOAEL-based TRV results for the revised Insectivorous Bird ERA Report. The presentation in the revision to the BERA will also be updated to reflect the inclusion of LOAEL-based TRVs.

The conservative TRV for the PAHs was evaluated in the uncertainty assessment of the draft document. The EPA Commenter is directed to Section 6.2.1 and Table 7 of the draft document for this information.

(b) Table 6 and Table B-4: Where no TRVs are listed for certain PAHs (e.g., fluoranthene, naphthalene, pyrene), a conservative toxicity reference value surrogate should be selected.

Response: Some of the PAHs did not have TRVs and were excluded from the draft report since they were not included as biota COPECs in the BERA (AMEC, 2001). However, for completeness, these can be added to the revised Insectivorous Bird ERA report using both realistic and conservative TRVs, consistent with the other PAHs. Surrogate values may be used to derive these TRVs, unless other toxicological data is available.

EPA Comment No. 7: Page 15, Section 6.1 – Risk Estimation:

(a) Since both TRV studies for avian PAH effects exhibit low confidence, both scenarios conservative (egg injection TRVs) and realistic (ingestion TRVs) should be used in the risk

estimation and presented for the risk management decision. Additionally, NCDENR has requested that average daily dose (ADD) calculations be computed using an area use factor (AUF) of 1 in addition to the calculated AUFs for the drainage ditch, Greenfield Creek and reference areas. This additional information will be helpful for establishing the most conservative consideration of other avian receptors that exhibit greater AUFs than the Eastern Kingbird. The AUF modification requested by NCDENR should be applied to the ADD calculations for both scenarios at each study area (reference, drainage ditch, and Greenfield Creek areas).

Response: The uncertainty section of the draft document discusses both the use of an AUF of one (see Section 6.2.2 and Table 8) and the use of conservative TRVs (see Section 6.2.1 and Table 7). Therefore, this comment has been considered and addressed.

(b) The derived hazard quotients (HQs) for PAHs should also be grouped into hazard indexes (HIs – summation of HQs for chemical groupings) by low molecular weight (LMW – two and three ringed compounds), high molecular weight (HMW – four or more ringed compounds), and total PAH (all PAHs). This is important as the PAHs for these groupings have similar modes of toxic action. These PAHs exist as mixtures and have additive toxic effects.

Response: As requested, we will include the HQ values based on the low- and high-molecular weight PAHs, and also the HI values, for the revised document.

(c) The risk analysis should be presented using both conservative and realistic scenarios in order to make a sound management decision. The realistic scenario should not be used alone when a low weight of evidence exists regarding avian dietary responses to PAHs. The extrapolation of LD50 data to LOAEL and NOAEL values is not a high weight of evidence approach. The inclusion of the assessed risks by using TRVs derived from the egg-injection study (conservative TRV) is warranted in this case.

Response: The use of the conservative TRVs for PAHs based on the egg-injection studies was evaluated and the results presented in Section 6.2.1 (and Table 7) in the Uncertainty section of the draft report. This evaluation will be supplemented by calculating the risks using the LOAEL-based TRVs.

(d) It is anticipated that some chemicals will have HQs or HIs that exceed unity for a particular exposure scenario. For any stressor that has an HQ or HI exceeding unity, the media risk-based calculations (RBCs) or preliminary remediation goals (PRGs) should be derived for consideration in the risk management decision.

Response: Back-calculated media concentrations will be calculated as noted in the comment above for the revised BERA. The EPA Commenter may not be aware that the

draft BERA (AMEC, 2001) included the evaluation of the other assessment and measurement endpoints, listed below:

- Assessment of benthic invertebrates (comparison to benchmarks, community assessment, COPC bioavailability assessment, and sediment toxicity testing);
- Assessment of potential effects on fish populations (comparison to water benchmarks and critical body burden benchmarks);
- Assessment of potential effects on piscivorous birds (Great Blue Heron);
- Assessment of potential effects on carnivorous birds (Red-Tailed Hawk); and
- Assessment of potential effects on piscivorous mammals (Mink).

The results from the insectivorous bird assessment will be integrated with those from the draft BERA [i.e., as "*assessment of potential effects on insectivorous birds (Eastern Kingbird)*"]. The evaluation of *all* of the risk assessment results for these different assessment and measurement endpoints will define what a suitable sediment cleanup goal would be, rather than basing the goal solely on the results from the insectivorous bird assessment. Therefore, we will develop back-calculated media concentrations for use in evaluating remediation of the drainage ditch and Greenfield Creek as part of the revised BERA, rather than in this report.

EPA Comment No. 8: Table 1 – PCDD/F results for insect sample collections
PCDD-TEQ values do not match the values presented in Tables B-3a, B-3b, B-3c, B-5 or B-6. These data cannot be verified without the laboratory report. The laboratory report was not included with this document; referring to the laboratory report would have enabled this reviewer to make recommendations for correction. Please include the laboratory report in the revised risk assessment document.

Response: The Table 1 values are correct (see Annex 1 for the laboratory backup). As stated earlier, the incorrect concentration units were reported for the insect results in Tables B-3a, B-3b, and B-3c. These will be corrected for the revised Insectivorous Bird ERA report.

During our review of Table B-5 it appears that the EPC values from Greenfield Creek were inadvertently used as the input for the Reference Area calculations. This was determined to be due to an error in the data lookup function. Table B-5 (and other associated tables), and the discussion from the draft report will be adjusted to reflect this corrected value in the revised Insectivorous Bird ERA report.

<u>EPA Comment No. 9</u>: Table 2 – PAH results for insect sample collections

PAH values do not match the values presented in Table B-5. These data cannot be verified without the laboratory report. The laboratory report was not included with this document; referring to the laboratory report would have enabled this reviewer to make recommendations for correction. Please include the laboratory report in the revised risk assessment document.

> ***<u>Response</u>***: The concentration units used for all of the risk calculation tables (Tables B-5 through B-6) were in mg/Kg since the TRV is in mg/Kg-day. For all of the insect results, the original reporting units from the lab (e.g., µg/Kg for the PAHs) were adjusted so that the units would be consistent. We have attached the insect results provided by the laboratory to this response document (Annex 1) in order to rectify any confusion related to the concentration units. These will also be included as a new attachment to the revised Insectivorous Bird ERA report.

<u>EPA Comment No. 10</u>: Table 3a and 3b – Method Blank Analytical Results for PCDD/F and PAH

These conclusions cannot be verified without the laboratory report. Please include the laboratory report in the revised risk assessment document.

> ***<u>Response:</u>*** This information is provided in Annex 1 and will also be included with the revised Insectivorous Bird ERA report.

<u>EPA Comment No. 11</u>: Table 4 – Summary of Insect Biota Transfer Factors for PCDD/Fs and Avian TEQ by Sample Location

The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

> ***<u>Response:</u>*** Tables compiling the analytical results for the sediments were originally provided as Tables 8-1 through 8-5 in the Supplemental Remedial Investigation Report (Schnabel, 2001). These tables can also be provided as a new appendix to the revised Insectivorous Bird ERA report. The insect analytical results are provided in Annex 1, and will also be included in the revised Insectivorous Bird ERA report.
>
> In addition, we can also provide a new attachment to the revised Insectivorous Bird ERA report that shows the BTF calculations in detail, to alleviate concerns related to "transparency."

<u>EPA Comment No. 12</u>: Table 5 – Summary of Insect Biota Transfer Factors for PAHs by Sample Location

The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

> ***<u>Response:</u>*** The insect analytical results provided by the laboratory were not included in the draft report since this report will be part of the revised BERA, which in turn is part of the revised Remedial Investigation Report that includes the laboratory reports. We have attached the insect results provided by the laboratory to this response document (Annex 1) and will also include it as an attachment to the revised Insectivorous Bird ERA report.
>
> Tables compiling the analytical results for the sediments were originally provided as Tables 8-1 through 8-5 in the Supplemental Remedial Investigation Report (Schnabel, 2001). These tables will also be provided as part of the revised Insectivorous Bird ERA report. In addition, we will also provide a new attachment to the revised Insectivorous Bird ERA report that shows the BTF calculations in detail, to alleviate concerns related to "transparency."

<u>EPA Comment No. 13</u>: Table 6 – Conservative and Bounding PAH Toxicity Reference Values for Avian Wildlife Receptors of Interest

(a) It is unclear if the TRV presented in this table are NOAEL or LOAEL based TRVs. Both NOAEL and LOAEL TRVs must be presented. Toxicity reference values (TRVs) were not reported for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. Surrogate TRVs should be used for those PAHs without TRVs in Tables 6 and B-4. Eleven other PAHs with similar chemical structure had realistic TRVs reported as 1.01E-1 mg/kg-d. A surrogate TRV of 1.01 mg/kg-d would be acceptable for those PAHs where no TRV was reported for the realistic scenario. The conservative TRVs should be handled in a similar manner for those PAHs without TRVs. The assumptions must be made clear regarding the use of all surrogate TRVs. See Comment #6a for additional required modifications to Table 6.

> ***<u>Response</u>:*** Some of the PAHs did not have TRVs in Table 6 and were excluded from the draft report since they were not included as biota COPECs in the BERA (AMEC, 2001). However, for completeness, these can be added to the revised Insectivorous Bird ERA report. The surrogate values presented in the comment will be used, unless other toxicological data is available.

We will also include HQ and HI values based on the low- and high-molecular weight PAHs, as requested, in the revised document.

(b) The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Response: This comment does not appear to be relevant to the table contents, which lists the realistic and conservative TRVs used in the uncertainty assessment for the PAHs. No changes were required.

EPA Comment No. 14: Table 7 – Comparison of HQ Values Generated from Conservative and Bounding PAH Toxicity Reference Values for the Eastern Kingbird.

(a) Hazard quotients (HQs) were not derived for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. For those PAHs that do not have TRVs, a surrogate should be used as per Comment #6a and HQs presented for those PAHs. A hazard index (HI) should be presented by summing the HQs for low molecular weight PAHs (LMW-PAHs – two and three ringed compounds), high molecular weight PAHs (HMW-PAHs – four or more ringed compounds) and total PAHs for all of the PAHs analyzed in the emergent insects.

Response: Some of the PAHs did not have TRVs and were excluded from the draft report since they were not included as biota COPECs in the BERA (AMEC, 2001). However, for completeness, these can be added to the revised Insectivorous Bird ERA report using both realistic and conservative TRVs, consistent with the other PAHs. Surrogate values may be used to derive these TRVs, unless other toxicological data is available.

As requested, we will include the HQ values based on the low- and high-molecular weight PAHs for the revised document.

(b) The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Response: This comment does not appear to be relevant to the table contents, which presents the HQ results from the uncertainty assessment using the conservative and bounding TRVs presented in Table 6. No changes were required.

<u>EPA Comment No. 15</u>: Table 8 – Comparison of HQ Values Generated from Realistic and Conservative Area Use Factors for the Eastern Kingbird.

(a) Hazard quotients (HQs) were not derived for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. For those PAHs that do not have TRVs, a surrogate should be used as per Comment #6a and HQs presented for those PAHs. A hazard index (HI) should be presented by summing the HQs for low molecular weight PAHs (LMW-PAHs – two and three ringed compounds), high molecular weight PAHs (HMW-PAHs – four or more ringed compounds) and total PAHs for all of the PAHs analyzed in the emergent insects.

<u>Response</u>: Some of the PAHs did not have TRVs and were excluded from the draft report since they were not included as biota COPECs in the BERA (AMEC, 2001). However, for completeness, these can be added to the revised Insectivorous Bird ERA report using both realistic and conservative TRVs, consistent with the other PAHs. Surrogate values may be used to derive these TRVs, unless other toxicological data is available.

As requested, we will include the HQ values based on the low- and high-molecular weight PAHs for the revised document.

(b) This table appears to have been generated using the "NOAEL – Realistic TRVs" and it must be shown that this is the case. Hazard quotients should be presented using the LOAEL TRV in addition to the NOAEL TRV. This table should be revised and additional tables should be included presenting the HQ and HI values generated using permutations of the "Realistic TRVs" and "Conservative TRVs" with realistic and conservative AUFs.

<u>Response</u>: As discussed in our responses to EPA Comments No. 6a and 6b, the TRVs were all NOAEL-based. We will include the HQs based on the LOAEL TRVs for the revised Insectivorous Bird ERA report.

Table 7 already compares the results of the assessment using realistic and conservative TRVs for the PAHs. We can prepare an additional table that includes use of the conservative TRV and conservative AUF, although this would represent an unlikely upper bound for the risk assessment.

(c) The data presented in this table cannot be verified without the laboratory report to verify the insect concentrations. Please include the insect laboratory report in the revised risk assessment document.

Response: This comment does not appear to be relevant to the table contents, which presents the HQ results from the uncertainty assessment using the conservative and bounding AUFs.

EPA Comment No. 16: Tables B-1a, B-1b, B-2a, and B-2b – Insect Biota Transfer Factors for Individual PCDD/Fs and Avian Dioxin TEQ and PAHs from Greenfield Creek and the Drainage Ditch (respectively)

The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Response: As discussed earlier the revised Insectivorous Bird ERA report will include a compilation of the historical sediment and surface water data, as well as a new attachment that presents the calculation of the biota transfer factors in detail.

EPA Comment No. 17: Table B-3a – Exposure Point Concentrations for Reference Area Samples

(a) The units for exposure point concentrations (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according to the data presented in Tables 1 and 2.

Response: The incorrect reporting units were presented in Table B-3a for the insects. The concentration units reported in Tables 1 and 2 were correct. For the risk calculation table (Table B-5 for the reference area samples), the insect PCDD/F and PAH concentration units of ng/Kg and µg/Kg (respectively) were converted to mg/Kg, since the TRV was in units of mg/Kg-day. The observed wet weight results also had to be converted to a dry weight basis to use the (dry-weight normalized) ingestion rate. Table B-3a will be corrected for the revised Insectivorous Bird ERA report by reporting all of the insect results in units of mg/Kg.

(b) No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

Response: Indeno(123-cd)pyrene was not detected in the insect composite sample from the Reference Area (Table 2). Although no entry was shown for this chemical in Table B-3a, one-half the reporting limit ("RL" value in Table 2) was used for the risk calculation (Table B-5). The RL value was used in lieu of the method detection limit (MDL) for the insect PAH results since it was the greater value and thus is more conservative. Table B-3a will be corrected to show an entry of "ND (3.07E-03)" in the revised Insectivorous Bird ERA report, since all of the insect results in this table will be reported in units of mg/Kg, per the response to Comment No. 17a.

(c) The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-5.

Response: The value shown in Table 1 (TCDD-TEQ of 1.1 ng/Kg) is correct. However, it appears that the value from Greenfield Creek was inadvertently used as the input for the Reference Area calculation for this chemical. The corrected TCDD-TEQ HQ value is 1.9E-03, compared to 1.3E-02 shown in Table B-5 of the draft report. The discussion from the draft report will be adjusted to reflect this corrected value for the revised Insectivorous Bird ERA report.

(d) The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Response: As discussed earlier, the revised Insectivorous Bird ERA report will include a compilation of the historical sediment and surface water data. Annex 1 contains the insect analytical results provided by the laboratory, which will also be included with the revised Insectivorous Bird ERA report.

EPA Comment No. 18: Table B-3b – Exposure Point Concentrations for the Drainage Ditch Samples

(a) The units for exposure point concentrations (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according to the data presented in Tables 1 and 2.

Response: The incorrect reporting units were presented in Table B-3b for the insects collected from the Drainage Ditch. The concentration units reported in Tables 1 and 2 were correct. For the risk calculation table (Table B-6 for the Drainage Ditch samples), the insect PCDD/F and PAH concentration units of ng/Kg and µg/Kg (respectively) were converted to mg/Kg, since the TRV was in units of mg/Kg-day. The observed wet weight results also had to be converted to a dry weight basis to use the (dry-weight normalized) ingestion rate. Table B-3b will be corrected for the revised Insectivorous Bird ERA report by reporting all of the insect results in units of mg/Kg.

(b) No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

Response: _Indeno(1,2,3-cd)pyrene was detected in the insect composite sample from Drainage Ditch (12.9 µg/Kg ww; Table 2) and had been inadvertently not included in the

Table 3b. However, although no entry was shown for this chemical in Table B-3b, it was evaluated in the risk assessment (see Table B-6) using the detected concentration. Table B-3b will be corrected to show the detected value in the revised Insectivorous Bird ERA report.

(c) The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-6.

Response: The Commenter noted that the TCDD-TEQ value shown in Table B-6 (1.92E-05 mg/Kg ww) did not match the value reported in Table 1 (1.84E-05 mg/Kg ww). We confirmed that the value shown in Table 1 was correctly calculated based on the avian TEFs. Therefore, Table B-6 will be revised to reflect the Table 1 value for TCDD-TEQ, which reduces the TCDD-TEQ HQ value from 3.3E-02 to 3.1E-02 for the Drainage Ditch exposure.

(d) The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Response: As discussed earlier, the revised Insectivorous Bird ERA report will include a compilation of the historical sediment and surface water data. Annex 1 contains the insect analytical results provided by the laboratory, which will also be included with the revised Insectivorous Bird ERA report,

EPA Comment No. 19: Table B-3c – Exposure Point Concentrations for the Greenfield Creek Samples

(a) The units for exposure point concentrations (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according to the data presented in Tables 1 and 2.

Response: The incorrect reporting units were presented in Table B-3c for the insects collected from Greenfield Creek. The concentration units reported in Tables 1 and 2 were correct. For the risk calculation table (Table B-7 for the Greenfield Creek samples), the insect PCDD/F and PAH concentration units of ng/Kg and µg/Kg (respectively) were converted to mg/Kg, since the TRV was in units of mg/Kg-day. The observed wet weight results also had to be converted to a dry weight basis to use the (dry-weight normalized) ingestion rate. Table B-3b will be corrected for the revised Insectivorous Bird ERA report by reporting all of the insect results in units of mg/Kg.

(b) No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

Response: Indeno(123-cd)pyrene was not detected in the insect composite sample from the Greenfield Creek (Table 2). Although no entry was shown for this chemical in Table B-3c, one-half the reporting limit ("RL" value in Table 2) was used for the risk calculation (Table B-7). The RL value was used in lieu of the method detection limit (MDL) for the insect PAH results since it was the greater value and would be more conservative. Table B-3c will be corrected to show an entry of "ND (2.49E-03)" in the revised Insectivorous Bird ERA report, since all of the insect results in this table will be reported in units of mg/Kg, per the response to Comment No. 17a.

(c) The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-7.

Response: The TCDD-TEQ (avian) data in Table 1 (7.5 ng/Kg) is the same as that shown in Table B-7 (7.5E-06 mg/Kg). The concentration units were converted from ng/Kg to mg/Kg in Table B-7 for the risk calculation, since the TRV was in units of mg/Kg-day. The wet weight results also had to be converted to a dry weight basis to use the (dry-weight normalized) ingestion rate. No text changes are required.

(d) The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Response: As discussed earlier, the revised Insectivorous Bird ERA report will include a compilation of the historical sediment and surface water data. Annex 1 contains the insect analytical results provided by the laboratory, which will also be included with the revised Insectivorous Bird ERA report,

EPA Comment No. 20: Table B-4 – Toxicity Reference Values for Wildlife Receptor of Interest

(a) It is unclear if the TRV presented in this table are NOAEL or LOAEL based TRVs. Both NOAEL and LOAEL TRVs must be presented. Toxicity reference values (TRVs) were not reported for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. Surrogate TRVs should be used for those PAHs without TRVs in Tables 6 and B-4. Eleven other PAHs with similar chemical structure had realistic TRVs reported as 1.01E-1 mg/kg-d. A surrogate TRV of 1.01 mg/kg-d would be acceptable for those PAHs where no TRV was reported for the realistic scenario. The conservative TRVs should be

handled in a similar manner for those PAHs without TRVs. The assumptions must be made clear regarding the use of all surrogate TRVs. See Comment #6a for additional required modifications.

Response: All of the TRVs used in this assessment were NOAEL-based. This is consistent with the approach taken in the BERA (AMEC, 2001). Details concerning the derivation of TRVs as noted in the comment were provided in the BERA (AMEC, 2001). LOAEL-based TRVs can also be developed and the hazard quotients (HQs) and hazard indices (HIs) presented in the draft report will be supplemented with the LOAEL-based TRV results for the revised Insectivorous Bird ERA Report. The presentation in the revision to the BERA will also be updated to reflect the inclusion of LOAEL-based TRVs.

Some of the PAHs did not have TRVs and were excluded from the draft report since they were not included as biota COPECs in the BERA (AMEC, 2001). However, for completeness, these can be added to the revised Insectivorous Bird ERA report using both realistic and conservative TRVs, consistent with the other PAHs. Surrogate values may be used to derive these TRVs, unless other toxicological data is available.

The conservative TRV for the PAHs was evaluated in the uncertainty assessment of the draft document. The EPA Commenter is directed to Section 6.2.1 and Table 7 of the draft document for this information.

(b) TRVs for all of the COPCs evaluated in this report should be well described. Tables should be constructed with the following information: Chemical name, test organism, body weight of test organism, duration of exposure, reported endpoint(s), reported concentration effect level (e.g., NOAEL, LOAEL, LD50), citation of the study, and the final chosen NOAEL and LOAEL used for hazard analysis. If NOAEL or LOAEL values are not reported, then the uncertainty factor applied to derive the NOAEL and/or LOAEL for the cited value must be included. For the PAH hazard analysis used in this study, TRVs from both the ingestion study (Realistic Scenario – Schaefer et al. 1983) and the egg injection study (Conservative Scenario – Brunström et al. 1991) should be used to bracket the uncertainty related to selection of TRVs for PAHs since the confidence in the TRVs gleaned from both studies is low.

Response: All of the TRVs used in this assessment were NOAEL-based. This is consistent with the approach taken in the BERA (AMEC, 2001). Details concerning the derivation of TRVs as noted in the comment were provided in the BERA (AMEC, 2001). LOAEL-based TRVs can also be developed and the hazard quotients (HQs) and hazard indices (HIs) presented in the draft report will be supplemented with the LOAEL-based TRV results for the revised Insectivorous Bird ERA Report. The presentation in the revision to the BERA will also be updated to reflect the inclusion of LOAEL-based TRVs.

The conservative TRV for the PAHs was evaluated in the uncertainty assessment of the draft document. The EPA Commenter is directed to Section 6.2.1 and Table 7 of the draft document for this information.

(c) The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Response: This comment is not relevant to the referenced table, which lists the TRVs used for the risk assessment. No changes were required for the revised Insectivorous Bird ERA report.

EPA Comment No. 21: Tables B-5 (Reference Area), B-6 (Drainage Ditch), and B-7 (Greenfield Creek) – Evaluation of Potential Ecological Risks to the Eastern Kingbird.

(a) Table B-5 – the PAH data do not match Table 2 or B-3a and the PCDD-TEQ data do not match Table 1 or B-3a.

Response: The Table 1 and Table 2 values are correct (see Annex 1 for the laboratory backup). It appears that the results from Greenfield Creek were incorrectly used as inputs for the insect results from the Reference Area due to a data lookup error. Table B-5, and the associated tables and results interpretation will be corrected for the revised Insectivorous Bird ERA report.

(b) Table B-6 – the PCDD-TEQ data do not match Table 1 or B-3b

Response: The Table 1 values are correct. As discussed in our responses to earlier comments, the incorrect units were shown for Table B-3b. The latter table will be corrected for the revised Insectivorous Bird ERA Report.

(c) Table B-7 – No data problems were discovered.

Response: No response required.

(d) The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document

Response: As discussed earlier, the revised Insectivorous Bird ERA report will include a compilation of the historical sediment and surface water data. Annex 1 contains the insect analytical results provided by the laboratory, which will also be included with the revised Insectivorous Bird ERA report.

(e) The hazard quotients (HQ) for those PAHs originally presented without TRVs should be recalculated using conservative TRV surrogates. The concentrations of Total Polycyclic Aromatic Hydrocarbons (Total PAHs) were presented in the data set for the collected insects. The hazard indexes (HI – summation of HQs) for LMW-PAHs, HMW-PAHs and Total PAHs should be presented in the risk evaluation tables.

Response: Some of the PAHs did not have TRVs and were excluded from the draft report since they were not included as biota COPECs in the BERA (AMEC, 2001). However, for completeness, these can be added to the revised Insectivorous Bird ERA report using both realistic and conservative TRVs, consistent with the other PAHs. Surrogate values may be used to derive these TRVs, unless other toxicological data is available.

As requested, we will include the HQ values based on the low- and high-molecular weight PAHs for the revised document.

(f) Additional tables are needed regarding the same calculations for the conservative scenario TRVs and AUF.

Response: These tables will be provided as part of the revised Insectivorous Bird ERA report.

EPA Comment No. 22: Figures B-1 and B-2 – Comparison of the log Octanol-Water Partition Coefficients to the Lipid- and Organic Carbon-Normalized Biota Transfer Factors for PAHs and PCDD/Fs from Greenfield Creek and the Drainage Ditch (respectively). The data presented in these figures cannot be verified without the sediment concentrations and organic carbon content (not presented in this report) or the laboratory report to verify the insect COPC or lipid concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Response: As discussed earlier, the revised Insectivorous Bird ERA report will include a compilation of the historical sediment and surface water data. Annex 1 contains the insect analytical results provided by the laboratory, which will also be included with the revised Insectivorous Bird ERA report

Subject: RE: Update requested
From: William.Arrants@rayonier.com
Date: Mon, 15 May 2006 10:35:26 -0400
To: Stuart Parker <stuart.parker@ncmail.net>
Return-Path: <William.Arrants@rayonier.com>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.069.1) id 44499D920012566E for stuart.parker@ncmail.net; Mon, 15 May 2006 10:35:30 -0400
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 44388BC8001DCAFC for stuart.parker@ncmail.net; Mon, 15 May 2006 10:35:30 -0400
Received: from scc098.its.state.nc.us (207.4.219.13) by scc152.its.state.nc.us (7.2.052) id 44388BC7001E6785 for stuart.parker@ncmail.net; Mon, 15 May 2006 10:35:30 -0400
Received: from swpmail.rayonier.com (swpmail.rayonier.com [208.63.80.237]) by scc098.its.state.nc.us (8.13.6/8.13.6/DFR) with SMTP id k4FEZSMn004642 for <stuart.parker@ncmail.net>; Mon, 15 May 2006 10:35:29 -0400 (EDT)
In-Reply-To: <4468883D.7090000@ncmail.net>
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OFAA06577E.85600F00-ON8525716F.004FD3AB-8525716F.00502660@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.4FP1|June 19, 2005) at 05/15/2006 10:35:29 AM
MIME-Version: 1.0
Content-type: text/plain; charset=ISO-8859-1
Content-transfer-encoding: quoted-printable
X-Spam-Status: Yes, hits=0 required=6
X-Spam-Score: 0
X-Scanned-By: MIMEDefang 2.56 on 207.4.219.13

Stuart,

AMEC will arrive at the site later today and will set up samplers. I plan to go over tomorrow to observe part of this event. I have alerted Layton to the schedule.

The following excerpt is from a 5/12 e-mail I received from AMEC's John Samuelian:

The sampling will be done by Amy Nelson - she did the sampling last year (she got married in the interim).

She should arrive at the Wilmington airport around noon and was planning on meeting with Danny Rawl from Schnabel at the hotel (she's staying at the Howard Johnsons) between 1 and 2. The sampling equipment is being shipped directly to the hotel - we'll be using 3 insect collectors. I spoke with Amy and she anticipated that they would be at the site around 4 pm. The equipment is now set up with a photodetector switch which turns on the UV light when its dark, so there is no need for them to be at the site at dusk.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103

Subject: Fw: SWP-Wilmington - Follow-up on NCDENR Post-Conference Call Questions
From: William.Arrants@rayonier.com
Date: Fri, 5 May 2006 14:03:53 -0400
To: stuart.parker@ncmail.net
CC: gkuntz@schnabel-eng.com, john.samuelian@amec.com
Return-Path: <William.Arrants@rayonier.com>
Received: from scc150.its.state.nc.us (207.192.33.37) by ms01.ncmail.net (7.2.069.1) id 44499D92000B485B for stuart.parker@ncmail.net; Fri, 5 May 2006 14:03:59 -0400
Received: from scc150.its.state.nc.us (127.0.0.1) by scc150.its.state.nc.us (7.2.052) id 44388A0900275CED for stuart.parker@ncmail.net; Fri, 5 May 2006 14:04:00 -0400
Received: from scc096.its.state.nc.us (207.192.32.78) by scc150.its.state.nc.us (7.2.052) id 44388A08002A0E4D for stuart.parker@ncmail.net; Fri, 5 May 2006 14:04:00 -0400
Received: from swpmail.rayonier.com (swpmail.rayonier.com [208.63.80.237]) by scc096.its.state.nc.us (8.13.6/8.13.6/DFR) with ESMTP id k45I3psg003321 for <stuart.parker@ncmail.net>; Fri, 5 May 2006 14:03:51 -0400 (EDT)
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OFC220D693.7BA8C222-ON85257165.0061F2F8-85257165.00633BD2@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.4FP1|June 19, 2005) at 05/05/2006 02:03:56 PM
MIME-Version: 1.0
Content-type: text/plain; charset=ISO-8859-1
Content-transfer-encoding: quoted-printable
X-Spam-Status: Yes, hits=0 required=6
X-Spam-Score: 0
X-Scanned-By: MIMEDefang 2.56 on 207.192.32.78

Stuart,

Here is a reply from John Samuelian to your questions.

We are scheduling sampling on the week of May 15th. This will be an additional expenditure of time and money, but it is our hope that the additional field data, along with a modified report which meets the Department's comments in the March 21 letter will address the Department and EPA's concerns about the study's conclusions. A response to the comment letter is underway.

Thank you for your consideration of these issues.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087 ----- Forwarded by William Arrants/RaySW/Rayonier on 05/05/2006 01:49 PM

"Samuelian, John H" <john.samuelian@amec.com> To "William Arrants"

05/05/2006 12:13 PM

<William.Arrants@rayonier.com>, "Greg Kuntz" <gkuntz@schnabel-eng.com>

cc

Subject
SWP-Wilmington - Follow-up on NCDENR Post-Conference Call Questions

Bill, Greg -

I was contacted by Stuart Parker from NCDENR a few days after our conference call with NCDENR and USEPA on 21 April 2006 concerning the Wilmington project. Stuart was in the process of completing notes from the conference call, and required some feedback on two items:

1. Clarification on the weighted versus unweighted insect uptake calculations performed in the draft Insectivorous Bird ERA.
2. Responding to a request from NC Ports requested that we look at the possibility of adding some additional insect sampling, principally near the elbow in Greenfield Creek.

Our feedback is presented below.

Weighted versus unweighted insect uptake calculations: During the call with NCDENR and USEPA I had mentioned (based on recollection) that there had not been great differences between whether the insect uptake factors were calculated by averaging the chemical results from nearby sediment locations ("unweighted" uptake factors) or adjusting them based on insect collection success ("weighted" uptake factors). Further examination of Tables B-1a, 1b, and 1c (for PCDD/Fs) and Tables B-2a and 2b (for PAHs) showed that this was true in some cases (e.g., acenaphthene in Table B-2b shows unweighted and weighted uptake factors of 1.62E-4 and 1.01E-4, respectively) but not correct in other cases (e.g., benzo(a)pyrene in Table B-2a shows unweighted and weighted uptake factors of 4.42E-3 and 4.76E-2). Therefore, whether the sediments were weighted (by insect collection success) or unweighted would affect the calculated uptake factors.

The uptake factors themselves are not used for any of the insectivorous bird risk calculations, since the latter are based on the composite insect chemical results from the evaluated areas. For the ERA, the uptake factors are compared against values reported in the literature to assess whether there are any potential factors influencing the chemical's bioavailability under site-specific conditions.

Request for additional insect collections: Insect samples were collected from the elbow area of Greenfield Creek in May 2005 (station FLY-GC-2), but only about 6% of the total collected insect mass from Greenfield Creek was from this location. As shown in Table A-1 of the draft ERA for Insectivorous Birds, the largest insect collections from the drainage ditch was at station FLY-DD1-2 (98% of total mass collected from this area); and the largest insect collections from Greenfield Creek was at station FLY-GC-3 (~83% of total mass collected from this area). Therefore, due to their large contribution as sources for uptake by insects, these sample locations could be used to "bound" the insect residue data (and uptake factor calculations). The average total PAHs from sediments associated with FLY-DD1-2 was ~1,000 mg/Kg, and

represents the upper bound exposure. The lower bound exposure would be represented by the sediments associated with FLY-GC-3, where the average total PAH concentrations in sediments was ~19 mg/Kg. This is a wide range of corresponding sediment concentrations, but the average total PAH concentration for sediments near FLY-GC-2 is somewhat higher (~1,600 mg/Kg). Therefore, since the total PAH concentration in sediments from this location is somewhat outside of the "bounding" range it would be helpful to collect an additional insect sample from station FLY-GC-2 to supplement the current insect residue dataset.

I checked with our field staff and they would be available to collect insects from this location during the week of 15 May. A more exact date for the sampling start will be made once the weather forecast for the period becomes available. Adjustments of the sampling schedule may need to be made if the weather is inclement during the entire week. As was done in May 2005, sampling will be performed using the UV light insect traps, but we will set up additional traps in the area to collect as much insect mass as possible. Samples will be processed as before, segregating the aquatic from the terrestrial insects, and analyzing the samples for dioxins/furans, PAHs (SIMs mode) and lipid content.

Please call if you have any questions.

John

John Samuelian, Ph.D.
AMEC Earth & Environmental
15 Franklin Street
Portland, ME 04101
207-879-4222
207-879-4223 (fax)
john.samuelian@amec.com

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If you receive this e-mail in error, please notify the sender by reply e-mail and delete and destroy the message.

SITE HEALTH AND SAFETY PLAN

A. General Information

Site Name Southern Wood Piedmont ID # NCD 058 517 467

Location East end of Greenfield Street,
Wilmington, New Hanover Co., NC

Proposed Date of Investigation 5/1/06 to 5/31/06

Date of Briefing 4/27/06

Date of Debriefing 6/5/06

Nature of Visit (check one):

On-Site Reconnaissance	
Off-Site Reconnaissance	
Sampling Overview	
Sampling	X
Remediation Overview	

Health Department Official Contacted Dianne Harvell's voice mail

Date of Contact 4/27/06

Site Investigation Team: All site personnel have read the Site Health and Safety Plan and are familiar with its provisions.

Personnel	Responsibilities	Signature
Team 1 Stuart Parker	team leader, sampling owners +	
Team 1 Hanna Assefa	Sampling	

Plan Preparation:

Prepared By: David Lilley, Industrial Hygiene Consultant

Reviewed By: Jack Butler, Superfund Section Chief

Teleconference

Date April 21, 2006

Participants:
RP: Bill Arrants (SWP Wilmington); Greg Kuntz (Schnabel Engineering); John Samuelian (AMEC E&E)
EPA: Ken Lucas
NCSF: Jack Butler; Stuart Parker; Hanna Assefa
Absent: James Bateson (NCSF); Layton Bedsole (NC Ports)

Bill Arrants started by stating the purpose of meeting: Response to comments on Insect Bioaccumulation Study/Risk Assessment. His position was that the study had been undertaken in good faith, attempting to realistically assess the risk, that the data were useful and that items cited by EPA and DENR could be rectified by the contractor.

John Samuelian then discussed the 5 primary issues summarized in the NCSF March 21 cover letter to the EPA comments. He first apologized for not including the supporting insect laboratory analytical results. He noted, however, that sediment data were readily available in the previously submitted Supplemental RI Report.

Samuelian noted the Centerdale Site in Rhode Island, a dioxin site where insect samples were composited from multiple locations, out of necessity. He stated that field conditions and "fickle weather" sometimes necessitate this step. Conditions at SWP Wilmington were unfavorable for collection early in the week-long event. To ensure adequate sample mass, samples were eventually composited from multiple locations along the contaminated drainage ditch and Greenfield Creek, respectively . He noted that all terrestrial insects (beetles) were removed, but that this biased the study in favor of uptake, since the receptor (kingbird) did not feed exclusively on aquatic-emerged insects. He also noted that high resolution 8270 analysis was used to optimize the PAH data. He stated that any additional sampling should attempt to accurately replicate the receptor food source.

Samuelian then requested clarification of the proposed role of Lumbriculus sp testing of sediment. He noted that while lumbriculus method was "not inappropriate" it could introduce uncertainty if used to estimate contaminant levels in adult insects. Specifically, in the absence of other data, lumbriculus tended to overestimate adult insect contaminant uptakes by a factor of 2. The suspected reason for this discrepancy was that lumbriculus was a single-life-stage test organism, but emergent insects metamorphosed and moulted during growth, shedding body (exoskeletal) mass.

Regarding use of Biotic Sediment Accumulation Factor (BSAF, from literature) to estimate risk: Samuelian noted that the Insectivorous Bird receptor was not the sole determinant in the ecological risk calculations. The piscivorous bird study generated a Hazard Quotient greater than 1, and the RI fish tissue sampling results also demonstrated that contaminant uptake had occurred into the aquatic food chain.

Hanna Assefa commented that the point of BSAF was to be conservative and therefore to screen whether a problem existed or not. She recommended that lumbriculus data be used in conjunction with the existing insect data. Samuelian again cited the uncertainty introduced by lumbriculus. Ken Lucas queried whether the two types of data could be used to reduce one-another's uncertainty.

Samuelian noted that using lumbriculus data to calculate insect uptake would result in a "bounding estimate". He suggested calculating potential uptake based on Lumbriculus, but then factoring to account for insect metamorphosis. He also noted that That BTFs (Biota Transfer Factors) calculated from averaged sediment sample concentrations were similar to those calculated using sediment concentrations weighted by corresponding insect sample mass (SFP note: The latter mean and range values were approximately twice those of the former).

Greg Kuntz noted that, although insect samples were consolidated, 98 % of the ditch sample mass, and 83 % of the Greenfield Creek sample mass, came from single respective locations: the ditch confluence with the creek; and the creek downstream from the ditch. These respective samples could therefore be considered "worst case" and "best case". The question was whether we needed an "intermediate case" to complete the study. He also reiterated the desire that the results be realistic and representative.

With regard to the report quality/clarity issue, SWP noted that the last submittal was a supplement attempting to present the new results, and not yet formatted for collation into the Final RI Report agreed to in the AOC.

SWP agreed to provide a written response detailing the above considerations for NCSF and the EPA. Bill Arrants expressed concern over NCSF reporting that SWP had "adamantly declined" to use the recommended approach, and reiterated that SWP wanted to move forward in a reasonable and cooperative manner. It was agreed that the deadline for the submittal would be May 27; however, AMEC stipulated that they could complete the task much sooner.

After the teleconference SFP spoke with Layton Bedsole at Ports Authority. Bedsole apologized for missing the teleconference. He then reported that higher management at SPA was very concerned about the outcome of the study, EPA/State comments and the apparent need for additional work. They felt that EPA and the State should have clarified the issues with sample collection at the time of the study, extending field work until sufficient mass had been collected. [SFP note: Contractor Logistics did not account for this contingency, initially estimating 3 days of field work and having bracketing commitments of their personnel after the 6-day period].

Although local media had not reported any plans to develop the site property, Bedsole clarified that the SPA was running out of storage space at their existing facility and was keen to develop the site as soon as possible. The concern was that additional risk analysis would delay the completion of the RI and therefore the DNAPL and groundwater remedy selection. These remedies, and not the ditch/creek cleanup, would have the most impact on plans to develop the site. They felt that the prospect of another year delay would be unacceptable, and were willing to express their frustration in writing. Bedsole's stated concern was that if additional insect data were needed, that missing the "window" would precipitate such a delay.

On 4/27/06 SFP spoke with John Samuelian (AMEC) to clarify some of his statements made during the teleconference. SFP inquired as to whether the target aquatic insects hatched at multiple times during the warm seasons, and whether they could be sampled at other parts of the year. Samuelian said that by midsummer the mosquito and other non-food insect populations would constitute most of the catch. Early-mid May was the optimal time to catch emergent aquatic insects. He noted that AMEC now had an office in NC and was already prepared to mobilize back on site in early May to catch more insects, if needed. He also reported that turnaround time would be much quicker and that they could furnish the data directly to NCSF and/or EPA.

MEMORANDUM

To: File
From: Stuart F. Parker, Hydrogeologist
Date: April 18, 2006
Subject: Southern Wood Piedmont (SWP) Wilmington
NCD 058 517 467
Deferral Status and potential issues for scheduled conference call.

On 4/18/06 Jim Bateson and I discussed the upcoming teleconference (10 AM Friday 4/21) scheduled between NCSF, EPA and SWP. This teleconference was requested by SWP after they received our March 21, 2006 letter and attached EPA comments on their Ecological Risk Assessment efforts to date. Here are the relevant considerations:

- In the March 21 communication we reported that the insect bio-accumulation study and Ecological Risk Assessment report submitted to NCSF by SWP in December 2005 was inadequate.

- We stipulated that an additional Lumbriculus sp. sediment bioaccumulation study or acceptable alternative (BSAF) analysis would be required to properly characterize risk at the site.

- Prior to the letter, EPA had tentatively proposed performing the work, subject to cost-recovery from SWP. However, shortly thereafter, EPA declined to undertake the task, citing prior work commitments. This last information was not communicated to SWP.

- Following discussion with EPA counsel Tanya Floyd, I also reported in the March 21 letter that the Cooper v Avial legal judgement would not affect SWP's potential contribution rights from other potentially responsible parties at the site. SWP had previously cited this legal precedent in declining to pursue the investigation alternatives mentioned above.

- Last week Ken Lucas (EPA) queried me as to our legal counsel, and I furnished him Kathleen Waylett's contact information.

- Separate discussion between Kathleen and Jim Bateson led to the suggestion of amending the Deferral AOC with SWP to clarify and ensure their contribution rights and provide them an incentive to undertake the mandated work.

- Rayonier, SWP's parent company, is in good financial condition (based on their 2005 annual report) and therefore remains a viable PRP.

- The RI to date indicated that the primary concerns at this site are 1) massive subsurface accumulation of Dense Non-aqueous Phase Liquid (DNAPL) and 2) contaminatiojn in a drainage ditch and possibly Greenfield Creek. The creek is no longer used for fishing (and is now posted) but is upstream from the Cape Fear a major brackish fishery. If necessary, the site can therefore be readily proposed for NPL addition based on both human health and ecological HRS concerns.

NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

March 21, 2006

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

Mr. William P. Arrants
Manager of Environmental Affairs/Regulatory Compliance
Southern Wood Piedmont Company
P.O. Box 5447
Spartanburg, SC 29304

SUBJECT: Southern Wood Piedmont Site
NCD 058 517 467
Wilmington, New Hanover County, NC
Supplemental Risk Evaluation Review and Comment;
Recommendations for Further Investigation

Dear Mr. Arrants:

The NCDENR Division of Waste Management and the USEPA Region IV have reviewed the report: "Supplemental Risk Evaluation for Insectivorous Birds at the Southern Wood Piedmont Facility in Wilmington, North Carolina". This report was submitted to the Division by Southern Wood Piedmont Co. (SWP) on December 9, 2005. This study was part of a Remedial Investigation, conducted by SWP under a State Deferral from NPL listing (Consent Docket # 91-SF-117). The EPA Technical Services Section has submitted extensive written comments (attached) and discussed the report with a Division Industrial Hygienist. Based on their evaluation, additional risk evaluation efforts will be required at this site.

The purpose of the Supplemental Risk Evaluation was to calculate ecological risk posed by sediment contaminants (semi-volatile organic compounds, dioxin and furan congeners) at the site. The study was intended (1) to summarize analytical results from the sample collection, (2) to derive site-specific biota transfer factors, assess bioavailability and derive media cleanup goals and (3) to assess the potential ecological risk to an insectivorous bird species.

The study methodology consisted of sampling emergent aquatic insects along a contaminated on-site drainage ditch and along Greenfield Creek contiguous to the property. A reference sample was also collected upstream from the site, near Greenfield Lake. Sample locations were designated to correspond to previously generated sediment data points. SWP proposed the insect study as an alternative to standard EPA sediment bioaccumulation testing, which uses a non-insect benthic invertebrate (e.g., *Lumbriculus variegatus*).

SWP contractors conducted field sampling operations during the period May 23-28, 2005. EPA and Division risk-assessment personnel observed initial sampling operations. Division project personnel remained to observe operations throughout the sampling event.

Insect sampling efforts met with limited results. Adverse weather conditions delayed significant insect hatching until late in the week. The traps, while functional, captured a combination of target and non-target species, requiring separation of the latter. After several days of limited harvest, SWP contractors consolidated sample locations along each respective waterway to ensure adequate sample mass for laboratory analysis.

The EPA Region IV Technical Services Section (TSS) has completed a technical review of the December 9 report, and their comments are attached. Following extensive discussion, the EPA and Division have agreed upon the following general conclusions:

1) The report has numerous quality, presentation and clarity issues which would require extensive revision to be properly addressed.

2) Supporting laboratory data - from both insect and (prior) sediment analyses - were not included in support of risk calculations. Neither were Toxicity Reference Values (TRVs) or Hazard Quotients (HQs) for several contaminants of potential concern (COPCs). OVERSIGHT BY

3) Several data errors/inconsistencies were present. Among examples cited: (i) mis-matched data results between on-site and background samples, and between different report data tables; (ii) exposure point concentration units which erred by orders of magnitude.

4) Sample data quantity was limited by the limited sizes of the insect harvests and by sample consolidation into composites from each pathway segment. Consolidation also negated any location correlation between insect samples and pre-existing sediment data. SEE PAGE

THOSE DATA WERE CORRECT. APPROP CORRECT SUMMARY TABLE NEEDS CORRECTION

— SUPPLEMENTAL PA FOR SEDIMENT DATA
— REVISED PAPER TO REVISE BER

5) The study described only a "realistic" risk scenario, despite low weight of supporting evidence. EPA TSS noted that a conservative risk scenario is also required to make a sound management decision.

In summary, the Division and EPA's shared consensus is that the December 2005 report and data fail to demonstrate that the site poses minimal ecological risk. Data generated are insufficiently specific, not only to the areas of potential remediation, but also for calculation of sediment cleanup goals. In light of these data issues, EPA opined that even extensive report revision would be unlikely to address the deficiencies of the study.

The EPA has proposed two alternative approaches to supplement (or replace) the insect bioaccumulation study. The first alternative would be collection of additional location-specific sediment samples for Lumbriculus (sp.) bioaccumulation testing, as previously recommended. The second alternative would be the use of Biotic Sediment Accumulation Factors (BSAFs) to calculate risk.

Southern Wood Piedmont has repeatedly and adamantly declined to conduct a lumbriculus study. SWP questioned the applicability and cost-effectiveness of the (laboratory) lumbriculus method, versus (field) collection of emergent insects. However, results of the subsequent insect study are unsatisfactory and therefore not applicable or cost-effective. The lumbriculus method remains the standard by which EPA conducts risk assessments.

SWP has also argued that potential cost contribution by other purported responsible parties might be precluded in the wake of Cooper Industries v. Aviall Services Inc., 125 S.Ct. 577 (2004). However, EPA Region IV legal counsel Tanya Floyd has advised that Cooper v. Aviall does not apply in this case because a signed administrative order exists with the State. The current AOC is also pursuant to the Superfund State Deferral Memorandum of Agreement (MOA) between the Division and EPA.

EPA Region IV is researching availability and cost for its Science and Ecosystem Support Division (SESD) to complete a lumbriculus study or a BSAF evaluation of this site for the Division. A lumbriculus study would require additional sediment sampling by EPA and the Division, but would involve limited field time and would not be weather-dependant. EPA may recommend BSAF evaluation, which would not require sampling. However, in either case, EPA costs would constitute Federal costs incurred by the Division and would therefore be recoverable from SWP under Section V-B of the Deferral AOC.

Alternatively, SWP is directed to furnish its own study plan, for either lumbriculus or BASF evaluation, within 30 days of receipt of this letter, as per the AOC Section VI-H. If you have any questions please call me at (919) 508-8469.

Sincerely,

Stuart F. Parker, Hydrogeologist
NC Superfund Section

Attachments.

cc: James Bateson
Ken Lucas (EPA Region IV)
H. Layton Bedsole (NC Ports Authority)
Hanna Assefa
file

ILS

Integrated
Laboratory
Systems

Waste Division
Technical Services Section
US EPA Region 4

3204 Lance Drive
Columbia, MO 65202
404-437-6306

February 9, 2006

MEMORANDUM

SUBJECT: Ecological risk review comments for the Supplemental Risk Evaluation for Insectivorous Birds at the Former SWP Facility in Wilmington, North Carolina.

FROM: Jason B. Wells, ILS E.S.A.T. Contractor, Technical Services Section

TO: Ken Lucas, Remedial Project Manager

THROUGH: Sharon Thoms, Technical Services Section

CC: Scott Sudweeks, Chief, Technical Services Section

Per your request, I have reviewed **Supplemental Risk Evaluation for Insectivorous Birds at the Former SWP Facility in Wilmington, North Carolina** submitted by the Southern Wood Piedmont Company prepared by AMEC Earth & Environmental, December 2, 2005. My comments provided below are addressed to you, the RPM and the Preparer. These comments can be conveyed verbatim to the party responsible for preparation of these documents. To facilitate the verbatim conveyance, I will be pleased to provide on request a copy of this memo via E-mail.

Comments to the RPM:

This document was poorly written and very difficult to review. Transparency and accuracy are very important elements of risk assessment that are not present in this document. Given that the presentation of this document was neither transparent nor accurate, extensive revision is necessary. The detailed comments from ILS outline these problems and offer suggestions for improvement. During this review, I contacted Hanna Assefa from North Carolina Department of Environment and Natural Resources (NCDENR) to discuss some aspects of this document. Ms. Assefa shared my concerns and was also having difficulty with reviewing this document.

AMEC Earth and Environmental prepared this report to summarize the results from the supplemental field collections of aquatic emergent insects and primarily to assess the potential ecological risks of polycyclic aromatic hydrocarbons (PAHs) and polychlorinated dibenzo-

dioxins and –furans (PCDD/Fs) in addition to other COPCs to a representative insectivorous bird (the Eastern Kingbird) at the SWP facility.

The primary objectives of this project were:

- To summarize the analytical results from the collection of aquatic emergent insects from the SWP facility;
- Derive site-specific biota transfer factors that can be used to assess bioavailability and derive media cleanup goals; and
- Assess the potential ecological risks to an insectivorous bird.

Insect trapping was suggested by SWP in lieu of conducting sediment toxicity testing or food web modeling using equilibrium partitioning techniques to estimate risks to ecological receptors. The insect trapping took place May 23-27, 2005 to match the hatching of emergent aquatic insects. This timing would theoretically increase the success of obtaining adequate sample mass for the appropriate contaminant analyses.

One off-site insect trap location was established for the reference area, along Greenfield Creek upstream of the SWP site. Multiple insect trap locations were established within the drainage ditch (two traps located near sediment sampling locations SD-24 and SD-28) and Greenfield Creek (three traps located near sediment sampling locations SD-30, SS-10, and SS-9) areas on the site proper. During this study, the collection of aquatic emergent insects was hampered by unfavorable weather conditions and low trapping success. As a result, it was necessary to combine the yield from each individual trap location from the Greenfield Creek, and drainage ditch areas into composite groups for those areas (1 composite sample for the drainage ditch and 1 composite sample for Greenfield Creek. The compositing was necessary to achieve the minimum sample mass for the analytical determinations of target contaminants in the insects. This action resulted in loss of statistical power, loss of site variability assessment, and reduced the correlation of insect contaminant concentrations to previously determined sediment concentrations where the traps were placed. Overall, the outcome of this insect sampling study resulted in a relatively weak assessment of potential risk to avian receptors at this site.

ILS detected several inconsistencies concerning data presentation (data mismatch problems) specifically with the concentrations of contaminants (polycyclic aromatic hydrocarbons [PAHs] and polychlorinated dioxins/furans [PCDD/Fs]) found in the emergent insects harvested from the SWP site and reference area. These inconsistencies must be corrected to gain an accurate estimation of potential risk to avian receptors at this site.

Since this was a "stand-alone" document, additional analytical data should have been included with this document. The analytical report from the laboratory that processed the captured insects was not included with this document for review and verification of the data that were presented by SWP. Surface water and sediment concentration data and the physical attributes of the sediments (organic carbon content) for individual samples were not included in this report. Many calculations performed in this risk assessment were based on data that were not presented. This made independent verification of those calculations presented by SWP impossible. The outcome of the risk assessment to avian receptors at SWP is questionable. None of the objectives set by

SWP for this project can be considered complete or verifiable. This document should be heavily revised and resubmitted for review.

Given the weakness and current state of this study, ILS advises that sediment toxicity/bioaccumulation studies using benthic invertebrates (e.g., *Lumbriculus variegatus*) be considered to better estimate the risks posed by the concentrations of COPCs at this site. This type of study is associated with greater confidence and is influenced less by subjectivity than the current insect trapping study.

Specific Comments to the Preparer:

1. Transparency and accuracy are major factors in ecological risk assessments. Much of the risk presentation in this document is not transparent (lack of verifiable information). Data mismatch errors were detected and potentially unacceptable risks may have been overlooked.

2. Since this was a "stand-alone" document, additional analytical data should have been included with this document. The analytical report from the laboratory that processed the captured insects was not included with this document for review and verification of the data that were presented by SWP. Surface water and sediment concentration data and the physical attributes of the sediments (organic carbon content) for individual samples were not included in this report. Many calculations performed in this risk assessment were based on data that were not presented. This made independent verification of those calculations presented by the preparer impossible.

3. ILS cannot concur at this time with the statement "The evaluation of the insectivorous bird exposure pathway showed no risks to this receptor from food-chain transfer of COPCs from sediments to emergent aquatic insects." This document should be heavily revised and resubmitted for review. The following comments will illustrate these shortcomings.

4. **Page 3, Section 2.2 Results from Previous Studies:**
   a. Please include a table of the historical PAH and PCDD/F media contaminant concentrations and physical attributes (specifically, organic carbon content) for individual samples from the three areas used in this report. This is necessary to verify the calculations presented in this report.

   b. Please include a figure or figures of the locations of the media sampling locations with the locations of the insect traps. This would be extremely helpful when verifying which media concentrations are associated with the insect traps (Table A-3 – Calculation of Sediment Weighting Factors Base on Insect Collection Success from Different Samples Areas).

5. **Page 3, Section 3.0 Field Collection Summary and Analytical Results:**
   Please include (as an attachment or appendix) the laboratory report from Paradigm Analytical Laboratories (PAL) for all of the analyses of the emergent insect samples.

This is very valuable information that enables the reviewer to verify the data presented by SWP. Data consistency problems were detected in the some of the tables presented by SWP (see additional comments); referring to the laboratory report would have enabled this reviewer to make recommendations for correction.

6. **Toxicity Reference Values (TRVs) - Page 15 Section 5.2 Ecological Effects Evaluation, Table 6 Conservative and Bounding PAH Toxicity Reference Values for Avian Wildlife Receptors of Interest, Table B-4 Toxicity Reference Values for Wildlife Receptor of Interest:**
   a. TRVs for <u>all</u> of the COPCs evaluated in this report should be well described. Tables should be constructed with the following information: Chemical name, test organism, body weight of test organism, duration of exposure, reported endpoint(s), reported concentration effect level (e.g., NOAEL, LOAEL, LD50), citation of the study, and the final chosen NOAEL and LOAEL used for hazard analysis. If NOAEL or LOAEL values are not reported, then the uncertainty factor applied to derive the NOAEL and/or LOAEL for the cited value must be included. For the PAH hazard analysis used in this study, TRVs from both the ingestion study (Realistic Scenario – Schaefer et al. 1983) and the egg injection study (Conservative Scenario – Brunström et al. 1991) should be used to bracket the uncertainty related to selection of TRVs for PAHs since the confidence in the TRVs gleaned from both studies is low.

   b. Table 6 and Table B-4: Where no TRVs are listed for certain PAHs (e.g., fluoranthene, naphthalene, pyrene), a conservative toxicity reference value surrogate should be selected.

7. **Page 15, Section 6.1 – Risk Estimation:**
   a. Since both TRV studies for avian PAH effects exhibit low confidence, both scenarios conservative (egg injection TRVs) and realistic (ingestion TRVs) should be used in the risk estimation and presented for the risk management decision. Additionally, NCDENR has requested that average daily dose (ADD) calculations be computed using an area use factor (AUF) of 1 in addition to the calculated AUFs for the drainage ditch, Greenfield Creek and reference areas. This additional information will be helpful for establishing the most conservative consideration of other avian receptors that exhibit greater AUFs than the Eastern Kingbird. The AUF modification requested by NCDENR should be applied to the ADD calculations for both scenarios at each study area (reference, drainage ditch, and Greenfield Creek areas).

   b. The derived hazard quotients (HQs) for PAHs should also be grouped into hazard indexes (HIs – summation of HQs for chemical groupings) by low molecular weight (LMW – two and three ringed compounds), high molecular weight (HMW – four or more ringed compounds), and total PAH (all PAHs). This is important as the PAHs for these groupings have similar modes of toxic action. These PAHs exist as mixtures and have additive toxic effects.

c. The risk analysis should be presented using both conservative and realistic scenarios in order to make a sound management decision. The realistic scenario should not be used alone when a low weight of evidence exists regarding avian dietary responses to PAHs. The extrapolation of LD50 data to LOAEL and NOAEL values is not a high weight of evidence approach. The inclusion of the assessed risks by using TRVs derived from the egg-injection study (conservative TRV) is warranted in this case.

d. It is anticipated that some chemicals will have HQs or HIs that exceed unity for a particular exposure scenario. For any stressor that has an HQ or HI exceeding unity, the media risk-based calculations (RBCs) or preliminary remediation goals (PRGs) should be derived for consideration in the risk management decision.

8. **Table 1 – PCDD/F results for insect sample collections**
PCDD-TEQ values do not match the values presented in Tables B-3a, B-3b, B-3c, B-5 or B-6. These data cannot be verified without the laboratory report. The laboratory report was not included with this document; referring to the laboratory report would have enabled this reviewer to make recommendations for correction. Please include the laboratory report in the revised risk assessment document.

9. **Table 2 – PAH results for insect sample collections**
PAH values do not match the values presented in Table B-5. These data cannot be verified without the laboratory report. The laboratory report was not included with this document; referring to the laboratory report would have enabled this reviewer to make recommendations for correction. Please include the laboratory report in the revised risk assessment document.

10. **Table 3a and 3b – Method Blank Analytical Results for PCDD/F and PAH**
These conclusions cannot be verified without the laboratory report. Please include the laboratory report in the revised risk assessment document.

11. **Table 4 – Summary of Insect Biota Transfer Factors for PCDD/Fs and Avian TEQ by Sample Location**
The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

12. **Table 5 - Summary of Insect Biota Transfer Factors for PAHs by Sample Location**
The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

13. **Table 6 – Conservative and Bounding PAH Toxicity Reference Values for Avian Wildlife Receptors of Interest**
    a. It is unclear if the TRV presented in this table are NOAEL or LOAEL based TRVs. Both NOAEL and LOAEL TRVs must be presented. Toxicity reference values (TRVs) were not reported for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. Surrogate TRVs should be used for those PAHs without TRVs in Tables 6 and B-4. Eleven other PAHs with similar chemical structures had realistic TRVs reported as 1.01E-1 mg/kg-d. A surrogate TRV of 1.01 mg/kg-d would be acceptable for those PAHs where no TRV was reported for the realistic scenario. The conservative TRVs should be handled in a similar manner for those PAHs without TRVs. The assumptions must be made clear regarding the use of all surrogate TRVs. See Comment #6a for additional required modifications to Table 6.

    b. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

14. **Table 7 – Comparison of HQ Values Generate from Conservative and Bounding PAH Toxicity Reference Values for the Eastern Kingbird.**
    a. Hazard quotients (HQs) were not derived for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. For those PAHs that do not have TRVs, a surrogate should be used as per Comment #6a and HQs presented for those PAHs. A hazard index (HI) should be presented by summing the HQs for low molecular weight PAHs (LMW-PAHs – two and three ringed compounds), high molecular weight PAHs (HMW-PAHs – four or more ringed compounds) and total PAHs for all of the PAHs analyzed in the emergent insects.

    b. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

15. **Table 8 – Comparison of HQ Values Generated from Realistic and Conservative Area Use Factors for the Eastern Kingbird.**
    a. Hazard quotients (HQs) were not derived for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. For those PAHs that do not have TRVs, a surrogate should be used as per Comment #6a and HQs presented for those PAHs. A hazard index (HI) should be presented by summing the HQs for low molecular weight PAHs (LMW-PAHs – two and three ringed compounds), high molecular weight PAHs (HMW-PAHs – four or more ringed compounds) and total PAHs for all of the PAHs analyzed in the emergent insects.

b. This table appears to have been generated using the "NOAEL – Realistic TRVs" and it must be shown that this is the case. Hazard quotients should be presented using the LOAEL TRV in addition to the NOAEL TRV. This table should be revised and additional tables should be included presenting the HQ and HI values generated using permutations of the "Realistic TRVs" and "Conservative TRVs" with realistic and conservative AUFs.

c. The data presented in this table cannot be verified without the laboratory report to verify the insect concentrations. Please include the insect laboratory report in the revised risk assessment document.

16. **Tables B-1a, B-1B, B-2a, and B-2b – Insect Biota Transfer Factors for Individual PCDD/Fs and Avian Dioxin TEQ and PAHs from Greenfield Creek and the Drainage Ditch (respectively)**
The data presented in these tables cannot be verified without the sediment concentrations and organic carbon content (not presented in this report) or the laboratory report to verify the insect COPC or lipid concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

17. **Table B-3a – Exposure Point Concentrations for Reference Area Samples**
a. The units for exposure point concentration (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according the data presented in Tables 1&2.

b. No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

c. The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-5.

d. The data presented in this table cannot be verified without the surface water and sediment concentrations (not presented in this report) or the laboratory report to verify the insect COPC concentrations. Please include the surface water data, sediment data, and insect laboratory report in the revised risk assessment document.

18. **Table B-3b - Exposure Point Concentrations for the Drainage Ditch Samples**
a. The units for exposure point concentration (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according the data presented in Tables 1&2.

b. No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

c. The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-6.

d. The data presented in this table cannot be verified without the surface water and sediment concentrations (not presented in this report) or the laboratory report to verify the insect COPC concentrations. Please include the surface water data, sediment data, and insect laboratory report in the revised risk assessment document.

19. Table B-3c - Exposure Point Concentrations for the Greenfield Creek Samples

a. The units for exposure point concentration (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according the data presented in Tables 1&2.

b. No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

c. The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-7.

d. The data presented in this table cannot be verified without the surface water and sediment concentrations (not presented in this report) or the laboratory report to verify the insect COPC concentrations. Please include the surface water data, sediment data, and insect laboratory report in the revised risk assessment document.

20. Table B-4 – Toxicity Reference Values for Wildlife Receptor of Interest

a. It is unclear if the TRV presented in this table are NOAEL or LOAEL based TRVs. Both NOAEL and LOAEL TRVs must be presented. Toxicity reference values (TRVs) were not reported for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. Surrogate TRVs should be used for those PAHs without TRVs in Tables 6 and B-4. Eleven other PAHs with similar chemical structures had realistic TRVs reported as 1.01E-1 mg/kg-d. A surrogate TRV of 1.01 mg/kg-d would be acceptable for those PAHs where no TRV was reported for the realistic scenario. The conservative TRVs should be handled in a similar manner for those PAHs without TRVs. The assumptions must be made clear regarding the use of all surrogate TRVs. See Comment #6a for additional required modifications.

b. TRVs for <u>all</u> of the COPCs evaluated in this report should be well described. Tables should be constructed with the following information: Chemical name, test

organism, body weight of test organism, duration of exposure, reported endpoint(s), reported concentration effect level (e.g., NOAEL, LOAEL, LD50), citation of the study, and the final chosen NOAEL and LOAEL used for hazard analysis. If NOAEL or LOAEL values are not reported, then the uncertainty factor applied to derive the NOAEL and/or LOAEL for the cited value must be included. For the PAH hazard analysis used in this study, TRVs from both the ingestion study (Realistic Scenario – Schaefer et al. 1983) and the egg injection study (Conservative Scenario – Brunström et al. 1991) should be used to bracket the uncertainty related to selection of TRVs for PAHs since the confidence in the TRVs gleaned from both studies is low.

c. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

21. **Tables B-5 (Reference Area), B-6 (Drainage Ditch), and B-7 (Greenfield Creek) – Evaluation of Potential Ecological Risks to the Eastern Kingbird.**
    a. Table B-5 – the PAH data do not match Table 2 or B-3a and the PCDD-TEQ data do not match Table 1 or B-3a.
    b. Table B-6 – the PCDD-TEQ data do not match Table 1 or B-3b.
    c. Table B-7 – No data problems were discovered

    d. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document

    e. The hazard quotients (HQ) for those PAHs originally presented without TRVs should be recalculated using conservative TRV surrogates. The concentrations of Total Polycyclic Aromatic Hydrocarbons (Total PAHs) were presented in the data set for the collected insects. The hazard indexes (HI – summation of HQs) for LMW-PAHs, HMW-PAHs and Total PAHs should be presented in the risk evaluation tables.

    f. Additional tables are needed regarding the same calculations for the conservative scenario TRVs and AUF.

22. **Figures B-1 and B-2 – Comparison of the log Octanol-Water Partition Coefficients to the Lipid- and Organic Carbon-Normalized Biota Transfer Factors for PAHs and PCDD/Fs from Greenfield Creek and the Drainage Ditch (respectively).**
    The data presented in these figures cannot be verified without the sediment concentrations and organic carbon content (not presented in this report) or the laboratory report to verify the insect COPC or lipid concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Subject: Re: Southern Wood Piedmont Wilmington: Conference Call Scheduling
From: William.Arrants@rayonier.com
Date: Thu, 13 Apr 2006 14:31:14 -0400
To: Stuart Parker <stuart.parker@ncmail.net>
CC: Campbell.Richard@epamail.epa.gov, Gregory Kuntz <gkuntz@schnabel-eng.com>, HANNA ASSEFA <HANNA.ASSEFA@ncmail.net>, james.bateson@ncmail.net, John Samuelian <john.samuelian@amec.com>, Layton Bedsole <Layton_Bedsole@ncports.com>, Lucas.Ken@epamail.epa.gov
Return-Path: <William.Arrants@rayonier.com>
Received: from scc151.its.state.nc.us (207.192.33.38) by ms01.ncmail.net (7.2.069.1) id 442F956F000A1750; Thu, 13 Apr 2006 14:31:18 -0400
Received: from scc151.its.state.nc.us (127.0.0.1) by scc151.its.state.nc.us (7.2.052) id 44388B1400047449; Thu, 13 Apr 2006 14:31:19 -0400
Received: from scc098.its.state.nc.us (207.4.219.13) by scc151.its.state.nc.us (7.2.052) id 44388B1300047E0A; Thu, 13 Apr 2006 14:31:19 -0400
Received: from swpmail.rayonier.com (swpmail.rayonier.com [208.63.80.237]) by scc098.its.state.nc.us (8.13.6/8.13.6/DFR) with SMTP id k3DIVFLx002434; Thu, 13 Apr 2006 14:31:16 -0400 (EDT)
In-Reply-To: <443E9602.2010101@ncmail.net>
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OF116061AB.9D3BF449-ON8525714F.0064A8D6-8525714F.0065BC71@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.4FP1|June 19, 2005) at 04/13/2006 02:31:17 PM
MIME-Version: 1.0
Content-type: text/plain; charset=ISO-8859-1
Content-transfer-encoding: quoted-printable
X-Spam-Status: Yes, hits=0 required=6
X-Spam-Score: 0
X-Scanned-By: MIMEDefang 2.56 on 207.4.219.13

Thanks Stuart.

Date and time: Friday, April 21 at 10:00.

Conference call #s:

Phone: 1-888-630-9075

Participant code: 599107

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087

Ken 562 8953
404

Stuart Parker
<stuart.parker@nc
mail.net>

To
William.Arrants@rayonier.com

NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

March 21, 2006

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

Mr. William P. Arrants
Manager of Environmental Affairs/Regulatory Compliance
Southern Wood Piedmont Company
P.O. Box 5447
Spartanburg, SC 29304

SUBJECT: Southern Wood Piedmont Site
NCD 058 517 467
Wilmington, New Hanover County, NC
Supplemental Risk Evaluation Review and Comment;
Recommendations for Further Investigation

Dear Mr. Arrants:

The NCDENR Division of Waste Management and the USEPA Region IV have reviewed the report: "Supplemental Risk Evaluation for Insectivorous Birds at the Southern Wood Piedmont Facility in Wilmington, North Carolina". This report was submitted to the Division by Southern Wood Piedmont Co. (SWP) on December 9, 2005. This study was part of a Remedial Investigation, conducted by SWP under a State Deferral from NPL listing (Consent Docket # 91-SF-117). The EPA Technical Services Section has submitted extensive written comments (attached) and discussed the report with a Division Industrial Hygienist. Based on their evaluation, additional risk evaluation efforts will be required at this site.

The purpose of the Supplemental Risk Evaluation was to calculate ecological risk posed by sediment contaminants (semi-volatile organic compounds, dioxin and furan congeners) at the site. The study was intended (1) to summarize analytical results from the sample collection, (2) to derive site-specific biota transfer factors, assess bioavailability and derive media cleanup goals and (3) to assess the potential ecological risk to an insectivorous bird species.

The study methodology consisted of sampling emergent aquatic insects along a contaminated on-site drainage ditch and along Greenfield Creek contiguous to the property. A reference sample was also collected upstream from the site, near Greenfield Lake. Sample locations were designated to correspond to previously generated sediment data points. SWP proposed the insect study as an alternative to standard EPA sediment bioaccumulation testing, which uses a non-insect benthic invertebrate (e.g., *Lumbriculus variegatus*).

SWP contractors conducted field sampling operations during the period May 23-28, 2005. EPA and Division risk-assessment personnel observed initial sampling operations. Division project personnel remained to observe operations throughout the sampling event.

Insect sampling efforts met with limited results. Adverse weather conditions delayed significant insect hatching until late in the week. The traps, while functional, captured a combination of target and non-target species, requiring separation of the latter. After several days of limited harvest, SWP contractors consolidated sample locations along each respective waterway to ensure adequate sample mass for laboratory analysis.

The EPA Region IV Technical Services Section (TSS) has completed a technical review of the December 9 report, and their comments are attached. Following extensive discussion, the EPA and Division have agreed upon the following general conclusions:

1) The report has numerous quality, presentation and clarity issues which would require extensive revision to be properly addressed.

2) Supporting laboratory data - from both insect and (prior) sediment analyses - were not included in support of risk calculations. Neither were Toxicity Reference Values (TRVs) or Hazard Quotients (HQs) for several contaminants of potential concern (COPCs).

3) Several data errors/inconsistencies were present. Among examples cited: (i) mis-matched data results between on-site and background samples, and between different report data tables; (ii) exposure point concentration units which erred by orders of magnitude.

4) Sample data quantity was limited by the limited sizes of the insect harvests and by sample consolidation into composites from each pathway segment. Consolidation also negated any location correlation between insect samples and pre-existing sediment data.

5) The study described only a "realistic" risk scenario, despite low weight of supporting evidence. EPA TSS noted that a conservative risk scenario is also required to make a sound management decision.

In summary, the Division and EPA's shared consensus is that the December 2005 report and data fail to demonstrate that the site poses minimal ecological risk. Data generated are insufficiently specific, not only to the areas of potential remediation, but also for calculation of sediment cleanup goals. In light of these data issues, EPA opined that even extensive report revision would be unlikely to address the deficiencies of the study.

The EPA has proposed two alternative approaches to supplement (or replace) the insect bioaccumulation study. The first alternative would be collection of additional location-specific sediment samples for Lumbriculus (sp.) bioaccumulation testing, as previously recommended. The second alternative would be the use of Biotic Sediment Accumulation Factors (BSAFs) to calculate risk.

Southern Wood Piedmont has repeatedly and adamantly declined to conduct a lumbriculus study. SWP questioned the applicability and cost-effectiveness of the (laboratory) lumbriculus method, versus (field) collection of emergent insects. However, results of the subsequent insect study are unsatisfactory and therefore not applicable or cost-effective. The lumbriculus method remains the standard by which EPA conducts risk assessments.

SWP has also argued that potential cost contribution by other purported responsible parties might be precluded in the wake of Cooper Industries v. Aviall Services Inc., 125 S.Ct. 577 (2004). However, EPA Region IV legal counsel Tanya Floyd has advised that Cooper v. Aviall does not apply in this case because a signed administrative order exists with the State. The current AOC is also pursuant to the Superfund State Deferral Memorandum of Agreement (MOA) between the Division and EPA.

EPA Region IV is researching availability and cost for its Science and Ecosystem Support Division (SESD) to complete a lumbriculus study or a BSAF evaluation of this site for the Division. A lumbriculus study would require additional sediment sampling by EPA and the Division, but would involve limited field time and would not be weather-dependant. EPA may recommend BSAF evaluation, which would not require sampling. However, in either case, EPA costs would constitute Federal costs incurred by the Division and would therefore be recoverable from SWP under Section V-B of the Deferral AOC.

Alternatively, SWP is directed to furnish its own study plan, for either lumbriculus or BASF evaluation, within 30 days of receipt of this letter, as per the AOC Section VI-H. If you have any questions please call me at (919) 508-8469.

Sincerely,

Stuart F. Parker, Hydrogeologist
NC Superfund Section

Attachments.

cc: James Bateson
Ken Lucas (EPA Region IV)
H. Layton Bedsole (NC Ports Authority)
Hanna Assefa
file

ILS

Integrated
Laboratory
Systems

Waste Division
Technical Services Section
US EPA Region 4

3204 Lance Drive
Columbia, MO 65202
404-437-6306

February 9, 2006

MEMORANDUM

SUBJECT: Ecological risk review comments for the Supplemental Risk Evaluation for Insectivorous Birds at the Former SWP Facility in Wilmington, North Carolina.

FROM: Jason B. Wells, ILS E.S.A.T. Contractor, Technical Services Section

TO: Ken Lucas, Remedial Project Manager

THROUGH: Sharon Thoms, Technical Services Section

CC: Scott Sudweeks, Chief, Technical Services Section

Per your request, I have reviewed **Supplemental Risk Evaluation for Insectivorous Birds at the Former SWP Facility in Wilmington, North Carolina** submitted by the Southern Wood Piedmont Company prepared by AMEC Earth & Environmental, December 2, 2005. My comments provided below are addressed to you, the RPM and the Preparer. These comments can be conveyed verbatim to the party responsible for preparation of these documents. To facilitate the verbatim conveyance, I will be pleased to provide on request a copy of this memo via E-mail.

Comments to the RPM:

This document was poorly written and very difficult to review. Transparency and accuracy are very important elements of risk assessment that are not present in this document. Given that the presentation of this document was neither transparent nor accurate, extensive revision is necessary. The detailed comments from ILS outline these problems and offer suggestions for improvement. During this review, I contacted Hanna Assefa from North Carolina Department of Environment and Natural Resources (NCDENR) to discuss some aspects of this document. Ms. Assefa shared my concerns and was also having difficulty with reviewing this document.

AMEC Earth and Environmental prepared this report to summarize the results from the supplemental field collections of aquatic emergent insects and primarily to assess the potential ecological risks of polycyclic aromatic hydrocarbons (PAHs) and polychlorinated dibenzo-

dioxins and –furans (PCDD/Fs) in addition to other COPCs to a representative insectivorous bird (the Eastern Kingbird) at the SWP facility.

The primary objectives of this project were:

- To summarize the analytical results from the collection of aquatic emergent insects from the SWP facility;
- Derive site-specific biota transfer factors that can be used to assess bioavailability and derive media cleanup goals; and
- Assess the potential ecological risks to an insectivorous bird.

Insect trapping was suggested by SWP in lieu of conducting sediment toxicity testing or food web modeling using equilibrium partitioning techniques to estimate risks to ecological receptors. The insect trapping took place May 23-27, 2005 to match the hatching of emergent aquatic insects. This timing would theoretically increase the success of obtaining adequate sample mass for the appropriate contaminant analyses.

One off-site insect trap location was established for the reference area, along Greenfield Creek upstream of the SWP site. Multiple insect trap locations were established within the drainage ditch (two traps located near sediment sampling locations SD-24 and SD-28) and Greenfield Creek (three traps located near sediment sampling locations SD-30, SS-10, and SS-9) areas on the site proper. During this study, the collection of aquatic emergent insects was hampered by unfavorable weather conditions and low trapping success. As a result, it was necessary to combine the yield from each individual trap location from the Greenfield Creek, and drainage ditch areas into composite groups for those areas (1 composite sample for the drainage ditch and 1 composite sample for Greenfield Creek. The compositing was necessary to achieve the minimum sample mass for the analytical determinations of target contaminants in the insects. This action resulted in loss of statistical power, loss of site variability assessment, and reduced the correlation of insect contaminant concentrations to previously determined sediment concentrations where the traps were placed. Overall, the outcome of this insect sampling study resulted in a relatively weak assessment of potential risk to avian receptors at this site.

ILS detected several inconsistencies concerning data presentation (data mismatch problems) specifically with the concentrations of contaminants (polycyclic aromatic hydrocarbons [PAHs] and polychlorinated dioxins/furans [PCDD/Fs]) found in the emergent insects harvested from the SWP site and reference area. These inconsistencies must be corrected to gain an accurate estimation of potential risk to avian receptors at this site.

Since this was a "stand-alone" document, additional analytical data should have been included with this document. The analytical report from the laboratory that processed the captured insects was not included with this document for review and verification of the data that were presented by SWP. Surface water and sediment concentration data and the physical attributes of the sediments (organic carbon content) for individual samples were not included in this report. Many calculations performed in this risk assessment were based on data that were not presented. This made independent verification of those calculations presented by SWP impossible. The outcome of the risk assessment to avian receptors at SWP is questionable. None of the objectives set by

SWP for this project can be considered complete or verifiable. This document should be heavily revised and resubmitted for review.

Given the weakness and current state of this study, ILS advises that sediment toxicity/bioaccumulation studies using benthic invertebrates (e.g., *Lumbriculus variegatus*) be considered to better estimate the risks posed by the concentrations of COPCs at this site. This type of study is associated with greater confidence and is influenced less by subjectivity than the current insect trapping study.

Specific Comments to the Preparer:

1. Transparency and accuracy are major factors in ecological risk assessments. Much of the risk presentation in this document is not transparent (lack of verifiable information). Data mismatch errors were detected and potentially unacceptable risks may have been overlooked.

2. Since this was a "stand-alone" document, additional analytical data should have been included with this document. The analytical report from the laboratory that processed the captured insects was not included with this document for review and verification of the data that were presented by SWP. Surface water and sediment concentration data and the physical attributes of the sediments (organic carbon content) for individual samples were not included in this report. Many calculations performed in this risk assessment were based on data that were not presented. This made independent verification of those calculations presented by the preparer impossible.

3. ILS cannot concur at this time with the statement "The evaluation of the insectivorous bird exposure pathway showed no risks to this receptor from food-chain transfer of COPCs from sediments to emergent aquatic insects." This document should be heavily revised and resubmitted for review. The following comments will illustrate these shortcomings.

4. **Page 3, Section 2.2 Results from Previous Studies:**
   a. Please include a table of the historical PAH and PCDD/F media contaminant concentrations and physical attributes (specifically, organic carbon content) for individual samples from the three areas used in this report. This is necessary to verify the calculations presented in this report.

   b. Please include a figure or figures of the locations of the media sampling locations with the locations of the insect traps. This would be extremely helpful when verifying which media concentrations are associated with the insect traps (Table A-3 – Calculation of Sediment Weighting Factors Base on Insect Collection Success from Different Samples Areas).

5. **Page 3, Section 3.0 Field Collection Summary and Analytical Results:**
   Please include (as an attachment or appendix) the laboratory report from Paradigm Analytical Laboratories (PAL) for all of the analyses of the emergent insect samples.

This is very valuable information that enables the reviewer to verify the data presented by SWP. Data consistency problems were detected in the some of the tables presented by SWP (see additional comments); referring to the laboratory report would have enabled this reviewer to make recommendations for correction.

6. **Toxicity Reference Values (TRVs) - Page 15 Section 5.2 Ecological Effects Evaluation, Table 6 Conservative and Bounding PAH Toxicity Reference Values for Avian Wildlife Receptors of Interest, Table B-4 Toxicity Reference Values for Wildlife Receptor of Interest:**
   a. TRVs for all of the COPCs evaluated in this report should be well described. Tables should be constructed with the following information: Chemical name, test organism, body weight of test organism, duration of exposure, reported endpoint(s), reported concentration effect level (e.g., NOAEL, LOAEL, LD50), citation of the study, and the final chosen NOAEL and LOAEL used for hazard analysis. If NOAEL or LOAEL values are not reported, then the uncertainty factor applied to derive the NOAEL and/or LOAEL for the cited value must be included. For the PAH hazard analysis used in this study, TRVs from both the ingestion study (Realistic Scenario – Schaefer et al. 1983) and the egg injection study (Conservative Scenario – Brunström et al. 1991) should be used to bracket the uncertainty related to selection of TRVs for PAHs since the confidence in the TRVs gleaned from both studies is low.

   b. Table 6 and Table B-4: Where no TRVs are listed for certain PAHs (e.g., fluoranthene, naphthalene, pyrene), a conservative toxicity reference value surrogate should be selected.

7. **Page 15, Section 6.1 – Risk Estimation:**
   a. Since both TRV studies for avian PAH effects exhibit low confidence, both scenarios conservative (egg injection TRVs) and realistic (ingestion TRVs) should be used in the risk estimation and presented for the risk management decision. Additionally, NCDENR has requested that average daily dose (ADD) calculations be computed using an area use factor (AUF) of 1 in addition to the calculated AUFs for the drainage ditch, Greenfield Creek and reference areas. This additional information will be helpful for establishing the most conservative consideration of other avian receptors that exhibit greater AUFs than the Eastern Kingbird. The AUF modification requested by NCDENR should be applied to the ADD calculations for both scenarios at each study area (reference, drainage ditch, and Greenfield Creek areas).

   b. The derived hazard quotients (HQs) for PAHs should also be grouped into hazard indexes (HIs – summation of HQs for chemical groupings) by low molecular weight (LMW – two and three ringed compounds), high molecular weight (HMW – four or more ringed compounds), and total PAH (all PAHs). This is important as the PAHs for these groupings have similar modes of toxic action. These PAHs exist as mixtures and have additive toxic effects.

c. The risk analysis should be presented using both conservative and realistic scenarios in order to make a sound management decision. The realistic scenario should not be used alone when a low weight of evidence exists regarding avian dietary responses to PAHs. The extrapolation of LD50 data to LOAEL and NOAEL values is not a high weight of evidence approach. The inclusion of the assessed risks by using TRVs derived from the egg-injection study (conservative TRV) is warranted in this case.

d. It is anticipated that some chemicals will have HQs or HIs that exceed unity for a particular exposure scenario. For any stressor that has an HQ or HI exceeding unity, the media risk-based calculations (RBCs) or preliminary remediation goals (PRGs) should be derived for consideration in the risk management decision.

8. **Table 1 – PCDD/F results for insect sample collections**
PCDD-TEQ values do not match the values presented in Tables B-3a, B-3b, B-3c, B-5 or B-6. These data cannot be verified without the laboratory report. The laboratory report was not included with this document; referring to the laboratory report would have enabled this reviewer to make recommendations for correction. Please include the laboratory report in the revised risk assessment document.

9. **Table 2 – PAH results for insect sample collections**
PAH values do not match the values presented in Table B-5. These data cannot be verified without the laboratory report. The laboratory report was not included with this document; referring to the laboratory report would have enabled this reviewer to make recommendations for correction. Please include the laboratory report in the revised risk assessment document.

10. **Table 3a and 3b – Method Blank Analytical Results for PCDD/F and PAH**
These conclusions cannot be verified without the laboratory report. Please include the laboratory report in the revised risk assessment document.

11. **Table 4 – Summary of Insect Biota Transfer Factors for PCDD/Fs and Avian TEQ by Sample Location**
The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

12. **Table 5 - Summary of Insect Biota Transfer Factors for PAHs by Sample Location**
The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

13. **Table 6 – Conservative and Bounding PAH Toxicity Reference Values for Avian Wildlife Receptors of Interest**
    a. It is unclear if the TRV presented in this table are NOAEL or LOAEL based TRVs. Both NOAEL and LOAEL TRVs must be presented. Toxicity reference values (TRVs) were not reported for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. Surrogate TRVs should be used for those PAHs without TRVs in Tables 6 and B-4. Eleven other PAHs with similar chemical structures had realistic TRVs reported as 1.01E-1 mg/kg-d. A surrogate TRV of 1.01 mg/kg-d would be acceptable for those PAHs where no TRV was reported for the realistic scenario. The conservative TRVs should be handled in a similar manner for those PAHs without TRVs. The assumptions must be made clear regarding the use of all surrogate TRVs. See Comment #6a for additional required modifications to Table 6.

    b. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

14. **Table 7 – Comparison of HQ Values Generate from Conservative and Bounding PAH Toxicity Reference Values for the Eastern Kingbird.**
    a. Hazard quotients (HQs) were not derived for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. For those PAHs that do not have TRVs, a surrogate should be used as per Comment #6a and HQs presented for those PAHs. A hazard index (HI) should be presented by summing the HQs for low molecular weight PAHs (LMW-PAHs – two and three ringed compounds), high molecular weight PAHs (HMW-PAHs – four or more ringed compounds) and total PAHs for all of the PAHs analyzed in the emergent insects.

    b. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

15. **Table 8 – Comparison of HQ Values Generated from Realistic and Conservative Area Use Factors for the Eastern Kingbird.**
    a. Hazard quotients (HQs) were not derived for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. For those PAHs that do not have TRVs, a surrogate should be used as per Comment #6a and HQs presented for those PAHs. A hazard index (HI) should be presented by summing the HQs for low molecular weight PAHs (LMW-PAHs – two and three ringed compounds), high molecular weight PAHs (HMW-PAHs – four or more ringed compounds) and total PAHs for all of the PAHs analyzed in the emergent insects.

b. This table appears to have been generated using the "NOAEL – Realistic TRVs" and it must be shown that this is the case. Hazard quotients should be presented using the LOAEL TRV in addition to the NOAEL TRV. This table should be revised and additional tables should be included presenting the HQ and HI values generated using permutations of the "Realistic TRVs" and "Conservative TRVs" with realistic and conservative AUFs.

c. The data presented in this table cannot be verified without the laboratory report to verify the insect concentrations. Please include the insect laboratory report in the revised risk assessment document.

16. Tables B-1a, B-1B, B-2a, and B-2b – Insect Biota Transfer Factors for Individual PCDD/Fs and Avian Dioxin TEQ and PAHs from Greenfield Creek and the Drainage Ditch (respectively)

The data presented in these tables cannot be verified without the sediment concentrations and organic carbon content (not presented in this report) or the laboratory report to verify the insect COPC or lipid concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

17. Table B-3a – Exposure Point Concentrations for Reference Area Samples

a. The units for exposure point concentration (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according the data presented in Tables 1&2.

b. No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

c. The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-5.

d. The data presented in this table cannot be verified without the surface water and sediment concentrations (not presented in this report) or the laboratory report to verify the insect COPC concentrations. Please include the surface water data, sediment data, and insect laboratory report in the revised risk assessment document.

18. Table B-3b - Exposure Point Concentrations for the Drainage Ditch Samples

a. The units for exposure point concentration (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according the data presented in Tables 1&2.

b. No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

c. The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-6.

d. The data presented in this table cannot be verified without the surface water and sediment concentrations (not presented in this report) or the laboratory report to verify the insect COPC concentrations. Please include the surface water data, sediment data, and insect laboratory report in the revised risk assessment document.

19. Table B-3c - Exposure Point Concentrations for the Greenfield Creek Samples

a. The units for exposure point concentration (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according the data presented in Tables 1&2.

b. No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

c. The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-7.

d. The data presented in this table cannot be verified without the surface water and sediment concentrations (not presented in this report) or the laboratory report to verify the insect COPC concentrations. Please include the surface water data, sediment data, and insect laboratory report in the revised risk assessment document.

20. Table B-4 – Toxicity Reference Values for Wildlife Receptor of Interest

a. It is unclear if the TRV presented in this table are NOAEL or LOAEL based TRVs. Both NOAEL and LOAEL TRVs must be presented. Toxicity reference values (TRVs) were not reported for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. Surrogate TRVs should be used for those PAHs without TRVs in Tables 6 and B-4. Eleven other PAHs with similar chemical structures had realistic TRVs reported as 1.01E-1 mg/kg-d. A surrogate TRV of 1.01 mg/kg-d would be acceptable for those PAHs where no TRV was reported for the realistic scenario. The conservative TRVs should be handled in a similar manner for those PAHs without TRVs. The assumptions must be made clear regarding the use of all surrogate TRVs. See Comment #6a for additional required modifications.

b. TRVs for <u>all</u> of the COPCs evaluated in this report should be well described. Tables should be constructed with the following information: Chemical name, test

organism, body weight of test organism, duration of exposure, reported endpoint(s), reported concentration effect level (e.g., NOAEL, LOAEL, LD50), citation of the study, and the final chosen NOAEL and LOAEL used for hazard analysis. If NOAEL or LOAEL values are not reported, then the uncertainty factor applied to derive the NOAEL and/or LOAEL for the cited value must be included. For the PAH hazard analysis used in this study, TRVs from both the ingestion study (Realistic Scenario – Schaefer et al. 1983) and the egg injection study (Conservative Scenario – Brunström et al. 1991) should be used to bracket the uncertainty related to selection of TRVs for PAHs since the confidence in the TRVs gleaned from both studies is low.

c. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

21. **Tables B-5 (Reference Area), B-6 (Drainage Ditch), and B-7 (Greenfield Creek) – Evaluation of Potential Ecological Risks to the Eastern Kingbird.**
    a. Table B-5 – the PAH data do not match Table 2 or B-3a and the PCDD-TEQ data do not match Table 1 or B-3a.
    b. Table B-6 – the PCDD-TEQ data do not match Table 1 or B-3b.
    c. Table B-7 – No data problems were discovered

    d. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document

    e. The hazard quotients (HQ) for those PAHs originally presented without TRVs should be recalculated using conservative TRV surrogates. The concentrations of Total Polycyclic Aromatic Hydrocarbons (Total PAHs) were presented in the data set for the collected insects. The hazard indexes (HI – summation of HQs) for LMW-PAHs, HMW-PAHs and Total PAHs should be presented in the risk evaluation tables.

    f. Additional tables are needed regarding the same calculations for the conservative scenario TRVs and AUF.

22. **Figures B-1 and B-2 – Comparison of the log Octanol-Water Partition Coefficients to the Lipid- and Organic Carbon-Normalized Biota Transfer Factors for PAHs and PCDD/Fs from Greenfield Creek and the Drainage Ditch (respectively).**
    The data presented in these figures cannot be verified without the sediment concentrations and organic carbon content (not presented in this report) or the laboratory report to verify the insect COPC or lipid concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Subject: Re: SWP RI
From: Lucas.Ken@epamail.epa.gov
Date: Mon, 20 Mar 2006 13:14:14 -0500
To: Stuart Parker <stuart.parker@ncmail.net>
CC: Campbell.Richard@epamail.epa.gov
X-Mozilla-Status: 0013
X-Mozilla-Status2: 10000000
Return-Path: <Lucas.Ken@epamail.epa.gov>
Received: from scc150.its.state.nc.us (207.192.33.37) by ms01.ncmail.net (7.2.069.1) id 440AD7E9000C7947 for stuart.parker@ncmail.net; Mon, 20 Mar 2006 13:15:33 -0500
Received: from scc150.its.state.nc.us (127.0.0.1) by scc150.its.state.nc.us (7.2.052) id 43EF623400206DC6 for stuart.parker@ncmail.net; Mon, 20 Mar 2006 13:15:33 -0500
Received: from scc096.its.state.nc.us (207.192.32.78) by scc150.its.state.nc.us (7.2.052) id 43EF62340021036E for stuart.parker@ncmail.net; Mon, 20 Mar 2006 13:15:33 -0500
Received: from marconi.rtp.epa.gov (marconi.rtp.epa.gov [134.67.208.99]) by scc096.its.state.nc.us (8.13.3/8.13.3/DFR) with ESMTP id k2KIFWim026503 for <stuart.parker@ncmail.net>; Mon, 20 Mar 2006 13:15:32 -0500 (EST)
Received: from epahub11.rtp.epa.gov (epahub11.rtp.epa.gov [134.67.213.52]) by epamail.epa.gov (PMDF V5.2-32 #42056) with ESMTP id <0IWF009HVUNT3Y@epamail.epa.gov> for stuart.parker@ncmail.net; Mon, 20 Mar 2006 13:14:17 -0500 (EST)
In-reply-to: <441EE4AF.6010806@ncmail.net>
Message-ID: <OF28EA063E.85994142-ON85257137.0063B185-85257137.00642E1C@epamail.epa.gov>
MIME-Version: 1.0
X-Mailer: Lotus Notes Release 6.0.2CF1 June 9, 2003
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Content-disposition: inline
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X-Spam-Status: Yes, hits=-99.876 required=6
X-Spam-Score: -99.876 NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.56 on 207.192.32.78

Stuart:

You did a great job of summarizing the issues and giving SWP the bottom line on their options. The only change that I would make is to refer to the applicable Section of the AOC. With that in mind, most of the citations that I noticed in the AOC refer to a 30-day (as opposed to the 60-days in the letter) turnaround for correction of deficiencies or submittal of a plan.

Otherwise the letter looks good. They may invoke the dispute resolution provision. Keep me posted.

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
Sam Nunn - Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303

phone: 404-562-8953
fax : 404-562-8788

Subject: Re: SWP RI
From: Lucas.Ken@epamail.epa.gov
Date: Mon, 20 Mar 2006 13:44:48 -0500
To: Stuart Parker <stuart.parker@ncmail.net>
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <Lucas.Ken@epamail.epa.gov>
Received: from scc150.its.state.nc.us (207.192.33.37) by ms01.ncmail.net (7.2.069.1) id 440AD7E9000C83EF for stuart.parker@ncmail.net; Mon, 20 Mar 2006 13:45:08 -0500
Received: from scc150.its.state.nc.us (127.0.0.1) by scc150.its.state.nc.us (7.2.052) id 43EF623400207F0C for stuart.parker@ncmail.net; Mon, 20 Mar 2006 13:45:08 -0500
Received: from scc097.its.state.nc.us (207.4.219.18) by scc150.its.state.nc.us (7.2.052) id 43EF623400211561 for stuart.parker@ncmail.net; Mon, 20 Mar 2006 13:45:08 -0500
Received: from myrtle.rtpnc.epa.gov (myrtle.rtpnc.epa.gov [134.67.208.33]) by scc097.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id k2KIj7eV021575 for <stuart.parker@ncmail.net>; Mon, 20 Mar 2006 13:45:07 -0500 (EST)
Received: from epahub11.rtp.epa.gov (epahub11.rtp.epa.gov [134.67.213.52]) by epamail.epa.gov (PMDF V5.2-32 #42055) with ESMTP id <0IWF00LH6W2OAL@epamail.epa.gov> for stuart.parker@ncmail.net; Mon, 20 Mar 2006 13:44:50 -0500 (EST)
In-reply-to: <441EF66B.1040008@ncmail.net>
Message-ID: <OFA04EF1DB.F557EFEF-ON85257137.0066DE7F-85257137.0066FA85@epamail.epa.gov>
MIME-Version: 1.0
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Content-type: text/plain; charset=US-ASCII
X-MIMETrack: Serialize by Router on EPAHUB11/USEPA/US(653HF66|November 02, 2004) at 03/20/2006 01:44:01 PM
X-Spam-Status: Yes, hits=-99.876 required=6
X-Spam-Score: -99.876 NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.56 on 207.4.219.18

In the last paragraph of the letter where you tell them to send in a sampling plan

Also, I have not gotten any more information on SESD's availability or the cost for conducting the study. However, looking into the AOC, SWP has agreed to reimburse ". . . the Division for all federally funded oversight and enforcement costs the Division incurs. . ". We (Rich and I) have interpreted that to mean that EPA would have to send a bill to NCDENR for the work in order for the State to recover. Similarly, it looks like EPA would seek its reimbursement from NCDENR, not the SWP PRP's.

I think that Jim B and Rich C. will have to talk about how to arrange for this to occur.

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
Sam Nunn - Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303

phone: 404-562-8953
fax : 404-562-8788

Subject: Re: Remedial Investigation, Final Report, Southern Wood Piedmont
From: William.Arrants@rayonier.com
Date: Tue, 7 Mar 2006 11:53:35 -0500
To: Layton_Bedsole@ncports.com
CC: gkuntz@schnabel-eng.com, stuart.parker@ncmail.net
X-Mozilla-Status: 0011
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Received: from scc151.its.state.nc.us (207.192.33.38) by ms01.ncmail.net (7.2.069.1) id 440AD7E90001D13D for stuart.parker@ncmail.net; Tue, 7 Mar 2006 11:53:43 -0500
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Message-ID: <OF6E72EDAF.7B70DBC6-ON8525712A.005CA137-8525712A.005CCC00@rayonier.com>
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X-Spam-Status: Yes, hits=0.124 required=6
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X-Scanned-By: MIMEDefang 2.56 on 207.4.219.18

Layton,

Greg Kuntz provided the following possible timetable.

1. NCDENR reviewing the insectivorous bird risk assessment - completion date unknown.
2. Following risk assessment, final RI submitted - 3 months after approval of risk assessment.
3. NCDENR review and approval of final RI - completion date unknown.
4. Remedial Action Plan Prep - 3 months after approval of final RI.
5. NCDENR review and approval of RAP.
6. RAP implementation - 1 year (bids, etc.) following RAP approval.

Current forecast for RAP implementation is 2008.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087

Layton_Bedsole@nc

ports.com

03/06/2006 01:17 PM

To
stuart.parker@ncmail.net,
William.Arrants@rayonier.com

cc

Subject
Remedial Investigation, Final Report, Southern Wood Piedmont

Good Afternoon Gentlemen,

Stuart, what is the tentative acceptance date of the Final Remedial Investigation Report? Bill, could you provide an "If then" schedule that would lead you to implementation of a preferred remedial action plan?

Thanks for the help guys!

Subject: Re: SWP RI
From: Lucas.Ken@epamail.epa.gov
Date: Tue, 14 Feb 2006 13:15:56 -0500
To: Stuart Parker <stuart.parker@ncmail.net>
CC: James Bateson <james.bateson@ncmail.net>, Sudweeks.Scott@epamail.epa.gov, Campbell.Richard@epamail.epa.gov, Thoms.Sharon@epamail.epa.gov
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <Lucas.Ken@epamail.epa.gov>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.069.1) id 43805265003FB18C for stuart.parker@ncmail.net; Tue, 14 Feb 2006 13:19:50 -0500
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 43DC50820016E5C0; Tue, 14 Feb 2006 13:19:51 -0500
Received: from scc097.its.state.nc.us (207.4.219.18) by scc152.its.state.nc.us (7.2.052) id 43DC508200186641; Tue, 14 Feb 2006 13:19:50 -0500
Received: from myrtle.rtpnc.epa.gov (myrtle.rtpnc.epa.gov [134.67.208.33]) by scc097.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id k1EIJbm7029261; Tue, 14 Feb 2006 13:19:48 -0500 (EST)
Received: from epahub11.rtp.epa.gov (epahub11.rtp.epa.gov [134.67.213.52]) by epamail.epa.gov (PMDF V5.2-32 #42055) with ESMTP id <0IUO004L1W2MO2@epamail.epa.gov>; Tue, 14 Feb 2006 13:15:58 -0500 (EST)
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MIME-Version: 1.0
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X-Spam-Status: Yes, hits=-99.876 required=6
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X-Scanned-By: MIMEDefang 2.54 on 207.4.219.18

Stuart:

I have been talking to our SESED coordinator about getting on their schedule. I'm not sure when the optimum time of the year for sample collection would be, or even if there is an optimum time of the year. I would suspect that we'd want to get there when their is less water flowing but I'm not sure.

I can participate in the field data collection if personnel from NCDENR or SESD are limited or not available. We also have a few new hires that may be able to participate.

In any event, we need to make sure that the personnel and analytical space are available. We also need to be clear to SESD about the format and timing for the sampling investigation report. Do we want an analytical report or do we want them to give us a 'data dump'. Timing is the key.

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
Sam Nunn - Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303

Subject: Re: SWP RI
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Mon, 13 Feb 2006 13:54:50 -0500
To: Lucas.Ken@epamail.epa.gov, James Bateson <james.bateson@ncmail.net>
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00800000
Message-ID: <43F0D5FA.9010508@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
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Hello Ken.

Thanks for the comments; I'm reviewing them now and have forwarded to Hanna Assefa. Received your voice mail this AM but wanted to discuss with Hanna first (she arrived midday) before calling back.
She agrees that what SWP has presented is of poor quality, and the results are "weak". Naturally, we'd like to have a conference call to ensure that DENR, EPA and SESD are in sync.

I will start drafting the letter to SWP, attaching all reviewer comments, and informing them that we */will/* perform additional data gathering to support accurate risk assessment at this site.

Thanks,
Stuart

Lucas.Ken@epamail.epa.gov wrote:

> Stuart/Jim:
>
> I received the a review of the "Supplemental Risk Evaluation for Insectivorous Birds" which was prepared by the SWP PRPs. The review has concluded that the risk evaluation had many errors and will require substantial revision. In addition, the study conducted by the PRPs was not as recommended by NCDNER and EPA. I believe that it is appropriate at this time for NCDENR collect the appropriate samples in cooperation with EPA's SESD and run the bioaccumulation tests that were recommended last year. This approach would have the advantage of getting to the information we need quickly to be able to assess the risk and to develop the site-specific cleanup goals. The alternative option is to continue on the same path of relying on the PRPs consultant to revise the risk assessment, using the data PRPs generated. The problem with this approach is that the PRPs data is less specific to the areas of the site targeted for potential remediation and lacks specificity required to develop a cleanup goal for sediments.
>
> Two points to bear in mind in taking the above approach:
>
> 1st - If NCDENR and SESD collect the data and the resultant analysis reveals that there is not be a risk involved with the specific part of the risk assessment that relies on this data, the effort may not be clearly cost recoverable.
>
> 2nd - The risk of not having NCDENR and SESD collect the data is that the project will suffer delay based on the evident lack of cooperation by PRPs in providing an appropriate assessment.
>
> Below is the comment memorandum that I received from the risk assessor.

Subject: SWP RI
From: Lucas.Ken@epamail.epa.gov
Date: Mon, 13 Feb 2006 12:34:40 -0500
To: james.bateson@ncmail.net, stuart parker <stuart.parker@ncmail.net>
CC: Lucas.Ken@epamail.epa.gov, Campbell.Richard@epamail.epa.gov
Return-Path: <Lucas.Ken@epamail.epa.gov>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.069.1) id 43805265003E8ADF for stuart.parker@ncmail.net; Mon, 13 Feb 2006 12:36:51 -0500
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 43DC50820014F24F; Mon, 13 Feb 2006 12:36:52 -0500
Received: from scc096.its.state.nc.us (207.192.32.78) by scc152.its.state.nc.us (7.2.052) id 43DC508200166039; Mon, 13 Feb 2006 12:36:52 -0500
Received: from marconi.rtp.epa.gov (marconi.rtp.epa.gov [134.67.208.99]) by scc096.its.state.nc.us (8.13.3/8.13.3/DFR) with ESMTP id k1DHamF4003132; Mon, 13 Feb 2006 12:36:48 -0500 (EST)
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X-Spam-Score: -99.876 NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.54 on 207.192.32.78

Stuart/Jim:

I received the a review of the "Supplemental Risk Evaluation for Insectivorous Birds" which was prepared by the SWP PRPs. The review has concluded that the risk evaluation had many errors and will require substantial revision. In addition, the study conducted by the PRPs was not as recommended by NCDNER and EPA. I believe that it is appropriate at this time for NCDENR collect the appropriate samples in cooperation with EPA's SESD and run the bioaccumulation tests that were recommended last year. This approach would have the advantage of getting to the information we need quickly to be able to assess the risk and to develop the site-specific cleanup goals. The alternative option is to continue on the same path of relying on the PRPs consultant to revise the risk assessment, using the data PRPs generated. The problem with this approach is that the PRPs data is less specific to the areas of the site targeted for potential remediation and lacks specificity required to develop a cleanup goal for sediments.

Two points to bear in mind in taking the above approach:

1st - If NCDENR and SESD collect the data and the resultant analysis reveals that there is not be a risk involved with the specific part of the risk assessment that relies on this data, the effort may not be clearly cost recoverable.

2nd - The risk of not having NCDENR and SESD collect the data is that the project will suffer delay based on the evident lack of cooperation by PRPs in providing an appropriate assessment.

Below is the comment memorandum that I received from the risk assessor. I have contacted the SESD coordinator and requested space on their schedule in the event that you decide that our support is needed.

(See attached file:
060209ESATjw_SouthernWoodPiedmont_InsectivorousBirdRA_SWP.pdf)

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
Sam Nunn - Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303

phone: 404-562-8953
fax : 404-562-8788

060209ESATjw_SouthernWoodPiedmont_InsectivorousBirdRA_SWP.pdf	**Content-Type:** application/pdf **Content-Encoding:** base64

ILS

Integrated
Laboratory
Systems

Waste Division
Technical Services Section
US EPA Region 4

3204 Lance Drive
Columbia, MO 65202
404-437-6306

February 9, 2006

MEMORANDUM

SUBJECT: Ecological risk review comments for the Supplemental Risk Evaluation for Insectivorous Birds at the Former SWP Facility in Wilmington, North Carolina.

FROM: Jason B. Wells, ILS E.S.A.T. Contractor, Technical Services Section

TO: Ken Lucas, Remedial Project Manager

THROUGH: Sharon Thoms, Technical Services Section

CC: Scott Sudweeks, Chief, Technical Services Section

Per your request, I have reviewed **Supplemental Risk Evaluation for Insectivorous Birds at the Former SWP Facility in Wilmington, North Carolina** submitted by the Southern Wood Piedmont Company prepared by AMEC Earth & Environmental, December 2, 2005. My comments provided below are addressed to you, the RPM and the Preparer. These comments can be conveyed verbatim to the party responsible for preparation of these documents. To facilitate the verbatim conveyance, I will be pleased to provide on request a copy of this memo via E-mail.

Comments to the RPM:

This document was poorly written and very difficult to review. Transparency and accuracy are very important elements of risk assessment that are not present in this document. Given that the presentation of this document was neither transparent nor accurate, extensive revision is necessary. The detailed comments from ILS outline these problems and offer suggestions for improvement. During this review, I contacted Hanna Assefa from North Carolina Department of Environment and Natural Resources (NCDENR) to discuss some aspects of this document. Ms. Assefa shared my concerns and was also having difficulty with reviewing this document.

AMEC Earth and Environmental prepared this report to summarize the results from the supplemental field collections of aquatic emergent insects and primarily to assess the potential ecological risks of polycyclic aromatic hydrocarbons (PAHs) and polychlorinated dibenzo-

dioxins and –furans (PCDD/Fs) in addition to other COPCs to a representative insectivorous bird (the Eastern Kingbird) at the SWP facility.

The primary objectives of this project were:

- To summarize the analytical results from the collection of aquatic emergent insects from the SWP facility;
- Derive site-specific biota transfer factors that can be used to assess bioavailability and derive media cleanup goals; and
- Assess the potential ecological risks to an insectivorous bird.

Insect trapping was suggested by SWP in lieu of conducting sediment toxicity testing or food web modeling using equilibrium partitioning techniques to estimate risks to ecological receptors. The insect trapping took place May 23-27, 2005 to match the hatching of emergent aquatic insects. This timing would theoretically increase the success of obtaining adequate sample mass for the appropriate contaminant analyses.

One off-site insect trap location was established for the reference area, along Greenfield Creek upstream of the SWP site. Multiple insect trap locations were established within the drainage ditch (two traps located near sediment sampling locations SD-24 and SD-28) and Greenfield Creek (three traps located near sediment sampling locations SD-30, SS-10, and SS-9) areas on the site proper. During this study, the collection of aquatic emergent insects was hampered by unfavorable weather conditions and low trapping success. As a result, it was necessary to combine the yield from each individual trap location from the Greenfield Creek, and drainage ditch areas into composite groups for those areas (1 composite sample for the drainage ditch and 1 composite sample for Greenfield Creek. The compositing was necessary to achieve the minimum sample mass for the analytical determinations of target contaminants in the insects. This action resulted in loss of statistical power, loss of site variability assessment, and reduced the correlation of insect contaminant concentrations to previously determined sediment concentrations where the traps were placed. Overall, the outcome of this insect sampling study resulted in a relatively weak assessment of potential risk to avian receptors at this site.

ILS detected several inconsistencies concerning data presentation (data mismatch problems) specifically with the concentrations of contaminants (polycyclic aromatic hydrocarbons [PAHs] and polychlorinated dioxins/furans [PCDD/Fs]) found in the emergent insects harvested from the SWP site and reference area. These inconsistencies must be corrected to gain an accurate estimation of potential risk to avian receptors at this site.

Since this was a "stand-alone" document, additional analytical data should have been included with this document. The analytical report from the laboratory that processed the captured insects was not included with this document for review and verification of the data that were presented by SWP. Surface water and sediment concentration data and the physical attributes of the sediments (organic carbon content) for individual samples were not included in this report. Many calculations performed in this risk assessment were based on data that were not presented. This made independent verification of those calculations presented by SWP impossible. The outcome of the risk assessment to avian receptors at SWP is questionable. None of the objectives set by

SWP for this project can be considered complete or verifiable. This document should be heavily revised and resubmitted for review.

Given the weakness and current state of this study, ILS advises that sediment toxicity/bioaccumulation studies using benthic invertebrates (e.g., *Lumbriculus variegatus*) be considered to better estimate the risks posed by the concentrations of COPCs at this site. This type of study is associated with greater confidence and is influenced less by subjectivity than the current insect trapping study.

Specific Comments to the Preparer:

1. Transparency and accuracy are major factors in ecological risk assessments. Much of the risk presentation in this document is not transparent (lack of verifiable information). Data mismatch errors were detected and potentially unacceptable risks may have been overlooked.

2. Since this was a "stand-alone" document, additional analytical data should have been included with this document. The analytical report from the laboratory that processed the captured insects was not included with this document for review and verification of the data that were presented by SWP. Surface water and sediment concentration data and the physical attributes of the sediments (organic carbon content) for individual samples were not included in this report. Many calculations performed in this risk assessment were based on data that were not presented. This made independent verification of those calculations presented by the preparer impossible.

3. ILS cannot concur at this time with the statement "The evaluation of the insectivorous bird exposure pathway showed no risks to this receptor from food-chain transfer of COPCs from sediments to emergent aquatic insects." This document should be heavily revised and resubmitted for review. The following comments will illustrate these shortcomings.

4. **Page 3, Section 2.2 Results from Previous Studies:**
    a. Please include a table of the historical PAH and PCDD/F media contaminant concentrations and physical attributes (specifically, organic carbon content) for individual samples from the three areas used in this report. This is necessary to verify the calculations presented in this report.

    b. Please include a figure or figures of the locations of the media sampling locations with the locations of the insect traps. This would be extremely helpful when verifying which media concentrations are associated with the insect traps (Table A-3 – Calculation of Sediment Weighting Factors Base on Insect Collection Success from Different Samples Areas).

5. **Page 3, Section 3.0 Field Collection Summary and Analytical Results:**
   Please include (as an attachment or appendix) the laboratory report from Paradigm Analytical Laboratories (PAL) for all of the analyses of the emergent insect samples.

This is very valuable information that enables the reviewer to verify the data presented by SWP. Data consistency problems were detected in the some of the tables presented by SWP (see additional comments); referring to the laboratory report would have enabled this reviewer to make recommendations for correction.

6. **Toxicity Reference Values (TRVs) - Page 15 Section 5.2 Ecological Effects Evaluation, Table 6 Conservative and Bounding PAH Toxicity Reference Values for Avian Wildlife Receptors of Interest, Table B-4 Toxicity Reference Values for Wildlife Receptor of Interest:**
   a. TRVs for <u>all</u> of the COPCs evaluated in this report should be well described. Tables should be constructed with the following information: Chemical name, test organism, body weight of test organism, duration of exposure, reported endpoint(s), reported concentration effect level (e.g., NOAEL, LOAEL, LD50), citation of the study, and the final chosen NOAEL and LOAEL used for hazard analysis. If NOAEL or LOAEL values are not reported, then the uncertainty factor applied to derive the NOAEL and/or LOAEL for the cited value must be included. For the PAH hazard analysis used in this study, TRVs from both the ingestion study (Realistic Scenario – Schaefer et al. 1983) and the egg injection study (Conservative Scenario – Brunström et al. 1991) should be used to bracket the uncertainty related to selection of TRVs for PAHs since the confidence in the TRVs gleaned from both studies is low.

   b. Table 6 and Table B-4: Where no TRVs are listed for certain PAHs (e.g., fluoranthene, naphthalene, pyrene), a conservative toxicity reference value surrogate should be selected.

7. **Page 15, Section 6.1 – Risk Estimation:**
   a. Since both TRV studies for avian PAH effects exhibit low confidence, both scenarios conservative (egg injection TRVs) and realistic (ingestion TRVs) should be used in the risk estimation and presented for the risk management decision. Additionally, NCDENR has requested that average daily dose (ADD) calculations be computed using an area use factor (AUF) of 1 in addition to the calculated AUFs for the drainage ditch, Greenfield Creek and reference areas. This additional information will be helpful for establishing the most conservative consideration of other avian receptors that exhibit greater AUFs than the Eastern Kingbird. The AUF modification requested by NCDENR should be applied to the ADD calculations for both scenarios at each study area (reference, drainage ditch, and Greenfield Creek areas).

   b. The derived hazard quotients (HQs) for PAHs should also be grouped into hazard indexes (HIs – summation of HQs for chemical groupings) by low molecular weight (LMW – two and three ringed compounds), high molecular weight (HMW – four or more ringed compounds), and total PAH (all PAHs). This is important as the PAHs for these groupings have similar modes of toxic action. These PAHs exist as mixtures and have additive toxic effects.

c. The risk analysis should be presented using both conservative and realistic scenarios in order to make a sound management decision. The realistic scenario should not be used alone when a low weight of evidence exists regarding avian dietary responses to PAHs. The extrapolation of LD50 data to LOAEL and NOAEL values is not a high weight of evidence approach. The inclusion of the assessed risks by using TRVs derived from the egg-injection study (conservative TRV) is warranted in this case.

d. It is anticipated that some chemicals will have HQs or HIs that exceed unity for a particular exposure scenario. For any stressor that has an HQ or HI exceeding unity, the media risk-based calculations (RBCs) or preliminary remediation goals (PRGs) should be derived for consideration in the risk management decision.

8. **Table 1 – PCDD/F results for insect sample collections**
PCDD-TEQ values do not match the values presented in Tables B-3a, B-3b, B-3c, B-5 or B-6. These data cannot be verified without the laboratory report. The laboratory report was not included with this document; referring to the laboratory report would have enabled this reviewer to make recommendations for correction. Please include the laboratory report in the revised risk assessment document.

9. **Table 2 – PAH results for insect sample collections**
PAH values do not match the values presented in Table B-5. These data cannot be verified without the laboratory report. The laboratory report was not included with this document; referring to the laboratory report would have enabled this reviewer to make recommendations for correction. Please include the laboratory report in the revised risk assessment document.

10. **Table 3a and 3b – Method Blank Analytical Results for PCDD/F and PAH**
These conclusions cannot be verified without the laboratory report. Please include the laboratory report in the revised risk assessment document.

11. **Table 4 – Summary of Insect Biota Transfer Factors for PCDD/Fs and Avian TEQ by Sample Location**
The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

12. **Table 5 - Summary of Insect Biota Transfer Factors for PAHs by Sample Location**
The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

13. **Table 6 – Conservative and Bounding PAH Toxicity Reference Values for Avian Wildlife Receptors of Interest**
    a. It is unclear if the TRV presented in this table are NOAEL or LOAEL based TRVs. Both NOAEL and LOAEL TRVs must be presented. Toxicity reference values (TRVs) were not reported for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. Surrogate TRVs should be used for those PAHs without TRVs in Tables 6 and B-4. Eleven other PAHs with similar chemical structures had realistic TRVs reported as 1.01E-1 mg/kg-d. A surrogate TRV of 1.01 mg/kg-d would be acceptable for those PAHs where no TRV was reported for the realistic scenario. The conservative TRVs should be handled in a similar manner for those PAHs without TRVs. The assumptions must be made clear regarding the use of all surrogate TRVs. See Comment #6a for additional required modifications to Table 6.

    b. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

14. **Table 7 – Comparison of HQ Values Generate from Conservative and Bounding PAH Toxicity Reference Values for the Eastern Kingbird.**
    a. Hazard quotients (HQs) were not derived for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. For those PAHs that do not have TRVs, a surrogate should be used as per Comment #6a and HQs presented for those PAHs. A hazard index (HI) should be presented by summing the HQs for low molecular weight PAHs (LMW-PAHs – two and three ringed compounds), high molecular weight PAHs (HMW-PAHs – four or more ringed compounds) and total PAHs for all of the PAHs analyzed in the emergent insects.

    b. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

15. **Table 8 – Comparison of HQ Values Generated from Realistic and Conservative Area Use Factors for the Eastern Kingbird.**
    a. Hazard quotients (HQs) were not derived for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. For those PAHs that do not have TRVs, a surrogate should be used as per Comment #6a and HQs presented for those PAHs. A hazard index (HI) should be presented by summing the HQs for low molecular weight PAHs (LMW-PAHs – two and three ringed compounds), high molecular weight PAHs (HMW-PAHs – four or more ringed compounds) and total PAHs for all of the PAHs analyzed in the emergent insects.

b. This table appears to have been generated using the "NOAEL – Realistic TRVs" and it must be shown that this is the case. Hazard quotients should be presented using the LOAEL TRV in addition to the NOAEL TRV. This table should be revised and additional tables should be included presenting the HQ and HI values generated using permutations of the "Realistic TRVs" and "Conservative TRVs" with realistic and conservative AUFs.

c. The data presented in this table cannot be verified without the laboratory report to verify the insect concentrations. Please include the insect laboratory report in the revised risk assessment document.

16. Tables B-1a, B-1B, B-2a, and B-2b – Insect Biota Transfer Factors for Individual PCDD/Fs and Avian Dioxin TEQ and PAHs from Greenfield Creek and the Drainage Ditch (respectively)

The data presented in these tables cannot be verified without the sediment concentrations and organic carbon content (not presented in this report) or the laboratory report to verify the insect COPC or lipid concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

17. Table B-3a – Exposure Point Concentrations for Reference Area Samples

a. The units for exposure point concentration (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according the data presented in Tables 1&2.

b. No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

c. The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-5.

d. The data presented in this table cannot be verified without the surface water and sediment concentrations (not presented in this report) or the laboratory report to verify the insect COPC concentrations. Please include the surface water data, sediment data, and insect laboratory report in the revised risk assessment document.

18. Table B-3b - Exposure Point Concentrations for the Drainage Ditch Samples

a. The units for exposure point concentration (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according the data presented in Tables 1&2.

b. No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

c. The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-6.

d. The data presented in this table cannot be verified without the surface water and sediment concentrations (not presented in this report) or the laboratory report to verify the insect COPC concentrations. Please include the surface water data, sediment data, and insect laboratory report in the revised risk assessment document.

19. Table B-3c - Exposure Point Concentrations for the Greenfield Creek Samples

a. The units for exposure point concentration (EPC) for emergent insects appear to have been described incorrectly. The units are presented in the table as mg/kg ww, but appear to be off by three orders of magnitude according the data presented in Tables 1&2.

b. No EPC for emergent insects was included for Indeno(1,2,3-cd)pyrene, but was presented in Table 2.

c. The value for TCDD-TEQ (avian) for the emergent insect EPC does not match data presented in Tables 1 or B-7.

d. The data presented in this table cannot be verified without the surface water and sediment concentrations (not presented in this report) or the laboratory report to verify the insect COPC concentrations. Please include the surface water data, sediment data, and insect laboratory report in the revised risk assessment document.

20. Table B-4 – Toxicity Reference Values for Wildlife Receptor of Interest

a. It is unclear if the TRV presented in this table are NOAEL or LOAEL based TRVs. Both NOAEL and LOAEL TRVs must be presented. Toxicity reference values (TRVs) were not reported for several PAHs where insect PAH concentrations or exposure point concentrations for emergent insect were presented in Table 2 and Tables B-3a-c, respectively. Surrogate TRVs should be used for those PAHs without TRVs in Tables 6 and B-4. Eleven other PAHs with similar chemical structures had realistic TRVs reported as 1.01E-1 mg/kg-d. A surrogate TRV of 1.01 mg/kg-d would be acceptable for those PAHs where no TRV was reported for the realistic scenario. The conservative TRVs should be handled in a similar manner for those PAHs without TRVs. The assumptions must be made clear regarding the use of all surrogate TRVs. See Comment #6a for additional required modifications.

b. TRVs for <u>all</u> of the COPCs evaluated in this report should be well described. Tables should be constructed with the following information: Chemical name, test

organism, body weight of test organism, duration of exposure, reported endpoint(s), reported concentration effect level (e.g., NOAEL, LOAEL, LD50), citation of the study, and the final chosen NOAEL and LOAEL used for hazard analysis. If NOAEL or LOAEL values are not reported, then the uncertainty factor applied to derive the NOAEL and/or LOAEL for the cited value must be included. For the PAH hazard analysis used in this study, TRVs from both the ingestion study (Realistic Scenario – Schaefer et al. 1983) and the egg injection study (Conservative Scenario – Brunström et al. 1991) should be used to bracket the uncertainty related to selection of TRVs for PAHs since the confidence in the TRVs gleaned from both studies is low.

c. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

21. Tables B-5 (Reference Area), B-6 (Drainage Ditch), and B-7 (Greenfield Creek) – Evaluation of Potential Ecological Risks to the Eastern Kingbird.

a. Table B-5 – the PAH data do not match Table 2 or B-3a and the PCDD-TEQ data do not match Table 1 or B-3a.
b. Table B-6 – the PCDD-TEQ data do not match Table 1 or B-3b.
c. Table B-7 – No data problems were discovered

d. The data presented in this table cannot be verified without the sediment concentrations (not presented in this report) or the laboratory report to verify the insect concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document

e. The hazard quotients (HQ) for those PAHs originally presented without TRVs should be recalculated using conservative TRV surrogates. The concentrations of Total Polycyclic Aromatic Hydrocarbons (Total PAHs) were presented in the data set for the collected insects. The hazard indexes (HI – summation of HQs) for LMW-PAHs, HMW-PAHs and Total PAHs should be presented in the risk evaluation tables.

f. Additional tables are needed regarding the same calculations for the conservative scenario TRVs and AUF.

22. Figures B-1 and B-2 – Comparison of the log Octanol-Water Partition Coefficients to the Lipid- and Organic Carbon-Normalized Biota Transfer Factors for PAHs and PCDD/Fs from Greenfield Creek and the Drainage Ditch (respectively).
The data presented in these figures cannot be verified without the sediment concentrations and organic carbon content (not presented in this report) or the laboratory report to verify the insect COPC or lipid concentrations. Please include the sediment data and insect laboratory report in the revised risk assessment document.

Subject: Re: Fw: SWP-Wilmington Insect ERA - Status Update
From: Lucas.Ken@epamail.epa.gov
Date: Mon, 30 Jan 2006 14:39:07 -0500
To: Stuart Parker <stuart.parker@ncmail.net>
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <Lucas.Ken@epamail.epa.gov>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.069.1) id 438052650033336F for stuart.parker@ncmail.net; Mon, 30 Jan 2006 14:43:51 -0500
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 43DC50820001B10A for stuart.parker@ncmail.net; Mon, 30 Jan 2006 14:43:52 -0500
Received: from scc098.its.state.nc.us (207.4.219.13) by scc152.its.state.nc.us (7.2.052) id 43DC50820001DD71 for stuart.parker@ncmail.net; Mon, 30 Jan 2006 14:43:52 -0500
Received: from myrtle.rtpnc.epa.gov (myrtle.rtpnc.epa.gov [134.67.208.33]) by scc098.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id k0UJhopo017601 for <stuart.parker@ncmail.net>; Mon, 30 Jan 2006 14:43:50 -0500 (EST)
Received: from epahub11.rtp.epa.gov (epahub11.rtp.epa.gov [134.67.213.52]) by epamail.epa.gov (PMDF V5.2-32 #42055) with ESMTP id <0ITX002HV7X95L@epamail.epa.gov> for stuart.parker@ncmail.net; Mon, 30 Jan 2006 14:39:09 -0500 (EST)
In-reply-to: <43DE525D.2030204@ncmail.net>
Message-ID: <OFFBBF50C9.FE219C9C-ON85257106.006BD5B7-85257106.006BF3D8@epamail.epa.gov>
MIME-Version: 1.0
X-Mailer: Lotus Notes Release 6.0.2CF1 June 9, 2003
Content-type: text/plain; charset=US-ASCII
X-MIMETrack: Serialize by Router on EPAHUB11/USEPA/US(653HF66|November 02, 2004) at 01/30/2006 02:38:13 PM
X-Spam-Status: Yes, hits=-99.876 required=6
X-Spam-Score: -99.876 NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.54 on 207.4.219.13

Stuart:

I submitted the document for review. I have not received comments from the risk assessor yet.
I will let you know as soon has I hear something.

Thanks

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
Sam Nunn - Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303

phone: 404-562-8953
fax : 404-562-8788

Stuart Parker
<stuart.parker@n
cmail.net>
01/30/2006 12:52
PM

To
Ken Lucas/R4/USEPA/US@EPA
cc
Subject

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

December 9, 2005

RECEIVED
DEC 12 2005
SUPERFUND SECTION

Mr. Stuart F. Parker, Jr.
Hydrogeologist
NC DENR
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605

Re: SWP-Wilmington, NC; EPA I.D. #NCD058517467
Insectivorous Bird Risk Assessment Report

Dear Mr. Parker:

Please find enclosed for your review the Supplemental Insectivorous Bird Risk Assessment Report for the SWP-Wilmington facility (EPA I.D. #NCD058517467).

Contact me at 864-599-1070, extension 103 if you have any questions or comments.

Sincerely,

William P. Arrants
General Manager

BOUND SEPARATELY

051209 Insectivorous Bird Risk Assess. Rpt.

amec

RECEIVED
DEC 12 2005
SUPERFUND SECTION

2 December 2005

William P. Arrants
General Manager
Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303

RE: **Supplemental Insectivorous Bird Risk Assessment Report for the Southern Wood Piedmont Site, Wilmington, New Hanover County, North Carolina**

Dear Bill:

We have attached the Supplemental Insectivorous Bird Ecological Risk Assessment for the Ecological Risk Assessment at the former Southern Wood Piedmont facility in Wilmington, North Carolina for your use.

If you have any questions about this document please do not hesitate to contact me in the Portland office.

Sincerely,

John H. Samuelian, Ph.D.
Senior Environmental Scientist/
Project Manager

WB

SUPPLEMENTAL RISK EVALUATION FOR INSECTIVOROUS BIRDS AT THE FORMER SWP FACILITY IN WILMINGTON, NORTH CAROLINA

Submitted to:

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303

Submitted by:

AMEC Earth & Environmental
Portland, Maine 04101

2 December 2005

Subject: Re: Insect Sampling
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Thu, 27 Oct 2005 16:19:30 -0400
To: william.arrants@rayonier.com
CC: Lucas.Ken@epamail.epa.gov, Layton Bedsole <Layton_Bedsole@ncports.com>
X-Mozilla-Status: 1011
X-Mozilla-Status2: 00800000
Message-ID: <43613652.9050905@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
References: <OF8BB26CCA.6BF0F1F8-ON8525706E.007581BA-8525706E.00759527@rayonier.com> <43163EB5.1040600@ncmail.net>
In-Reply-To: <43163EB5.1040600@ncmail.net>
Content-Type: text/plain; charset=ISO-8859-1; format=flowed
Content-Transfer-Encoding: 7bit

Hello Bill:

Have the bioaccumulation/risk study results been presented to SWP ?
I am quite concerned that two more months have passed, since our last update.

Sincerely,
Stuart Parker

> On 08/31/2005, William.Arrants@rayonier.com wrote:
>
> Stuart,
>
> The test results are in and AMEC is working them up in the risk study. We should have something from them in the next few weeks.
>
> Bill
>
> William P. Arrants
> General Manager
>
> Southern Wood Piedmont Company
> 591 Springfield Road
> Spartanburg, South Carolina 29303
> Phone: (864)-599-1070 Ext. 103
> Fax: (864)-599-1087
>
> Stuart Parker <stuart.parker@ncmail.net> To William.Arrants@rayonier.com
> 10:15 AM cc Lucas.Ken@epamail.epa.gov
> Subject Re: Insect Sampling
>
> Stuart Parker wrote:
>
> Hello Bill:
>
> As I am reminded, three months have now passed since the collection of

Subject: Re: Insect Sampling
From: William.Arrants@rayonier.com
Date: Wed, 31 Aug 2005 17:24:18 -0400
To: Stuart Parker <stuart.parker@ncmail.net>
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.052) id 430E9B340003EBCE for stuart.parker@ncmail.net; Wed, 31 Aug 2005 17:25:20 -0400
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 426443CA008E69B7 for stuart.parker@ncmail.net; Wed, 31 Aug 2005 17:25:22 -0400
Received: from scc096.its.state.nc.us (207.192.32.78) by scc152.its.state.nc.us (7.2.052) id 426443C9009319E6 for stuart.parker@ncmail.net; Wed, 31 Aug 2005 17:25:22 -0400
Received: from swpmail.rayonier.com (swpmail.rayonier.com [208.63.80.237]) by scc096.its.state.nc.us (8.13.3/8.13.3/DFR) with ESMTP id j7VLPJ3w025796 for <stuart.parker@ncmail.net>; Wed, 31 Aug 2005 17:25:19 -0400 (EDT)
In-Reply-To: <4315BB65.9020905@ncmail.net>
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OF8BB26CCA.6BF0F1F8-ON8525706E.007581BA-8525706E.00759527@rayonier.com>
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X-Spam-Status: Yes, hits=0.124 required=6
X-Spam-Score: 0.124 NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.52 on 207.192.32.78

Stuart,

The test results are in and AMEC is working them up in the risk study. We should have something from them in the next few weeks.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087

Stuart Parker
<stuart.parker@nc
mail.net>

08/31/2005 10:15
AM

To
William.Arrants@rayonier.com
cc
Lucas.Ken@epamail.epa.gov
Subject
Re: Insect Sampling

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

June 20, 2005

RECEIVED
JUN 23 2005
SUPERFUND SECTION

Mr. Stuart F. Parker, Jr.
Hydrogeologist
NC DENR
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605

Re: Southern Wood Piedmont
Wilmington, North Carolina Site

Dear Mr. Parker:

Attached to this letter is Southern Wood Piedmont Company's response to the Environmental Protection Agency's (EPA) *Ecological Review Comments for the Insectivorous Bird Risk Assessment for Supplemental Remedial Investigation Report at Southern Wood Piedmont Site, Wilmington, New Hanover County, North Carolina*, forwarded to SWP via e-mail on April 21, 2005.

From the outset, please be aware that SWP is very disappointed by EPA's late demands to alter the already agreed upon plan for eco-toxicity testing at the Wilmington site. EPA's sudden change of direction causes SWP significant concern on at least two fronts. First, EPA's request will require substantial additional tasks, and their attendant increased costs. EPA's demands could place SWP in a detrimental legal position if these additional tasks are later deemed unnecessary in order to obtain the information required to make remedial decisions at this site. Second, EPA's requests need to be realistically evaluated in light of recent case law developments regarding contribution from other Potentially Responsible Parties ("PRPs").

SWP is particularly concerned about the scope, timing and cost implications of EPA's comments, specifically, EPA's suggestions that SWP (1) perform a lab-based bioaccumulation study and (2) add bats to the evaluated eco-receptors. SWP is frankly surprised by these late-coming suggestions, given the long history of SWP's cooperation and interaction with you and your colleagues at the North Carolina Department of Environment and Natural Resources (NCDENR) with respect to the design of the proposed ecological risk assessment. SWP and its consultants have been working with the Aquatic Toxicology Unit and the Superfund Section of the NCDENR since 2003 to design a study that fully meets the Department's requirements for an ecological risk assessment. SWP originally proposed to conduct a study of fish-eating birds for the purpose of evaluating the potential for sediment contaminant uptake in representative eco-receptors. In response, NCDENR proposed that the study be designed to evaluate insect-eating birds and that SWP add a bioaccumulation test using a species such as *Lumbriculus variegatus*. NCDENR never suggested that SWP be required to evaluate bats.

After much cooperative discussion with NCDENR, SWP agreed that it was appropriate to evaluate insect-eating birds, and the Department acknowledged that, under the circumstances, the costs and effort necessary to conduct a *Lumbriculus* study was not required, particularly given the anticipated effort to remediate impacted sediments. As reiterated in the attached response, SWP's qualified consultants explained to NCDENR that collecting empirical data using field-collected emergent insects would be more representative of potential exposure to insect-eating birds than the extrapolation of information from a lab-conducted test. Extrapolation from a *Lumbriculus* study will likely overestimate a realistic accumulation by emergent flying insects, and would not have any meaningful role in designing remedial objectives for the Site. In reliance on the agreement reached with NCDENR, SWP spent considerable human and monetary resources to establish the current timetable and plan.

NCDENR's approval of SWP's Exposure Assessment for Insectivorous Birds, using the Eastern Kingbird as the representative receptor, was issued in January 2005. All parties anticipated that insect collection would be conducted in Spring 2005, as Spring is the optimum time for such collection to occur. SWP took all appropriate steps to ensure that the insect collection event would go forward as scheduled. SWP received EPA's comments only approximately 30 days before the insect collection event that was scheduled to commence on May 23, 2005. The insect collection event was performed and completed on May 28, and the insects are currently being evaluated in the lab pursuant to the agreed-upon plan. Given this schedule and the Department's prior approval, SWP believes that NCDENR should ask EPA to reconsider and withdraw its requests for additional work.

Second, as you are fully aware, SWP has already allocated significant resources and incurred significant costs with respect to the Wilmington site, including the on-site drainage ditch, Greenfield Creek and the Cape Fear River. SWP's significant prior efforts have included the collection and analysis of sediment samples and performance of ecotoxicity testing associated with those areas. SWP has conducted these evaluations alone despite the fact that evidence of contribution by other PRPs exists, particularly with respect to the creek. SWP arguably takes these costly actions at significant risk, in light of the current uncertain state of the law in the wake of *Cooper Industries, Inc. v. Aviall Services, Inc.*, 125 S.Ct. 577 (2004). The *Aviall* case essentially precludes the commencement of a CERCLA response cost contribution action unless the plaintiff is or has been the subject of a lawsuit brought pursuant to CERCLA §§ 106 or 107, or has achieved an administrative or judicially-approved settlement with the state or federal government. While SWP believes its former operations are not the most likely source of the conditions being observed at the Site and in the creek (*i.e.*, there may be other PRPs), SWP may be faced with the significant hurdle of overcoming *Aviall*-based defenses if it decides to seek contribution from other PRPs. Under these circumstances, SWP's commitment to go forward with its proposed eco-risk assessment activities should be viewed by the department and EPA as a sign of extreme good faith, and EPA should conduct its review with an eye towards ensuring that SWP is permitted to perform the most cost-effective yet CERCLA-quality investigation possible at the Site.

Because EPA's comments raise significant unexpected cost and schedule concerns, SWP voiced those concerns to NCDENR. In response, SWP was informed that EPA was, if necessary, prepared to perform its proposed studies itself. SWP assumes that if EPA goes ahead with that work that it may attempt to seek reimbursement of any costs it incurs from SWP. As stated above and discussed in detail in the attached response, SWP is concerned that other PRPs may argue that the additional lab-based bioaccumulation study is not useful or warranted, regardless of who performs the work, and, accordingly, that the costs of performing a lab-based bioaccumulation study could be deemed by court to not be "necessary" or recoverable within the meaning of CERCLA and the NCP. Given the difficulties already presented to SWP by *Aviall*, SWP will not be made responsible for funding and/or attempting to collect costs associated with the performance of potentially unnecessary work. SWP has similar concerns with the EPA's suggestion that SWP perform a bat study. For the reasons explained in the attached response, other PRPs may argue that a bat study is not necessary, since insectivorous birds would yield a more conservative risk than the mammalian insectivore.

Given the advanced stage of the eco-toxicity work being performed by SWP's consultants, all of which was previously approved by NCDENR, SWP would like to discuss EPA's comments with NCDENR and EPA as soon as possible. Please advise us when you will be available to meet with our representatives.

Sincerely yours,

William Arrants
General Manager

Attachment

cc: T. K. Arthur, Rayonier, Inc.
D. A. Calland, Babst, Calland, Clements, Zomnir
G. Kuntz, Schnabel Engineering
K. A. Lucas, USEPA
J. H. Samuelian, AMEC

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

June 20, 2005

RECEIVED
JUN 23 2005
SUPERFUND SECTION

Mr. Stuart F. Parker, Jr.
Hydrogeologist
NC DENR
401 Oberlin Road, Suite 150
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Wilmington, North Carolina Site

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Sincerely yours,

William Arrants
General Manager

Attachment

cc: T. K. Arthur, Rayonier, Inc.
D. A. Calland, Babst, Calland, Clements, Zomnir
G. Kuntz, Schnabel Engineering
K. A. Lucas, USEPA
J. H. Samuelian, AMEC

SWP | TELEPHONE CONF w/ BILL ARRANTS, SWP. ON 6/20/05 16:00

ATTY INPUT

+ GREG TEAM INPUT

ATTACHMENT BY AMEC RESP TO EPA ITEMS.

TIMING EPA — THEY ARE UNHAPPY THAT EPA IS INSISTING SO LATE IN THE GAME.

COOPER VS ~~AVIALL~~ AVIALL

IF PARTY (UNDER CERCLA, BY ORDER OR VOLUNTARY) NOT ~~[illegible]~~ DOING WORK TASK UNDER ENFORCEMENT.

~~OTHER PRP~~

(12) IF DOING VOLUNTARY WORK, ~~AND~~ ~~[illegible]~~ CANNOT SUE OTHER PRPS. (ex AMOCO TEAM.

WANT TO PARTICIPATE AS THEY DIDE BUT RETAIN RIGHT. TO PURSUE COSTS AGAINST ~~[illegible]~~

IF SWP SAYS NO LIMITATIONS, WE WANT DO AND IF EPA GOES AHEAD W/ WORK, SWP WANT ~~[illegible]~~ TO RECOVER COST UNLESS EPA OR STATE HAS ORDERED (> MATURA TOC) (FROM ~~AN~~ OTHER PRP)

I ESI Report Structure:

Exhibit 6-1 (pp. 110-113) of the SI Guidance outlines the standard SI Report Narrative Format: The report introduction is followed by Site Description and Regulatory History, then Operational History and Waste Characteristics. The NC Superfund Section (as in the June 1995 SIP report) commonly condenses these into one section. However, the Kerr McGee ESI report does not address source sampling and source analytical results until the Soil Exposure Pathway Section.

Note also that site Regulatory History is a *concise* summary of the scope of previous investigations; analytical results are covered in Waste Characteristics.

The Operational History and Waste Characteristics section is intended to characterize source areas known (or suspected) to exist on site. The section is expected to summarize all source sampling and results obtained to date, including tables and sample location map(s) [The Superfund Section often "breaks out" SI sampling and results into a "Waste/Source Sampling" section]. SI and ESI reports are structured to characterize contaminant sources *prior to* any discussion of migration pathways or receptors. XXX

Subject: Eco review of Southern Wood Piedmont - Work Plan
From: Lucas.Ken@epamail.epa.gov
Date: Thu, 21 Apr 2005 08:52:02 -0400
To: stuart parker <stuart.parker@ncmail.net>
CC: Lucas.Ken@epamail.epa.gov
X-Mozilla-Status: 1001
X-Mozilla-Status2: 00000000
Return-Path: <Lucas.Ken@epamail.epa.gov>
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Received: from scc098.its.state.nc.us (207.4.219.13) by scc152.its.state.nc.us (7.2.052) id 426443C90003BD83 for stuart.parker@ncmail.net; Thu, 21 Apr 2005 08:52:10 -0400
Received: from myrtle.rtpnc.epa.gov (myrtle.rtpnc.epa.gov [134.67.208.33]) by scc098.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j3LCq8fB004824 for <stuart.parker@ncmail.net>; Thu, 21 Apr 2005 08:52:08 -0400 (EDT)
Received: from epahub12.rtp.epa.gov (epahub12.rtp.epa.gov [134.67.213.53]) by epamail.epa.gov (PMDF V5.2-32 #42055) with ESMTP id <0IFA007JKRQRQB@epamail.epa.gov> for stuart.parker@ncmail.net; Thu, 21 Apr 2005 08:52:03 -0400 (EDT)
Message-ID: <OF8EEA8895.FB9F89EC-ON85256FEA.004642F2-85256FEA.0046AE79@epamail.epa.gov>
MIME-Version: 1.0
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Content-transfer-encoding: base64
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X-Spam-Status: Yes, hits=-98.183 required=6
X-Spam-Score: -98.183
MIME_BASE64_BLANKS,MIME_BASE64_NO_NAME,NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.51 on 207.4.219.13

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+103

Stuart:

Below is the Ecological Review of the Work Plan for the SWP site. I am transmitting this via email because of the short time before the work is scheduled to commence. A hard copy will follow later this week.

Ecological review comments for the Insectivorous Bird Risk Assessment for Supplemental Remedial Investigation Report at Southern Wood Piedmont Site, Wilmington, New Hanover County, North Carolina.

1. SWP has recommended field collection of insects using traps incorporating the use of black (ultra-violet) light as an attractant in lieu of completing the insectivorous risk assessment using Lumbriculus. The proposed insect collection areas are adjacent to the drainage ditch and Greenfield Creek. SWP contends that the insects captured at the site would give a better estimation of the concentrations of COCs in the insects that are used as a food source for the insectivorous birds. The central hypothesis for this work plan is that there are unacceptable risks due to contaminant transport through the food chain from sediment to emergent flying insects to insectivorous receptors. According to the proposed field program, the insects will be enumerated at the order level and noted. The proposed field program also states that all of the insects will be placed into one container for each sampling location for subsequent tissue residue analysis. Only the relevant orders of emergent insects should be used for the tissue residue analysis. This

constraint may require that additional sampling (trap nights) to obtain the appropriate amount of tissue for residue analyses. This insect sampling method also has limitations which should be discussed in the ERA:

a. Not all insects are attracted to UV light;

b. All insects attracted to UV light will be captured (not just emergent aquatic insects);

c. The inclusion of terrestrial insects that have little or no exposure to the COCs in sediment would in effect "dilute" the concentrations of COCs in the total captured insect pool;

d. The trap collects all insects attracted to UV light. The trap does not selectively capture only the insects used as food for insectivorous birds further "diluting" the perceived concentrations of COCs in the total insect pool.

2. EPA believes that the field collection of insects is a good idea. However, a bioaccumulation study should also be done. At least two options for bioaccumulation testing exist which are:

a. A modified life cycle test using the midge (Chironomus tentans) could be used to determine bioaccumulation for this site (EPA test method 100.5, U.S. EPA 2000). Normally, this test is started with newly hatched larvae (<24-h old) and continues through emergence, reproduction, and hatching of the F1 generation. The proposed modification would entail not performing the reproduction and hatching steps, only harvesting the emergent adults for residue analysis. This test would use sediment from the site with the body residues from the metamorphosed adult to compute the BSAF for flying insects. This proposed test would address the overestimation of BSAF for the COCs at this site using the Lumbriculus test. No BSAF correction factors would be needed. A large number of test replicates would be needed to ensure enough recoverable biomass for body residue determination in the emergent adult midges. This test requires that the midges be fed during the test. Feeding presents many problems as the food could reduce the bioavailability of the contaminants of interest or it could artificially enhance the uptake of the bioaccumulative chemicals.

b. The standardized Lumbriculus bioaccumulation study previously requested by NCDENR could be used to derive the BSAFs and an adjustment to the derived BSAF for each of the COCs could be made that is agreeable to all parties. Correction factors can be used to develop BSAFs for flying insects using literature resources which have been discussed in the section of the Work Plan: "Effects of Metamorphosis from Larval to Adult Life Stage on Chemical Body Burdens in Insects." Methods have been established to address the minimum biomass needed for residue analyses. No feeding of the test organisms is necessary for this test protocol, thus the problems associated with feeding would not be an issue. Option B is the best method regarding logistics and analytical methodology. EPA recommends that the Lumbriculus bioaccumulation assay be used at this site.

3. The proposed assumptions used for food chain modeling using the Eastern Kingbird appear to be acceptable for use in this risk assessment.

4. Other insectivorous receptors are likely to exist at or near this site which have greater sensitivity to the COCs being investigated than birds. Bats consume more insects per body weight than birds and bats have a much higher metabolism. Generally, mammals are more sensitive than birds to the COCs (e.g., PCBs, Dioxins) at this site. Bats should also be used as a modeled insectivorous receptor at this site. An exposure assessment for bats should be developed similar to the exposure assessment for insectivorous avian receptors in this risk assessment. Bats are year-round residents of this area and hibernate during parts of the year relying on fat stores for energy. The COCs being investigated at this site are lipophilic, being stored in fatty tissues during active feeding and mobilized during hibernation. Although bats hibernate during parts of the year, all food sources used during the year (i.e., active feeding time plus fat reserves used during hibernation) are assumed to be derived from the site. Therefore, no temporal modifying factor would be applied to the bat.

5. The Exposure Assessment for Insectivorous Birds includes a revised toxicity profile for PAHs. The "realistic" toxicity reference value

(TRV) proposed by SWP is based on toxicity studies that used a single dose of a single PAH compound with an acute exposure of only 18 hours with LD50 values adjusted by a factor of 1000 (proposed "realistic" TRV = 0.101 mg/kg). The acute toxicology endpoint only considers non-specific non-polar narcosis which is a relatively weak mode of toxic action. Not addressed are the more potent, chronic toxic modes of action that exist for PAHs: photo-induced toxicity, immune system depression, and PAH-DNA adduct formation (leading to mutations, teratogenicity, and carcinogenicity). Responses to PAHs are quite variable between species, and can be significantly modified by many chemicals, including other PAHs. Caution should be used with the proposed "realistic" scenario, as the LD50 data (>101 mg/kg [No effect level]) was not bounded by a higher concentration which actually caused an adverse effect. The "conservative" scenario used egg-injection studies to evaluate PAH effects on developing embryos through the route of maternal transfer of PAHs to the eggs. Food chain modeling should be done using the TRVs from both the "conservative" and "realistic" scenarios for comparison.

References:

U.S. EPA. 2000. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates, Second Edition. 600/R-99/064
http://www.epa.gov/waterscience/cs/freshmanual.pdf

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
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RECEIVED
JUN 20 2005

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SOUTHERN WOOD PIEDMONT

17 June 2005

William P. Arrants
General Manager
Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303

RE: Response to USEPA Comments EPA's Ecological Review Comments for the Insectivorous Bird Risk Assessment for Supplemental Remedial Investigation Report at Southern Wood Piedmont Site, Wilmington, New Hanover County, North Carolina

Dear Bill:

We have attached our response to USEPA's Ecological Review comments concerning the insectivorous bird exposure pathway planned for the Ecological Risk Assessment at the former Southern Wood Piedmont facility in Wilmington, North Carolina.

If you have any questions about this response please do not hesitate to contact me in the Portland office.

Sincerely,

John H. Samuelian, Ph.D.
Senior Environmental Scientist/
Project Manager

WB

Response to EPA's Ecological Review Comments for the Insectivorous Bird Risk Assessment for Supplemental Remedial Investigation Report at Southern Wood Piedmont Site, Wilmington, New Hanover County, North Carolina.

Comment 1: SWP has recommended field collection of insects using traps incorporating the use of black (ultra-violet) light as an attractant in lieu of completing the insectivorous risk assessment using *Lumbriculus*. The proposed insect collection areas are adjacent to the drainage ditch and Greenfield Creek. SWP contends that the insects captured at the site would give a better estimation of the concentrations of COCs in the insects that are used as a food source for the insectivorous birds. The central hypothesis for this work plan is that there are unacceptable risks due to contaminant transport through the food chain from sediment to emergent flying insects to insectivorous receptors. According to the proposed field program, the insects will be enumerated at the order level and noted. The proposed field program also states that all of the insects will be placed into one container for each sampling location for subsequent tissue residue analysis. Only the relevant orders of emergent insects should be used for the tissue residue analysis. This constraint may require that additional sampling (trap nights) to obtain the appropriate amount of tissue for residue analyses. This insect sampling method also has limitations which should be discussed in the ERA:

a. Not all insects are attracted to UV light;
b. All insects attracted to UV light will be captured (not just emergent aquatic insects);
c. The inclusion of terrestrial insects that have little or no exposure to the COCs in sediment would in effect "dilute" the concentrations of COCs in the total captured insect pool;
d. The trap collects all insects attracted to UV light. The trap does not selectively capture only the insects used as food for insectivorous birds further "diluting" the perceived concentrations of COCs in the total insect pool.

Response: AMEC will include a discussion of the advantages and disadvantages of the UV-light insect collection method as part of the revised ERA. This trap was selected because it is a proven method for field collection on insects, does not require the use of chemical attractants or preserving agents (Schauff, 1997). It also uses equipment that can be easily handled in the field.

The primary objective for this field effort is the collection of flying insects that have spent part of their lives associated with Greenfield Creek or drainage ditch sediments and/or adjoining littoral zones and that serve as prey for insectivorous birds. It is recognized that the UV-light insect collection is "non-specific" and may also collect terrestrial insects. However, that is the reason why the sampling was planned to occur as close to the drainage ditch and creek as possible and also to schedule the sampling as early in the spring as possible when insects associated with more aquatic environments would be predominant and available for collection. Delaying the sampling to later in the summer would increase the chance of "mixed" sample collections that may include more terrestrial insects (e.g., moths).

It should be recognized, however, that the avian insectivore would not prey exclusively on emergent flying insects since terrestrial insect may also be preyed upon by this species. We will be attempting to preferentially bias the sampling towards this group of insects in order to derive a site-specific BSAF, and also a conservative estimate of the potential risks to avian insectivores.

In recognition of EPA's concern with the potential co-collection of terrestrial insect species, any large moths or beetles that are collected during the overnight sampling events planned for later in May will be noted in the log books but discarded for chemical analysis unless there is agreement with NCDENR or EPA representatives that these insects can be included for analysis. Sampling will continue, perhaps with the use of multiple traps at the same locations, to ensure collection of sufficient sample for chemical analysis.

Comment 2: EPA believes that the field collection of insects is a good idea. However, a bioaccumulation study should also be done. At least two options for bioaccumulation testing exist which are:

a. A modified life cycle test using the midge (*Chironomus tentans*) could be used to determine bioaccumulation for this site (EPA test method 100.5, U.S. EPA 2000). Normally, this test is started with newly hatched larvae (<24-h old) and continues through emergence, reproduction, and hatching of the F1 generation. The proposed modification would entail not performing the reproduction and hatching steps, only harvesting the emergent adults for residue analysis. This test would use sediment from the site with the body residues from the metamorphosed adult to compute the BSAF for flying insects. This proposed test would address the overestimation of BSAF for the COCs at this site using the *Lumbriculus* test. No BSAF correction factors would be needed. A large number of test replicates would be needed to ensure enough recoverable biomass for body residue determination in the emergent adult midges. This test requires that the midges be fed during the test. Feeding presents many problems as the food could reduce the bioavailability of the contaminants of interest or it could artificially enhance the uptake of the bioaccumulative chemicals.

b. The standardized *Lumbriculus* bioaccumulation study previously requested by NCDENR could be used to derive the BSAFs and an adjustment to the derived BSAF for each of the COCs could be made that is agreeable to all parties. Correction factors can be used to develop BSAFs for flying insects using literature resources which have been discussed in the section of the Work Plan: "Effects of Metamorphosis from Larval to Adult Life Stage on Chemical Body Burdens in Insects." Methods have been established to address the minimum biomass needed for residue analyses. No feeding of the test organisms is necessary for this test protocol, thus the problems associated with feeding would not be an issue. Option B is the best method regarding logistics and analytical methodology. EPA recommends that the *Lumbriculus* bioaccumulation assay be used at this site.

Response: AMEC concurs that it is appropriate to collect empirical data for the insect life stage that represents the potential dose to the avian receptor. However, AMEC disagrees with the use of the *Lumbriculus* bioaccumulation bioassays to reflect flying insect tissue levels due to uncertainties associated with extrapolation to the flying life stages of insects. Our assessment of the application of this bioassay was transmitted to NCDENR in late September 2004. The key concerns with the application of the *Lumbriculus* bioaccumulation bioassay to estimate an appropriate biota-sediment accumulation factor (BSAF) include the following:

- Comparability of the laboratory test to bioaccumulation results in field-collected oligochaetes;

- Uncertainty in oligochaete biota-sediment accumulation factors (BSAFs) and extrapolation to the potential bioaccumulation by aquatic insects; and

- Effect of metamorphosis from larval to adult life stages on chemical body burdens in aquatic insects.

Our previous assessment also summarized some of the uncertainties associated with the use of chironomid bioassays to estimate adult insect tissue concentration. Although the proposed emergent midge test would reduce the uncertainty associated with the BSAF for an insect's aquatic larval stage, several issues remain that would make this methodology logistically difficult to implement, as summarized below:

- This test method would reflect the potential uptake of only one group of prey items for the insectivorous bird.

- To generate a meaningful and appropriate BSAF, the test would need to be performed on sediment samples collected across a concentration gradient, since the BSAFs (even when normalized to lipid content and sediment organic carbon content) are highly variable.

- An extensive number of replicates would be needed to provide a sufficient mass for chemical analyses for all of the chemical groups of concern that were site-related (Dioxin/furans and PAHs);

- Due to the large number of larval insects required for this analysis it may be difficult to identify an appropriate supplier of the test organisms by a commercial toxicity testing laboratory. Use of test organisms from multiple sources would increase the uncertainty in the uptake estimates.

- Finally, an appropriate and mutually agreeable extrapolation factor to reflect the change in tissue chemical concentrations between the larval and adult life stages would need to be derived.

The collection of the adult flying insects is clearly more effective to implement and would provide a more realistic representation of the prey items and potential chemical exposure for the avian receptors.

Comment No. 3: The proposed assumptions used for food chain modeling using the Eastern Kingbird appear to be acceptable for use in this risk assessment.

Response: AMEC concurs with this comment.

Comment No. 4: Other insectivorous receptors are likely to exist at or near this site which have greater sensitivity to the COCs being investigated than birds. Bats consume more insects per body weight than birds and bats have a much higher metabolism. Generally, mammals are more sensitive than birds to the COCs (e.g., PCBs, Dioxins) at this site. Bats should also be used as a modeled insectivorous receptor at this site. An exposure assessment for bats should be developed similar to the exposure assessment for insectivorous avian receptors in this risk assessment. Bats are year-round residents of this area and hibernate during parts of the year relying on fat stores for energy. The COCs being investigated at this site are lipophilic, being stored in fatty tissues during active feeding and mobilized during hibernation. Although bats hibernate during parts of the year, all food sources used during the year (i.e., active feeding time

plus fat reserves used during hibernation) are assumed to be derived from the site. Therefore, no temporal modifying factor would be applied to the bat.

Response: Aquatic insectivorous birds or bats were originally excluded from the ERA since the focus was to select higher trophic level predators that would likely utilize the area of interest (i.e., Greenfield Creek and drainage ditch) as part of their forage areas. Weighting this need with the likelihood of greater potential accumulation of COPECs in fish as opposed to insect prey, it was concluded that an avian piscivore would be an appropriate receptor to reflect the potential risks to avian species from exposures related to chemical residues in Greenfield Creek and the drainage ditch. These issues are equally relevant to the addition of the insectivorous bat to the revised ERA. Despite the greater potential for accumulation of the COPECs by prey fish, in subsequent discussions with NCDENR it was agreed to further assess the insectivorous bird for the revised ERA.

AMEC agrees that the bats are more sensitive than birds to the dioxins/furans but they are less sensitive to PAHs[1]. Although the current habitats of both Greenfield Creek and the drainage ditch are suitable areas for forage for avian and mammalian insectivores, an avian insectivore is preferable over a mammalian insectivore for the following reasons:

- The avian insectivore has a smaller home range (8.4 hectares; Canadian Wildlife Service, 2002) than a representative bat species such as the little brown bat (10 hectares; Saunders, 1988). This value was based on the density of this bat species in the northeastern US (1 per 10 hectare). This is likely a low estimate, since Sample et al (1997) report that a related bat in the genus *Myotis* may travel as far as 12 km from roost caves to foraging sites. Assuming a circular area centered on the roost cave this equates to a home range of 45,200 hectares. Even with the conservative (lower) home range for the bat the avian insectivore would have a larger area use factor (AUF) relative to the mammalian insectivore.

- In contrast to the statement that bats consume more insects than birds the consumption rate of the avian insectivore is in fact greater than the mammalian insectivore. The ingestion rate for the insectivorous bird is 7.5E-3 Kg(dw)/day, which converts to 2.5E-2 Kg(ww)/day assuming a moisture content of 30% of the invertebrate prey. The ingestion rate for the little brown bat is an order of magnitude lower, and ranges from 2.5E-3 Kg(ww)/day (Baron et al., 1999) to 4.85E-3 Kg(ww)/day (Nagy, 2001). When adjusted for body weight, the ingestion rates are comparable. For the insectivorous bird the ingestion rate is 5.8E-1 Kg(ww)/Kg_{bw}-day while the value for the bat ranges from 3.6E-1 to 6.9E-1 Kg(ww)/Kg_{bw}-day

Therefore an avian insectivore would yield more conservative risks than a mammalian insectivore and would be a more appropriate receptor for the risk characterization portion of the ERA.

Although bats rely on stored fat as a food source during hibernation, a temporal modifying factor is appropriate to use for species that hibernate such as bats. The toxicity tests used to derive the TRVs are normalized to an averaged daily basis even when the dose regimen is typically not performed on a daily basis to the test organism. Therefore, TRVs are the daily equivalents of the dose based on characteristics of the test organism and the dose regimen that is

[1] For the little brown bat, which could be used to represent an insectivorous mammal, the TRVs for dioxin, and PAHs would be 1.07E-7 mg/Kg-day, and 1.41 mg/Kg-day, respectively (Sample et al., 1996).

equivalent to no effect on the evaluated organism. Because the ingested dose calculation has the same units as the TRV (mg/Kg-day), it too reflects the daily equivalent exposure independent of the dose regimen (which can include periods of feeding cessation).

Comment No. 5: The Exposure Assessment for Insectivorous Birds includes a revised toxicity profile for PAHs. The "realistic" toxicity reference value (TRV) proposed by SWP is based on toxicity studies that used a single dose of a single PAH compound with an acute exposure of only 18 hours with LD50 values adjusted by a factor of 1000 (proposed "realistic" TRV = 0.101 mg/kg). The acute toxicology endpoint only considers non-specific non-polar narcosis which is a relatively weak mode of toxic action. Not addressed are the more potent, chronic toxic modes of action that exist for PAHs: photo-induced toxicity, immune system depression, and PAH-DNA adduct formation (leading to mutations, teratogenicity, and carcinogenicity). Responses to PAHs are quite variable between species, and can be significantly modified by many chemicals, including other PAHs. Caution should be used with the proposed "realistic" scenario, as the LD_{50} data (>101 mg/kg [No effect level]) was not bounded by a higher concentration which actually caused an adverse effect. The "conservative" scenario used egg-injection studies to evaluate PAH effects on developing embryos through the route of maternal transfer of PAHs to the eggs. Food chain modeling should be done using the TRVs from both the "conservative" and "realistic" scenarios for comparison.

Response: It was our intent to calculate hazard quotients based on both the realistic and more conservative TRVs to generate bounding estimates to support the risk management decision. An uncertainty assessment of the risk estimates generated from both sets of TRVs was planned for the revised ERA. Furthermore, we will include some additional studies as part of this assessment, such as those from DeWitt et al (2005a, b) to evaluate the suitability and representativeness of egg injection studies to derive a TRV based on maternal exposure.

EPA Comment References

U.S. EPA. 2000. *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates*, Second Edition. 600/R-99/064 [http://www.epa.gov/waterscience/cs/freshmanual.pdf]

AMEC Response References

Baron, LA, BE Sample, and GW Suter II. 1999. Ecological risk assessment in a large river–reservoir: 5. Aerial insectivorous wildlife. *Environmental Toxicology and Chemistry*: 18(4): 621–627.

Canadian Wildlife Service (CWS). 2002. Life History Information: Eastern Kingbird [http://www.on.ec.gc.ca/wildlife/wildspace/life.cfm?ID=EAKI&Page=More&Lang=e]

DeWitt, J.C., E.B. Meyer, and D.S. Henshel. 2005a. Environmental Toxicity Studies Using Chickens as Surrogates for Wildlife: Effects of Vehicle Volume. *Archives of Environmental Contamination and Toxicology*. 48: 260–269.

DeWitt, J.C., E.B. Meyer, and D.S. Henshel. 2005b. Environmental Toxicity Studies Using Chickens as Surrogates for Wildlife: Effects. *Archives of Environmental Contamination and Toxicology*. 48: 270–277

Nagy, K.A. 2001. Food requirements of wild animals: Predictive equations for free-living mammals, reptiles, and birds. *Nutrition Abstracts and Reviews, Series B: Livestock Feeds and Feeding*. 71(10): 1R-12R.

Sample, B.E., D.M. Opresko and G.W. Suter II. 1996. *Toxicological Benchmarks for Wildlife: 1996 Revision.* Oak Ridge National Laboratory. Es/Er/TM-86/R3. June. 43p + app.

Sample, B.E., M.S. Alpin, R.A. Efroymson, G.W. Suter II, and C.J.E. Welsh. 1997. *Methods and Tools for Estimation of the Exposure of Terrestrial Wildlife to Contaminants.* ORNL/TM-13391. October.

Schauff, M.E. 1997. *Collecting and Preserving Insects and Mites: Techniques and Tools.* US Department of Agriculture, Systematic Entomology Laboratory. 68p. [http://www.sel.barc.usda.gov/selhome/collpres/collpres.htm]

06/14/2005 03:14 PM

cc gkuntz@schnabel-eng.com, john.samuelian@amec.com

Subject Re: Insect Sampling

Good Afternoon, Bill:

I realize that it is still early for results from the Insect Bioaccumulation study. However, I was told that a response to EPA's April 21, 2005 comments had already been drafted. I was curious as to whether SWP intends to present/discuss these two items together or separately, and in what estimated time frame.

Thanks,
Sincerely,
Stuart Parker

William.Arrants@rayonier.com wrote:

> Stuart,
>
> We will provide a response to the EPA comments and are working on that at this time. I will contact you after the response has been drafted to discuss a conference that includes the EPA representatives.
>
> Pending outcome of an agreement on issues in the USEPA's comments, we are at this time planning a field collection for the flying insects during the week of May 23.
>
> Bill
>
> William P. Arrants
> General Manager
>
> Southern Wood Piedmont Company
> 591 Springfield Road
> Spartanburg, South Carolina 29303
> Phone: (864)-599-1070 Ext. 103
> Fax: (864)-599-1087

Subject: Re: Insect Sampling
From: William.Arrants@rayonier.com
Date: Thu, 16 Jun 2005 08:29:01 -0400
To: Stuart Parker <stuart.parker@ncmail.net>
CC: gkuntz@schnabel-eng.com, john.samuelian@amec.com
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Received: from scc150.its.state.nc.us (207.192.33.37) by ms01.ncmail.net (7.2.052) id 428757260015DA18 for STUART.PARKER@dwm.denr.ncmail.net; Thu, 16 Jun 2005 08:29:10 -0400
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Received: from scc098.its.state.nc.us (207.4.219.13) by scc150.its.state.nc.us (7.2.052) id 426442AE002A9211 for stuart.parker@ncmail.net; Thu, 16 Jun 2005 08:29:09 -0400
Received: from swpmail.rayonier.com (swpmail.rayonier.com [208.63.80.237]) by scc098.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j5GCT7IQ008297 for <stuart.parker@ncmail.net>; Thu, 16 Jun 2005 08:29:08 -0400 (EDT)
In-Reply-To: <42AF2CB0.4020406@ncmail.net>
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OF852D1ADD.17824361-ON85257022.00446FFE-85257022.00449349@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.3FP1|December 15, 2004) at 06/16/2005 08:29:04 AM
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Content-transfer-encoding: quoted-printable
X-Spam-Status: Yes, hits=0.124 required=6
X-Spam-Score: 0.124 NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.51 on 207.4.219.13

Dean,

The letter is primarily a response to the EPA's comments. It does mention the status of the current assessment, that being we have collected the flying insect samples. We have not received any data from their analysis, however, so we don't have anything to report at this time.

I'll call you to discuss the letter before it is mailed. It should go out this week.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087

Stuart Parker
<stuart.parker@nc
mail.net>

To
William.Arrants@rayonier.com

Subject: RE: SWP Wilmington
From: Amy DiBenedetto <amy.dibenedetto@amec.com>
Date: Fri, 20 May 2005 14:27:50 -0400
To: Stuart Parker <stuart.parker@ncmail.net>, Lucas.Ken@epamail.epa.gov
CC: Wells.Jason@epamail.epa.gov, David Lilley <david.lilley@ncmail.net>, HANNA ASSEFA <HANNA.ASSEFA@ncmail.net>, Ken Cerreto <ken.cerreto@amec.com>, Gregory Kuntz <gkuntz@schnabel-eng.com>, william.arrants@rayonier.com, Layton Bedsole <Layton_Bedsole@ncports.com>, James Bateson <james.bateson@ncmail.net>, John Samuelian <john.samuelian@amec.com>
X-Mozilla-Status: 0011
X-Mozilla-Status2: 00000000
Return-Path: <amy.dibenedetto@amec.com>
Received: from scc151.its.state.nc.us (207.192.33.38) by ms01.ncmail.net (7.2.052) id 4287572600047489; Fri, 20 May 2005 14:27:54 -0400
Received: from scc151.its.state.nc.us (127.0.0.1) by scc151.its.state.nc.us (7.2.052) id 4264428A0017345C; Fri, 20 May 2005 14:27:54 -0400
Received: from scc098.its.state.nc.us (207.4.219.13) by scc151.its.state.nc.us (7.2.052) id 42644288001A3AB6; Fri, 20 May 2005 14:27:54 -0400
Received: from mailer.amec.com (mailer.amec.com [12.178.15.2]) by scc098.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j4KIRqTK020686; Fri, 20 May 2005 14:27:53 -0400 (EDT)
Received: from atl-ex0.am.int.amec.com ([10.41.1.8]) by mailer.amec.com with InterScan Messaging Security Suite; Fri, 20 May 2005 14:27:51 -0400
Received: by ATL-EX0.am.int.amec.com with Internet Mail Service (5.5.2653.19) id <K1QBRJJS>; Fri, 20 May 2005 14:27:51 -0400
Message-ID: <E336AEEDADCA034E94BFF7425CF76E5CFCB315@wfd-ex0.am.int.amec.com>
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2653.19)
Content-Type: multipart/alternative; boundary="----_=_NextPart_001_01C55D69.A0E322EB"
X-Spam-Status: Yes, hits=1.651 required=6
X-Spam-Score: 1.651
HTML_50_60,HTML_MESSAGE,HTML_TEXT_AFTER_BODY,HTML_TEXT_AFTER_HTML,HTML_TITLE_EMPTY
X-Scanned-By: MIMEDefang 2.51 on 207.4.219.13

Hi Stuart,

Thank you for your arrival information. AMEC expects to meet Greg on site at 1:30 on Monday, May 23rd. We are arriving at the airport around noon, and need to stop and pick up some local supplies prior to arriving on site.

My cell phone is 978 - 973 - 7002.

Nelson

Amy DiBenedetto
Risk Assessment
AMEC Earth & Environmental
239 Littleton Rd., Suite 1B
Westford, MA 01886
Phone: 978-692-9090
Fax: 978-692-6633
amy.dibenedetto@amec.com

From: Stuart Parker [mailto:stuart.parker@ncmail.net]
Sent: Friday, May 20, 2005 2:22 PM
To: Lucas.Ken@epamail.epa.gov
Cc: Wells.Jason@epamail.epa.gov; David Lilley; HANNA ASSEFA; Amy DiBenedetto; Ken Cerreto; Gregory Kuntz; william.arrants@rayonier.com; Layton Bedsole; James Bateson
Subject: Re: SWP Wilmington

Sorry: I was out yesterday with a viral fever. I'll be in office through this afternoon.

I plan to arrive the 23rd around noon to meet AMEC personnel, unless they expect to arrive **on site** at a later hour (please advise).

Subject: Re: Wilmington Insect Sampling
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Fri, 13 May 2005 14:44:43 -0400
To: Lucas.Ken@epamail.epa.gov
CC: James Bateson <james.bateson@ncmail.net>, Layton Bedsole <Layton_Bedsole@ncports.com>, HANNA ASSEFA <HANNA.ASSEFA@ncmail.net>
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00800000
Message-ID: <4284F59B.7080306@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
References: <OFE047E166.4F1804B0-ON85257000.00603069-85257000.0060F7CB@rayonier.com>
In-Reply-To: <OFE047E166.4F1804B0-ON85257000.00603069-85257000.0060F7CB@rayonier.com>
Content-Type: text/plain; charset=us-ascii; format=flowed
Content-Transfer-Encoding: 7bit

William.Arrants@rayonier.com wrote:

> Stuart,
>
> Representatives from AMEC Earth & Environmental plan to begin sampling of flying insects at the Wilmington site on Monday, May 23. Two AMEC employees will be on site-Amy DiBenedetto and Ken Cerreto. They will arrive at about noon on the 23rd. The first sampling will begin on Monday night.
>
> It is projected that sampling will take 3 days to complete.
>
> If you have questions about coordinating a meeting with the samplers, feel free to call AMEC's John Samuelian at 207-879-4222, or contact him via e-mail at john.samuelian@amec.com.
>
> As always, please contact me if you have other questions.
>
> Bill
>
> William P. Arrants
> General Manager
>
> Southern Wood Piedmont Company
> 591 Springfield Road
> Spartanburg, South Carolina 29303
> Phone: (864)-599-1070 Ext. 103
> Fax: (864)-599-1087

Subject: Wilmington Insect Sampling
From: William.Arrants@rayonier.com
Date: Fri, 13 May 2005 13:39:09 -0400
To: stuart.parker@ncmail.net
CC: john.samuelian@amec.com, groush@geosyntec.com
X-Mozilla-Status: 0003
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Received: from scc151.its.state.nc.us (207.192.33.38) by ms01.ncmail.net (7.2.052) id 42764F820008628E for STUART.PARKER@dwm.denr.ncmail.net; Fri, 13 May 2005 13:40:12 -0400
Received: from scc151.its.state.nc.us (127.0.0.1) by scc151.its.state.nc.us (7.2.052) id 4264428A00124956 for STUART.PARKER@dwm.denr.ncmail.net; Fri, 13 May 2005 13:40:13 -0400
Received: from scc097.its.state.nc.us (207.4.219.18) by scc151.its.state.nc.us (7.2.052) id 4264428800156AC6 for stuart.parker@ncmail.net; Fri, 13 May 2005 13:40:13 -0400
Received: from swpmail.rayonier.com (swpmail.rayonier.com [208.63.80.237]) by scc097.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j4DHe8W9013934 for <stuart.parker@ncmail.net>; Fri, 13 May 2005 13:40:09 -0400 (EDT)
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OFE047E166.4F1804B0-ON85257000.00603069-85257000.0060F7CB@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.3FP1|December 15, 2004) at 05/13/2005 01:39:25 PM
MIME-Version: 1.0
Content-type: text/plain; charset=ISO-8859-1
Content-transfer-encoding: quoted-printable
X-Spam-Status: Yes, hits=0.124 required=6
X-Spam-Score: 0.124 NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.51 on 207.4.219.18

Stuart,

Representatives from AMEC Earth & Environmental plan to begin sampling of flying insects at the Wilmington site on Monday, May 23. Two AMEC employees will be on site-Amy DiBenedetto and Ken Cerreto. They will arrive at about noon on the 23rd. The first sampling will begin on Monday night.

It is projected that sampling will take 3 days to complete.

If you have questions about coordinating a meeting with the samplers, feel free to call AMEC's John Samuelian at 207-879-4222, or contact him via e-mail at john.samuelian@amec.com.

As always, please contact me if you have other questions.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087

Subject: SWP - Insect sampling reference for Roanoke River
From: Wells.Jason@epamail.epa.gov
Date: Mon, 02 May 2005 14:57:25 -0400
To: stuart.parker@ncmail.net
CC: Lucas.Ken@epamail.epa.gov
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00000000
Return-Path: <Wells.Jason@epamail.epa.gov>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.052) id 42764F8200003CF4 for STUART.PARKER@dwm.denr.ncmail.net; Mon, 2 May 2005 14:59:18 -0400
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 426443CA000FC967 for STUART.PARKER@dwm.denr.ncmail.net; Mon, 2 May 2005 14:59:18 -0400
Received: from scc096.its.state.nc.us (207.192.32.78) by scc152.its.state.nc.us (7.2.052) id 426443C900133189 for stuart.parker@ncmail.net; Mon, 2 May 2005 14:59:18 -0400
Received: from myrtle.rtpnc.epa.gov (myrtle.rtpnc.epa.gov [134.67.208.33]) by scc096.its.state.nc.us (8.13.3/8.13.3/DFR) with ESMTP id j42IxHWO020676 for <stuart.parker@ncmail.net>; Mon, 2 May 2005 14:59:17 -0400 (EDT)
Received: from epahub12.rtp.epa.gov (epahub12.rtp.epa.gov [134.67.213.53]) by epamail.epa.gov (PMDF V5.2-32 #42055) with ESMTP id <0IFV0005ALZP4T@epamail.epa.gov> for stuart.parker@ncmail.net; Mon, 2 May 2005 14:57:25 -0400 (EDT)
Message-ID: <OF0F47242B.FD29EAC8-ON85256FF5.006591A0-85256FF5.00682223@epamail.epa.gov>
MIME-Version: 1.0
X-Mailer: Lotus Notes Release 6.0.2CF1 June 9, 2003
Content-type: text/plain; charset=US-ASCII
X-MIMETrack: Serialize by Router on EPAHUB12/USEPA/US(653HF66|November 02, 2004) at 05/02/2005 02:57:25 PM
X-Spam-Status: Yes, hits=-99.876 required=6
X-Spam-Score: -99.876 NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.51 on 207.192.32.78

Stuart,

On Thursday (4/28) we spoke about the SWP site regarding the insect sampling/analysis and bioaccumulation study with Lumbriculus. I referred to a similar study on the Roanoke River. You requested the citation.

This study is part of a Superfund NPL Caliber cleanup for Weyerhaeuser Company Plymouth Wood Treating Plant (Martin County, NC). The details of how the insect sampling was done can be located in Appendix H of the "Ecological Risk Assessment - Study Design and Sampling Analysis Plan (Revision 1, March 1999)". The insect data for that sampling event can be found in Sections 4.2.3 and 4.2.4 and Tables 4-11 and 4-12 of the "Revised Final Baseline Ecological Risk Assessment Report" for the Welch Creek Area (May 2003). Both of these documents were prepared by RMT, Inc.

I can fax the relevant portions of those documents to you if you wish. Please let me know if you need any other information from the Weyerhaeuser investigation you would like (i.e., Lumbriculus study).

I will be in the office this week, but will be out the week of May 9.

Jason B. Wells, M.S.
Ecological Risk Assessor
ILS, Inc., ESAT Contractor for
USEPA R4/Waste Division/Superfund
Technical Services Section - 11th Fl.

Subject: Insect Sampling
From: William.Arrants@rayonier.com
Date: Fri, 29 Apr 2005 11:35:33 -0400
To: stuart.parker@ncmail.net
CC: gkuntz@schnabel-eng.com, john.samuelian@amec.com
X-Mozilla-Status: 0003
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.052) id 424FE8290012ECAF for STUART.PARKER@dwm.denr.ncmail.net; Fri, 29 Apr 2005 11:36:02 -0400
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 426443CA000D89BC for STUART.PARKER@dwm.denr.ncmail.net; Fri, 29 Apr 2005 11:36:03 -0400
Received: from scc096.its.state.nc.us (207.192.32.78) by scc152.its.state.nc.us (7.2.052) id 426443C9001079F5 for stuart.parker@ncmail.net; Fri, 29 Apr 2005 11:36:03 -0400
Received: from swpmail.rayonier.com (swpmail.rayonier.com [208.63.80.237]) by scc096.its.state.nc.us (8.13.3/8.13.3/DFR) with ESMTP id j3TFZvRE024082 for <stuart.parker@ncmail.net>; Fri, 29 Apr 2005 11:35:57 -0400 (EDT)
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OFEB309401.85FC1007-ON85256FF2.0054B31A-85256FF2.0055B1F8@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.3FP1|December 15, 2004) at 04/29/2005 11:35:35 AM
MIME-Version: 1.0
Content-type: text/plain; charset=ISO-8859-1
Content-transfer-encoding: quoted-printable
X-Spam-Status: Yes, hits=0.124 required=6
X-Spam-Score: 0.124 NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.51 on 207.192.32.78

Stuart,

We will provide a response to the EPA comments and are working on that at this time. I will contact you after the response has been drafted to discuss a conference that includes the EPA representatives.

Pending outcome of an agreement on issues in the USEPA's comments, we are at this time planning a field collection for the flying insects during the week of May 23.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087

Subject: Re: [Fwd: Eco review of Southern Wood Piedmont - Work Plan]
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Thu, 28 Apr 2005 19:31:14 -0400
To: Stuart Parker <stuart.parker@ncmail.net>, William.Arrants@rayonier.com
CC: Lucas.Ken@epamail.epa.gov, James Bateson <james.bateson@ncmail.net>, Layton Bedsole <Layton_Bedsole@ncports.com>
X-Mozilla-Status: 0011
X-Mozilla-Status2: 00000000
Return-Path: <stuart.parker@ncmail.net>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.052) id 424FE829001284BB for STUART.PARKER@dwm.denr.ncmail.net; Thu, 28 Apr 2005 19:31:15 -0400
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 426443CA000CDD80; Thu, 28 Apr 2005 19:31:17 -0400
Received: from ncmail.net (149.168.37.3) by scc152.its.state.nc.us (7.2.052) id 426443C9000FA4C6; Thu, 28 Apr 2005 19:31:17 -0400
Message-ID: <42717242.2090804@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
References: <OF466F3394.0D901117-ON85256FF0.00742E86-85256FF0.0074C37F@rayonier.com> <42700DE8.4050301@ncmail.net>
In-Reply-To: <42700DE8.4050301@ncmail.net>
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Hello Bill,

I spoke at length today with Ken Lucas at EPA Region IV and with Jason Wells at EPA Science and Ecosystem Support Division. SESD is proficient at performing bioaccumulation studies in technical support for State and other agencies evaluating sites in Region IV; they have recently done such studies at another sites in the Wilmington NC area.

1) SESD remains firm in their conviction that, lacking a sediment bioaccumulation study, the insect collection approach alone would likely result in bias away from environmental protectiveness. They maintain that a sediment bioaccumulation study is essential for proper completion of the ecological risk assessment, albeit with the adjustments described in Comment 2b. They cited a similar study, conducted on the Roanoke River, and I am awaiting that reference. The ecological risk results will be crucial in establishing cleanup levels in the surface waterway. As Project Lead, I therefore cannot dismiss the above considerations simply for purpose of expediency.

2) Mr Wells stated that SESD would be able to conduct the sampling and lumbriculus study. Contrary to my initial impression, however, such support work would be subject to cost recovery from SWP. He mentioned, however, that many private-sector laboratories are also available to conduct the sediment testing for SWP (the lumbriculus test interval is a 28 day exposure).

3) With respect for scheduling constraints, and for SWP's wish to minimalize field mobilization costs, there's no technical reason why sediment collection would need to occur on the same day(s) as

insect collection efforts already scheduled.

4) EPA wishes to visit the site with me and observe the insect sampling process. However, I still do not know on what specific date(s) this field work is scheduled to take place, despite brief queries last week (to Schnabel and to AMEC) which produced estimates ranging from May 16 to early June.

I am available for conference on Friday and Monday.

Sincerely,
Stuart Parker
919-508-8469

Subject: Re: [Fwd: Eco review of Southern Wood Piedmont - Work Plan]
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Wed, 27 Apr 2005 18:10:48 -0400
To: William.Arrants@rayonier.com
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00800000
Message-ID: <42700DE8.4050301@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
References: <OF466F3394.0D901117-ON85256FF0.00742E86-85256FF0.0074C37F@rayonier.com>
In-Reply-To: <OF466F3394.0D901117-ON85256FF0.00742E86-85256FF0.0074C37F@rayonier.com>
Content-Type: multipart/alternative; boundary="----------020108010503000009060303"

Bill,

The cost recovery question will be foremost in our discussion with EPA. They emphasized the need for a sediment bioaccumulation study, and EPA already has resources earmarked (but underutilized) for technical assistance, and the political incentive to expend them wherever needed. This specific portion of the study is a prime candidate, especialy given the time constraints, and the fact that they recently rendered similar tech support in the Wilmington area. Therefore, I am cautiously optimistic that cost will not be an issue, but I will confirm up front.

The Superfund Section's cost recovery is due, in part, to the fact that our primary EPA grant is earmarked for in-house completion of Site Assessments, but does not cover oversight of Deferral Sites like SWP.

To clarify: Although NC Superfund is the lead agency, we are still in a partnership with EPA; when EPA is lead agency, they make every effort to address our comments and concerns. They are also, in effect, our brain trust in Risk and Ecological research. Under the Deferral agreements, their requirements and standards remain applicable to Deferral Site investigation/remediation.

I'll contact you when I have more specifics.

Sincerely,
Stuart

William.Arrants@rayonier.com wrote:

> Stuart,
>
> Thanks for the reply.
>
> I am concerned with this proposal, however, for if EPA is going to do the work, I don't want to receive an invoice for their services. SWP has cooperated fully with the State to this point and intends to continue to do so. As a result of previous experience, we know we are more cost effective in performing assessments than the EPA. We have spent significant funds on the assessment to date and will spend millions on the remediation. I want to assure good cost control at every point. Cost control works from a realistic and reasonable assessment standpoint as well as an efficiently operated effort.

I am not sure exactly what is happening at this time as EPA seems to be taking the lead on the risk issue.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087

Stuart Parker
<stuart.parker@nc mail.net>

04/27/2005 05:08 PM

To William.Arrants@rayonier.com

cc

Subject Re: [Fwd: Eco review of Southern Wood Piedmont - Work Plan]

William.Arrants@rayonier.com wrote:

> If possible I would like to discuss the letter with you first more from an administrative standpoint. We could then have EPA on board to discuss technical issues. I don't want to get into the technical issues at this point. As you might imagine, this letter is a major issue in comparison to what we planned to do for the site in a few weeks.
>
> Bill

Hello again Bill,

1) I got a message delivery failure on my last response that cc:d Greg Kuntz.

2) I just got off the phone with Ken Lucas at EPA. I expressed concern about the implications of the comments for the field work.
I emphasized the need to stay on schedule.

However, he pointed out that the additional data gathering, while necessary for the quality of the study, does not have to be added directly to your
workload; EPA already planned to send specialists to observe the upcoming field work, but they also have resources and personnel available to directly assist NC Superfund in field studies requiring

specialized expertise. They have assisted us in data gathering and in ecological and bioaccumulation studies at other sites, and it is quite likely that they could perform the sediment bioaccumulation study and share the results. As I understand it, most of the other issues are on paper.

Ken and I plan to discuss this further AM tomorrow. Will contact you when I know more.

Stuart

Subject: Re: [Fwd: Eco review of Southern Wood Piedmont - Work Plan]
From: William.Arrants@rayonier.com
Date: Wed, 27 Apr 2005 17:15:22 -0400
To: Stuart Parker <stuart.parker@ncmail.net>
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.052) id 424FE82900119660 for STUART.PARKER@dwm.denr.ncmail.net; Wed, 27 Apr 2005 17:15:58 -0400
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 426443CA000B688E for STUART.PARKER@dwm.denr.ncmail.net; Wed, 27 Apr 2005 17:16:00 -0400
Received: from scc096.its.state.nc.us (207.192.32.78) by scc152.its.state.nc.us (7.2.052) id 426443C9000DD553 for stuart.parker@ncmail.net; Wed, 27 Apr 2005 17:16:00 -0400
Received: from swpmail.rayonier.com (swpmail.rayonier.com [208.63.80.237]) by scc096.its.state.nc.us (8.13.3/8.13.3/DFR) with ESMTP id j3RLFv4Y028397 for <stuart.parker@ncmail.net>; Wed, 27 Apr 2005 17:15:58 -0400 (EDT)
In-Reply-To: <426FFF44.8090801@ncmail.net>
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OF466F3394.0D901117-ON85256FF0.00742E86-85256FF0.0074C37F@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.3FP1|December 15, 2004) at 04/27/2005 05:15:33 PM
MIME-Version: 1.0
Content-type: text/plain; charset=ISO-8859-1
Content-transfer-encoding: quoted-printable
X-Spam-Status: Yes, hits=0.124 required=6
X-Spam-Score: 0.124 NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.51 on 207.192.32.78

Stuart,

Thanks for the reply.

I am concerned with this proposal, however, for if EPA is going to do the work, I don't want to receive an invoice for their services. SWP has cooperated fully with the State to this point and intends to continue to do so. As a result of previous experience, we know we are more cost effective in performing assessments than the EPA. We have spent significant funds on the assessment to date and will spend millions on the remediation. I want to assure good cost control at every point. Cost control works from a realistic and reasonable assessment standpoint as well as an efficiently operated effort.

I am not sure exactly what is happening at this time as EPA seems to be taking the lead on the risk issue.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road

Subject: Re: [Fwd: Eco review of Southern Wood Piedmont - Work Plan]
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Wed, 27 Apr 2005 17:08:20 -0400
To: William.Arrants@rayonier.com
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00800000
Message-ID: <426FFF44.8090801@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
References: <OFCAACB261.31558F9A-ON85256FF0.006EB23A-85256FF0.006EF86F@rayonier.com>
In-Reply-To: <OFCAACB261.31558F9A-ON85256FF0.006EB23A-85256FF0.006EF86F@rayonier.com>
Content-Type: text/plain; charset=UTF-8; format=flowed
Content-Transfer-Encoding: 7bit

William.Arrants@rayonier.com wrote:

> If possible I would like to discuss the letter with you first more from an administrative standpoint. We could then have EPA on board to discuss technical issues. I don't want to get into the technical issues at this point. As you might imagine, this letter is a major issue in comparison to what we planned to do for the site in a few weeks.
>
> Bill

Hello again Bill,

1) I got a message delivery failure on my last response that cc:d Greg Kuntz.

2) I just got off the phone with Ken Lucas at EPA. I expressed concern about the implications of the comments for the field work.
I emphasized the need to stay on schedule.

However, he pointed out that the additional data gathering, while necessary for the quality of the study, does not have to be added directly to your workload; EPA already planned to send specialists to observe the upcoming field work, but they also have resources and personnel available to directly assist NC Superfund in field studies requiring specialized expertise. They have assisted us in data gathering and in ecological and bioaccumulation studies at other sites, and it is quite likely that they could perform the sediment bioaccumulation study and share the results. As I understand it, most of the other issues are on paper.

Ken and I plan to discuss this further AM tomorrow. Will contact you when I know more.

Stuart

Subject: Re: SWP Field Investigation
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Wed, 27 Apr 2005 16:22:16 -0400
To: Lucas.Ken@epamail.epa.gov
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00800000
Message-ID: <426FF478.5020504@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
References: <OF68AE1382.D9206ED3-ON85256FCF.0072047D-85256FCF.00727E2D@epamail.epa.gov>
In-Reply-To: <OF68AE1382.D9206ED3-ON85256FCF.0072047D-85256FCF.00727E2D@epamail.epa.gov>
Content-Type: text/plain; charset=ISO-8859-1; format=flowed
Content-Transfer-Encoding: 7bit

Hello Ken,

As expected, SWP is very concerned about the timing and implications of the EPA comments, esp for their work scope and schedule.
Looks like they will do the field work the week of May 16th, but I still don't have final confirmation, even from their eco risk contractor.

Can we arrange a conference call, in short order, to which maybe their risk folks and EPA's can contribute and help us agree on what's essential ? See below.

Thanks,
Stuart
919-508-8469

> Stuart,
>
> This list of comments and recommendations contains many new implications in regard to the planned assessment we had agreed upon with NCDENR.
>
> Greg and I would like to discuss the issue with you. Are you available Thursday morning 4/28 or Friday 4/29? If so, please propose a time and we will give you a call.
>
> Thanks.
>
> Bill
>
> William P. Arrants
> General Manager
>
> Southern Wood Piedmont Company
> 591 Springfield Road
> Spartanburg, South Carolina 29303
> Phone: (864)-599-1070 Ext. 103
> Fax: (864)-599-1087
>
> Stuart Parker
> <stuart.parker@nc
> mail.net>
> To
> william.arrants@rayonier.com
> 04/21/2005 11:31
> AM
> cc
> Layton Bedsole
> <Layton Bedsole@ncports.com>,
> Lucas.Ken@epamail.epa.gov, HANNA
> ASSEFA <HANNA.ASSEFA@ncmail.net>
> Subject
> [Fwd: Eco review of Southern Wood
> Piedmont - Work Plan]

Subject: Re: [Fwd: Eco review of Southern Wood Piedmont - Work Plan]
From: William.Arrants@rayonier.com
Date: Wed, 27 Apr 2005 16:12:05 -0400
To: Stuart Parker <stuart.parker@ncmail.net>
CC: gkuntz@schnabel-eng.com
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Received: from scc151.its.state.nc.us (207.192.33.38) by ms01.ncmail.net (7.2.052) id 424FE829001184D8 for STUART.PARKER@dwm.denr.ncmail.net; Wed, 27 Apr 2005 16:12:33 -0400
Received: from scc151.its.state.nc.us (127.0.0.1) by scc151.its.state.nc.us (7.2.052) id 4264428A000730CA for STUART.PARKER@dwm.denr.ncmail.net; Wed, 27 Apr 2005 16:12:34 -0400
Received: from scc097.its.state.nc.us (207.4.219.18) by scc151.its.state.nc.us (7.2.052) id 4264428800096B97 for stuart.parker@ncmail.net; Wed, 27 Apr 2005 16:12:34 -0400
Received: from swpmail.rayonier.com (swpmail.rayonier.com [208.63.80.237]) by scc097.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j3RKCUhn029209 for <stuart.parker@ncmail.net>; Wed, 27 Apr 2005 16:12:31 -0400 (EDT)
In-Reply-To: <426FF0F7.4040905@ncmail.net>
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OFCAACB261.31558F9A-ON85256FF0.006EB23A-85256FF0.006EF86F@rayonier.com>
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MIME-Version: 1.0
Content-type: text/plain; charset=UTF-8
Content-transfer-encoding: base64
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X-Spam-Score: 1.817 MIME_BASE64_BLANKS,MIME_BASE64_NO_NAME,NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.51 on 207.4.219.18

If possible I would like to discuss the letter with you first more from an administrative standpoint. We could then have EPA on board to discuss technical issues. I don't want to get into the technical issues at this point. As you might imagine, this letter is a major issue in comparison to what we planned to do for the site in a few weeks.

Bill

Stuart Parker <stuart.parker@ncmail.net> 04/27/2005 04:07 PM		To William.Arrants@rayonier.com cc gkuntz@schnabel-eng.com Subject Re: [Fwd: Eco review of Southern Wood Piedmont - Work Plan]

Subject: Re: [Fwd: Eco review of Southern Wood Piedmont - Work Plan]
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Wed, 27 Apr 2005 16:07:19 -0400
To: William.Arrants@rayonier.com
CC: gkuntz@schnabel-eng.com
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00800000
Message-ID: <426FF0F7.4040905@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
References: <OF5CB42D88.66821FBE-ON85256FF0.00622353-85256FF0.00628A69@rayonier.com>
In-Reply-To: <OF5CB42D88.66821FBE-ON85256FF0.00622353-85256FF0.00628A69@rayonier.com>
Content-Type: text/plain; charset=UTF-8; format=flowed
Content-Transfer-Encoding: 8bit

I am willing to discuss but would like to have the EPA - and, specifically their Risk people - on board, to explain why they recommend these additional measures. I am not presuming that all of them will be implemented. Rather, I forwarded them directly to you so that you could get feedback from your contractors prior to discussion. I apologize for the awkward timing.
I will contact Ken Lucas today.

Hopefuly we will reach a consensus that 1) is mutually agreeable and 2) will not impose any additional delays or excessive costs. Emphasis on that.

Stuart

William.Arrants@rayonier.com wrote:

> Stuart,
>
> This list of comments and recommendations contains many new implications in regard to the planned assessment we had agreed upon with NCDENR.
>
> Greg and I would like to discuss the issue with you. Are you available Thursday morning 4/28 or Friday 4/29? If so, please propose a time and we will give you a call.
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> Bill
>
> William P. Arrants
> General Manager
>
> Southern Wood Piedmont Company
> 591 Springfield Road
> Spartanburg, South Carolina 29303
> Phone: (864)-599-1070 Ext. 103
> Fax: (864)-599-1087
>
> Stuart Parker
> <stuart.parker@nc
> mail.net> To
> william.arrants@rayonier.com
> 04/21/2005 11:31 CC
> AM Layton Bedsole
> <Layton Bedsole@ncports.com>,
> Lucas.Ken@epamail.epa.gov, HANNA

Subject: Re: [Fwd: Eco review of Southern Wood Piedmont - Work Plan]
From: William.Arrants@rayonier.com
Date: Wed, 27 Apr 2005 13:56:19 -0400
To: Stuart Parker <stuart.parker@ncmail.net>
CC: gkuntz@schnabel-eng.com
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Received: from scc151.its.state.nc.us (207.192.33.38) by ms01.ncmail.net (7.2.052) id 424FE8290011541A for STUART.PARKER@dwm.denr.ncmail.net; Wed, 27 Apr 2005 13:56:49 -0400
Received: from scc151.its.state.nc.us (127.0.0.1) by scc151.its.state.nc.us (7.2.052) id 4264428A00070059 for STUART.PARKER@dwm.denr.ncmail.net; Wed, 27 Apr 2005 13:56:50 -0400
Received: from scc097.its.state.nc.us (207.4.219.18) by scc151.its.state.nc.us (7.2.052) id 4264428800093AA5 for stuart.parker@ncmail.net; Wed, 27 Apr 2005 13:56:49 -0400
Received: from swpmail.rayonier.com (swpmail.rayonier.com [208.63.80.237]) by scc097.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j3RHuk1L003619 for <stuart.parker@ncmail.net>; Wed, 27 Apr 2005 13:56:46 -0400 (EDT)
In-Reply-To: <4267C746.2070900@ncmail.net>
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OF5CB42D88.66821FBE-ON85256FF0.00622353-85256FF0.00628A69@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.3FP1|December 15, 2004) at 04/27/2005 01:56:23 PM
MIME-Version: 1.0
Content-type: text/plain; charset=UTF-8
Content-transfer-encoding: base64
X-Spam-Status: Yes, hits=1.817 required=6
X-Spam-Score: 1.817 MIME_BASE64_BLANKS,MIME_BASE64_NO_NAME,NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.51 on 207.4.219.18

Stuart,

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Greg and I would like to discuss the issue with you. Are you available Thursday morning 4/28 or Friday 4/29? If so, please propose a time and we will give you a call.

Thanks.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087

Stuart Parker
<stuart.parker@nc
mail.net>

To

Subject: Re: SWP field schedule
From: Lucas.Ken@epamail.epa.gov
Date: Thu, 21 Apr 2005 16:28:28 -0400
To: Stuart Parker <stuart.parker@ncmail.net>
CC: Wells.Jason@epamail.epa.gov
X-Mozilla-Status: 0011
X-Mozilla-Status2: 00000000
Return-Path: <Lucas.Ken@epamail.epa.gov>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.052) id 424FE829000DD4CF for STUART.PARKER@dwm.denr.ncmail.net; Thu, 21 Apr 2005 16:30:15 -0400
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 426443CA00042E7F for STUART.PARKER@dwm.denr.ncmail.net; Thu, 21 Apr 2005 16:30:17 -0400
Received: from scc096.its.state.nc.us (207.192.32.78) by scc152.its.state.nc.us (7.2.052) id 426443C9000500F5 for stuart.parker@ncmail.net; Thu, 21 Apr 2005 16:30:17 -0400
Received: from marconi.rtp.epa.gov (marconi.rtp.epa.gov [134.67.208.99]) by scc096.its.state.nc.us (8.13.3/8.13.3/DFR) with ESMTP id j3LKUFnV003245 for <stuart.parker@ncmail.net>; Thu, 21 Apr 2005 16:30:16 -0400 (EDT)
Received: from epahub12.rtp.epa.gov (epahub12.rtp.epa.gov [134.67.213.53]) by epamail.epa.gov (PMDF V5.2-32 #42056) with ESMTP id <0IFB00AXRCVG80@epamail.epa.gov> for stuart.parker@ncmail.net; Thu, 21 Apr 2005 16:28:28 -0400 (EDT)
In-reply-to: <42680929.1010209@ncmail.net>
Message-ID: <OFBE38FC64.E9977D9A-ON85256FEA.006FA84E-85256FEA.0070783C@epamail.epa.gov>
MIME-Version: 1.0
X-Mailer: Lotus Notes Release 6.0.2CF1 June 9, 2003
Content-type: text/plain; charset=US-ASCII
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X-Spam-Status: Yes, hits=-99.876 required=6
X-Spam-Score: -99.876 NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.51 on 207.192.32.78

Thanks for the update Stuart. I plan to coordinate our site visit to SWP with some work we will be doing in Lil Washington.
Jason Wells is our ecological risk support person. He wants to participate in the initial setup and trapping. He will not need to be there for any follow up.

I hope to meet you an Hanna there.

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
Sam Nunn - Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303

phone: 404-562-8953
fax : 404-562-8788

Stuart Parker
<stuart.parker@n
cmail.net>

04/21/2005 04:12
PM

To
cc
Ken Lucas/R4/USEPA/US@EPA
Subject
Re: SWP field schedule

Subject: Re: SWP field schedule
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Thu, 21 Apr 2005 16:12:25 -0400
CC: Lucas.Ken@epamail.epa.gov
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00800000
Message-ID: <42680929.1010209@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
References: <4267C746.2070900@ncmail.net>
In-Reply-To: <4267C746.2070900@ncmail.net>
Content-Type: text/plain; charset=UTF-8; format=flowed
Content-Transfer-Encoding: 7bit

Contacted John Samuelian at AMEC environmental. He said "some time between May 16th and May 30", but
he will give me a better idea when his field operative reports in tomorrow.

Subject: [Fwd: Eco review of Southern Wood Piedmont - Work Plan]
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Thu, 21 Apr 2005 11:31:18 -0400
To: william.arrants@rayonier.com
CC: Layton Bedsole <Layton_Bedsole@ncports.com>, Lucas.Ken@epamail.epa.gov, HANNA ASSEFA <HANNA.ASSEFA@ncmail.net>
X-Mozilla-Status: 0003
X-Mozilla-Status2: 10800000
Message-ID: <4267C746.2070900@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
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Hello Bill,

EPA Region IV has comments (attached) on the proposed insect collection and bioaccumulation analysis scheduled 4-5 weeks from now.
I forwarded to Hanna Assefa, who concurs with their comments and recommendations.

Please also note that the Division and Superfund Section have a new telephone numbering system:

Division: 919-508-8400
Stuart Parker: 919-508-8469
Hanna Assefa: 919-508-8445

Thanks,

Stuart Parker

SWP Field Investigation.eml	**Content-Type:** message/rfc822 **Content-Encoding:** 7bit

Eco review of Southern Wood Piedmont - Work Plan	**Content-Type:** message/rfc822 **Content-Encoding:** 7bit

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

RECEIVED
APR 27 2005
SUPERFUND SECTION

APR 21 2005

Mr. Sturt F. Parker, Hydrogeologist
North Carolina Department of Environment and Natural Resources
Division of Waste Management
1646 Mail Service Center
Raleigh, NC 27200-1646

Subject: Ecological Review Comments for the Insectivorous Bird Risk Assessment for Supplemental Remedial Investigation Report at Southern Wood Piedmont Site, Wilmington, New Hanover County, North Carolina.

Dear Mr. Parker:

In accordance with the Superfund State Deferral Memorandum of Agreement Between United States Environmental Protection Agency, Region 4, and the State of North Carolina, EPA has reviewed the revision to the *Insectivorous Bird Risk Assessment for Supplemental Remedial Investigation Report at Southern Wood Piedmont Site, Wilmington, New Hanover County, North Carolina* submitted by AMEC Earth and Environmental, Inc. prepared for Southern Wood Piedmont Company (SWP). EPA's comments are enclosed with this letter.

EPA appreciates the opportunity to provide input on the work at the SWP Site. If you have any questions or concerns, please call me at 404-562-8953.

Sincerely,

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial and Site Evaluation Branch

Enclosure

cc: Jason Wells, Technical Services Section

USEPA's Ecological review comments for the Insectivorous Bird Risk Assessment for Supplemental Remedial Investigation Report at Southern Wood Piedmont Site, Wilmington, New Hanover County, North Carolina.

1. SWP has recommended field collection of insects using traps incorporating the use of black (ultra-violet) light as an attractant in lieu of completing the insectivorous risk assessment using *Lumbriculus*. The proposed insect collection areas are adjacent to the drainage ditch and Greenfield Creek. SWP contends that the insects captured at the site would give a better estimation of the concentrations of COCs in the insects that are used as a food source for the insectivorous birds. The central hypothesis for this work plan is that there are unacceptable risks due to contaminant transport through the food chain from sediment to emergent flying insects to insectivorous receptors. According to the proposed field program, the insects will be enumerated at the order level and noted. The proposed field program also states that all of the insects will be placed into one container for each sampling location for subsequent tissue residue analysis. Only the relevant orders of emergent insects should be used for the tissue residue analysis. This constraint may require that additional sampling (trap nights) to obtain the appropriate amount of tissue for residue analyses. This insect sampling method also has limitations which should be discussed in the ERA:

    a. Not all insects are attracted to UV light;

    b. All insects attracted to UV light will be captured (not just emergent aquatic insects);

    c. The inclusion of terrestrial insects that have little or no exposure to the COCs in sediment would in effect "dilute" the concentrations of COCs in the total captured insect pool;

    d. The trap collects all insects attracted to UV light. The trap does not selectively capture only the insects used as food for insectivorous birds further "diluting" the perceived concentrations of COCs in the total insect pool.

2. EPA believes that the field collection of insects is a good idea. However, a bioaccumulation study should also be done. At least two options for bioaccumulation testing exist which are:

    a. A modified life cycle test using the midge *(Chironomus tentans)* could be used to determine bioaccumulation for this site (EPA test method 100.5, U.S. EPA 2000). Normally, this test is started with newly hatched larvae (<24-h old) and continues through emergence, reproduction, and hatching of the F1 generation. The proposed modification would entail not performing the reproduction and hatching

steps, only harvesting the emergent adults for residue analysis. This test would use sediment from the site with the body residues from the metamorphosed adult to compute the BSAF for flying insects. This proposed test would address the overestimation of BSAF for the COCs at this site using the *Lumbriculus* test. No BSAF correction factors would be needed. A large number of test replicates would be needed to ensure enough recoverable biomass for body residue determination in the emergent adult midges. This test requires that the midges be fed during the test. Feeding presents many problems as the food could reduce the bioavailability of the contaminants of interest or it could artificially enhance the uptake of the bioaccumulative chemicals.

b. The standardized *Lumbriculus* bioaccumulation study previously requested by NCDENR could be used to derive the BSAFs and an adjustment to the derived BSAF for each of the COCs could be made that is agreeable to all parties. Correction factors can be used to develop BSAFs for flying insects using literature resources which have been discussed in the section of the Work Plan: "*Effects of Metamorphosis from Larval to Adult Life Stage on Chemical Body Burdens in Insects.*" Methods have been established to address the minimum biomass needed for residue analyses. No feeding of the test organisms is necessary for this test protocol, thus the problems associated with feeding would not be an issue. Option B is the best method regarding logistics and analytical methodology. <u>EPA recommends that the *Lumbriculus* bioaccumulation assay be used at this site.</u>

3. The proposed assumptions used for food chain modeling using the Eastern Kingbird appear to be acceptable for use in this risk assessment.

4. Other insectivorous receptors are likely to exist at or near this site which have greater sensitivity to the COCs being investigated than birds. Bats consume more insects per body weight than birds and bats have a much higher metabolism. Generally, mammals are more sensitive than birds to the COCs (e.g., PCBs, Dioxins) at this site. Bats should also be used as a modeled insectivorous receptor at this site. An exposure assessment for bats should be developed similar to the exposure assessment for insectivorous avian receptors in this risk assessment. Bats are year-round residents of this area and hibernate during parts of the year relying on fat stores for energy. The COCs being investigated at this site are lipophilic, being stored in fatty tissues during active feeding and mobilized during hibernation. Although bats hibernate during parts of the year, all food sources used during the year (i.e., active feeding time plus fat reserves used during hibernation) are assumed to be derived from the site. Therefore, no temporal modifying factor would be applied to the bat.

5. The Exposure Assessment for Insectivorous Birds includes a revised toxicity profile for PAHs. The "realistic" toxicity reference value (TRV) proposed by SWP is based on toxicity studies that used a single dose of a single PAH compound with an acute exposure

of only 18 hours with LD50 values adjusted by a factor of 1000 (proposed "realistic" TRV = 0.101 mg/kg). The acute toxicology endpoint only considers non-specific non-polar narcosis which is a relatively weak mode of toxic action. Not addressed are the more potent, chronic toxic modes of action that exist for PAHs: photo-induced toxicity, immune system depression, and PAH-DNA adduct formation (leading to mutations, teratogenicity, and carcinogenicity). Responses to PAHs are quite variable between species, and can be significantly modified by many chemicals, including other PAHs. Caution should be used with the proposed "realistic" scenario, as the LD50 data (>101 mg/kg [No effect level]) was not bounded by a higher concentration which actually caused an adverse effect. The "conservative" scenario used egg-injection studies to evaluate PAH effects on developing embryos through the route of maternal transfer of PAHs to the eggs. Food chain modeling should be done using the TRVs from both the "conservative" and "realistic" scenarios for comparison.

References:

U.S. EPA. 2000. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates, Second Edition. 600/R-99/064 http://www.epa.gov/waterscience/cs/freshmanual.pdf

Subject: Eco review of Southern Wood Piedmont - Work Plan
From: Lucas.Ken@epamail.epa.gov
Date: Thu, 21 Apr 2005 08:52:02 -0400
To: stuart parker <stuart.parker@ncmail.net>
CC: Lucas.Ken@epamail.epa.gov
X-Mozilla-Status: 1001
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Return-Path: <Lucas.Ken@epamail.epa.gov>
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Message-ID: <OF8EEA8895.FB9F89EC-ON85256FEA.004642F2-85256FEA.0046AE79@epamail.epa.gov>
MIME-Version: 1.0
X-Mailer: Lotus Notes Release 6.0.2CF1 June 9, 2003
Content-type: text/plain; charset=UTF-8
Content-transfer-encoding: base64
X-MIMETrack: Serialize by Router on EPAHUB12/USEPA/US(653HF66|November 02, 2004) at 04/21/2005 08:52:03 AM
X-Spam-Status: Yes, hits=-98.183 required=6
X-Spam-Score: -98.183
MIME_BASE64_BLANKS,MIME_BASE64_NO_NAME,NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.51 on 207.4.219.13

Stuart:

Below is the Ecological Review of the Work Plan for the SWP site. I am transmitting this via email because of the short time before the work is scheduled to commence. A hard copy will follow later this week.

Ecological review comments for the Insectivorous Bird Risk Assessment for Supplemental Remedial Investigation Report at Southern Wood Piedmont Site, Wilmington, New Hanover County, North Carolina.

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IF PERSIST OVERSIGHT AND LUMBRICULUS, THEN ARGUES FOR SEND DOING IT INSTEAD.

light attenuation

constraint may require that additional sampling (trap nights) to obtain the appropriate amount of tissue for residue analyses. This insect sampling method also has limitations which should be discussed in the ERA:

Address uncertainties

a. Not all insects are attracted to UV light;
b. All insects attracted to UV light will be captured (not just emergent aquatic insects);
c. The inclusion of terrestrial insects that have little or no exposure to the COCs in sediment would in effect "dilute" the concentrations of COCs in the total captured insect pool;
d. The trap collects all insects attracted to UV light. The trap does not selectively capture only the insects used as food for insectivorous birds further "diluting" the perceived concentrations of COCs in the total insect pool.

2. EPA believes that the field collection of insects is a good idea. However, a bioaccumulation study should also be done. At least two options for bioaccumulation testing exist which are:

a. A modified life cycle test using the midge (Chironomus tentans) could be used to determine bioaccumulation for this site (EPA test method 100.5, U.S. EPA 2000). Normally, this test is started with newly hatched larvae (<24-h old) and continues through emergence, reproduction, and hatching of the F1 generation. The proposed modification would entail not performing the reproduction and hatching steps, only harvesting the emergent adults for residue analysis. This test would use sediment from the site with the body residues from the metamorphosed adult to compute the BSAF for flying insects. This proposed test would address the overestimation of BSAF for the COCs at this site using the Lumbriculus test. No BSAF correction factors would be needed. A large number of test replicates would be needed to ensure enough recoverable biomass for body residue determination in the emergent adult midges. This test requires that the midges be fed during the test. Feeding presents many problems as the food could reduce the bioavailability of the contaminants of interest or it could artificially enhance the uptake of the bioaccumulative chemicals.

1 sampling benefits PRP

b. The standardized Lumbriculus bioaccumulation study previously requested by NCDENR could be used to derive the BSAFs and an adjustment to the derived BSAF for each of the COCs could be made that is agreeable to all parties. Correction factors can be used to develop BSAFs for flying insects using literature resources which have been discussed in the section of the Work Plan: "Effects of Metamorphosis from Larval to Adult Life Stage on Chemical Body Burdens in Insects." Methods have been established to address the minimum biomass needed for residue analyses. No feeding of the test organisms is necessary for this test protocol, thus the problems associated with feeding would not be an issue. Option B is the best method regarding logistics and analytical methodology. EPA recommends that the Lumbriculus bioaccumulation assay be used at this site.

3. The proposed assumptions used for food chain modeling using the Eastern Kingbird appear to be acceptable for use in this risk assessment.

4. Other insectivorous receptors are likely to exist at or near this site which have greater sensitivity to the COCs being investigated than birds. Bats consume more insects per body weight than birds and bats have a much higher metabolism. Generally, mammals are more sensitive than birds to the COCs (e.g., PCBs, Dioxins) at this site. Bats should also be used as a modeled insectivorous receptor at this site. An exposure assessment for bats should be developed similar to the exposure assessment for insectivorous avian receptors in this risk assessment. Bats are year-round residents of this area and hibernate during parts of the year relying on fat stores for energy. The COCs being investigated at this site are lipophilic, being stored in fatty tissues during active feeding and mobilized during hibernation. Although bats hibernate during parts of the year, all food sources used during the year (i.e., active feeding time plus fat reserves used during hibernation) are assumed to be derived from the site. Therefore, no temporal modifying factor would be applied to the bat.

2 adjpts needed

5. The Exposure Assessment for Insectivorous Birds includes a revised

toxicity profile for PAHs. The "realistic" toxicity reference value (TRV) proposed by SWP is based on toxicity studies that used a single dose of a single PAH compound with an acute exposure of only 18 hours with LD50 values adjusted by a factor of 1000 (proposed "realistic" TRV = 0.101 mg/kg). The acute toxicology endpoint only considers non-specific non-polar narcosis which is a relatively weak mode of toxic action. Not addressed are the more potent, chronic toxic modes of action that exist for PAHs: photo-induced toxicity, immune system depression, and PAH-DNA adduct formation (leading to mutations, teratogenicity, and carcinogenicity). Responses to PAHs are quite variable between species, and can be significantly modified by many chemicals, including other PAHs. Caution should be used with the proposed "realistic" scenario, as the LD50 data (>101 mg/kg [No effect level]) was not bounded by a higher concentration which actually caused an adverse effect. The "conservative" scenario used egg-injection studies to evaluate PAH effects on developing embryos through the route of maternal transfer of PAHs to the eggs. Food chain modeling should be done using the TRVs from both the "conservative" and "realistic" scenarios for comparison.

References:

U.S. EPA. 2000. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates, Second Edition. 600/R-99/064
http://www.epa.gov/waterscience/cs/freshmanual.pdf

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
Sam Nunn - Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303

phone: 404-562-8953
fax : 404-562-8788

Subject: Eco review of Southern Wood Piedmont - Work Plan
From: Lucas.Ken@epamail.epa.gov
Date: Thu, 21 Apr 2005 08:52:02 -0400
To: stuart parker <stuart.parker@ncmail.net>
CC: Lucas.Ken@epamail.epa.gov
X-Mozilla-Status: 1001
X-Mozilla-Status2: 00000000
Return-Path: <Lucas.Ken@epamail.epa.gov>
Received: from scc152.its.state.nc.us (207.192.33.39) by ms01.ncmail.net (7.2.052) id 424FE829000D3E01 for STUART.PARKER@dwm.denr.ncmail.net; Thu, 21 Apr 2005 08:52:09 -0400
Received: from scc152.its.state.nc.us (127.0.0.1) by scc152.its.state.nc.us (7.2.052) id 426443CA00032FE4 for STUART.PARKER@dwm.denr.ncmail.net; Thu, 21 Apr 2005 08:52:10 -0400
Received: from scc098.its.state.nc.us (207.4.219.13) by scc152.its.state.nc.us (7.2.052) id 426443C90003BD83 for stuart.parker@ncmail.net; Thu, 21 Apr 2005 08:52:10 -0400
Received: from myrtle.rtpnc.epa.gov (myrtle.rtpnc.epa.gov [134.67.208.33]) by scc098.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j3LCq8fB004824 for <stuart.parker@ncmail.net>; Thu, 21 Apr 2005 08:52:08 -0400 (EDT)
Received: from epahub12.rtp.epa.gov (epahub12.rtp.epa.gov [134.67.213.53]) by epamail.epa.gov (PMDF V5.2-32 #42055) with ESMTP id <0IFA007JKRQRQB@epamail.epa.gov> for stuart.parker@ncmail.net; Thu, 21 Apr 2005 08:52:03 -0400 (EDT)
Message-ID: <OF8EEA8895.FB9F89EC-ON85256FEA.004642F2-85256FEA.0046AE79@epamail.epa.gov>
MIME-Version: 1.0
X-Mailer: Lotus Notes Release 6.0.2CF1 June 9, 2003
Content-type: text/plain; charset=UTF-8
Content-transfer-encoding: base64
X-MIMETrack: Serialize by Router on EPAHUB12/USEPA/US(653HF66|November 02, 2004) at 04/21/2005 08:52:03 AM
X-Spam-Status: Yes, hits=-98.183 required=6
X-Spam-Score: -98.183
MIME_BASE64_BLANKS,MIME_BASE64_NO_NAME,NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.51 on 207.4.219.13

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http://www.epa.gov/waterscience/cs/freshmanual.pdf

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
Sam Nunn - Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303

phone: 404-562-8953
fax : 404-562-8788

Subject: Re: SWP Field Investigation
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Wed, 30 Mar 2005 17:01:49 -0500
To: Lucas.Ken@epamail.epa.gov
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00800000
Message-ID: <424B21CD.6090800@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
References: <OF68AE1382.D9206ED3-ON85256FCF.0072047D-85256FCF.00727E2D@epamail.epa.gov>
In-Reply-To: <OF68AE1382.D9206ED3-ON85256FCF.0072047D-85256FCF.00727E2D@epamail.epa.gov>
Content-Type: text/plain; charset=ISO-8859-1; format=flowed
Content-Transfer-Encoding: 7bit

Lucas.Ken@epamail.epa.gov wrote:

> Stuart:
>
> Our Eco Risk Section will be providing comment on the work scope for the forthcoming ecological field investigation.
> I expect to be able to transmit the comments to you next week.
> Additionally, my risk assessor and I would like to participate in an overview of the field work. The latest schedule showed the week of May 16, 2005. Has this been confirmed; and are either you or Hanna planning to participate?
>
> Kenneth A. Lucas
> Remedial Project Manager
> Superfund Remedial Site Evaluation Branch
> U. S. Environmental Protection Agency, R4
> Sam Nunn - Atlanta Federal Center
> 61 Forsyth Street
> Atlanta, GA 30303
>
> phone: 404-562-8953
> fax : 404-562-8788

I plan to observe. I'm told that the work will consist of setting out insect traps late one day, and collecting them the next.
I have heard no updates on the event schedule. Last report was either 5/16th week or 5/23rd week.

Stuart

Subject: SWP Field Investigation
From: Lucas.Ken@epamail.epa.gov
Date: Fri, 25 Mar 2005 15:50:34 -0500
To: stuart parker <stuart.parker@ncmail.net>
CC: Lucas.Ken@epamail.epa.gov
X-Mozilla-Status: 0003
X-Mozilla-Status2: 00000000
Return-Path: <Lucas.Ken@epamail.epa.gov>
Received: from scc151.its.state.nc.us (207.192.33.38) by ms01.ncmail.net (7.2.052) id 421C05DA00147273 for STUART.PARKER@dwm.denr.ncmail.net; Fri, 25 Mar 2005 15:50:38 -0500
Received: from scc151.its.state.nc.us (127.0.0.1) by scc151.its.state.nc.us (7.2.052) id 4241C0C000006F0E for STUART.PARKER@dwm.denr.ncmail.net; Fri, 25 Mar 2005 15:50:39 -0500
Received: from scc098.its.state.nc.us (207.4.219.13) by scc151.its.state.nc.us (7.2.052) id 4241C0B900009990 for stuart.parker@ncmail.net; Fri, 25 Mar 2005 15:50:39 -0500
Received: from marconi.rtp.epa.gov (marconi.rtp.epa.gov [134.67.208.99]) by scc098.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j2PKoc6b025130 for <stuart.parker@ncmail.net>; Fri, 25 Mar 2005 15:50:38 -0500 (EST)
Received: from epahub12.rtp.epa.gov (epahub12.rtp.epa.gov [134.67.213.53]) by epamail.epa.gov (PMDF V5.2-32 #42056) with ESMTP id <0IDX00DS0DWAHG@epamail.epa.gov> for stuart.parker@ncmail.net; Fri, 25 Mar 2005 15:50:34 -0500 (EST)
Message-ID: <OF68AE1382.D9206ED3-ON85256FCF.0072047D-85256FCF.00727E2D@epamail.epa.gov>
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X-Mailer: Lotus Notes Release 6.0.2CF1 June 9, 2003
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X-Spam-Status: Yes, hits=-99.876 required=6
X-Spam-Score: -99.876 NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.51 on 207.4.219.13

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Sam Nunn - Atlanta Federal Center
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Atlanta, GA 30303

phone: 404-562-8953
fax : 404-562-8788

March 14, 2005

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Evaluation and Removal Branch

From: Hanna Assefa
Environmental Toxicologist
Inactive Hazardous Sites Branch

RE: Southern Wood Piedmont

I have re-evaluated the issue of area use factor for the subject site including the justification provided in AMECs February 28, 2005 letter. At this time I concur with AMECs proposal to include calculated AUFs based on habitat size in the main body of the risk assessment, and present a discussion of the use of AUFS and calculation of hazard quotients using an area use factor of 1 in the uncertainty section.

Post-it® Fax Note 7671	Date 3/18/05 # of pages ▶ 1
To BILL ARFANTS	From STUART PARKER
Co./Dept. SWP/RAYONIER	Co. NCDENR SUPERFUND
Phone #	Phone # 919 733 2801
Fax # 864 599 1087	Fax #

Post-it® Fax Note 7671	Date # of pages ▶ 1
To KEN LUCAS	From STUART PARKER
Co./Dept. EPA REGION IV	Co.
Phone #	Phone #
Fax # 404 562 8788	Fax #

Post-it® Fax Note 7671	Date # of pages ▶ 1
To LAYTON BENSOLE	From STUART PARKER
Co./Dept. NC DOT	Co.
Phone #	Phone #
Fax # 910 790 2334	Fax #

Subject: Port Participation
From: Layton Bedsole <Layton_Bedsole@ncports.com>
Date: Wed, 9 Mar 2005 12:31:49 -0500
To: stuart.parker@ncmail.net
CC: Bill Bennett <Bill_Bennett@ncports.com>
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00000000
Return-Path: <Layton_Bedsole@ncports.com>
Received: from scc074.its.state.nc.us (207.4.22.38) by ms01.ncmail.net (7.2.052) id 421C05DA0009C788 for STUART.PARKER@dwm.denr.ncmail.net; Wed, 9 Mar 2005 12:39:13 -0500
Received: from scc074.its.state.nc.us (127.0.0.1) by scc074.its.state.nc.us (6.5.029) id 41F3B66E0024E349 for STUART.PARKER@dwm.denr.ncmail.net; Wed, 9 Mar 2005 12:39:12 -0500
Received: from scc097.its.state.nc.us (207.4.219.18) by scc074.its.state.nc.us (6.5.029) id 41F3B66A0025EBB8 for stuart.parker@ncmail.net; Wed, 9 Mar 2005 12:39:11 -0500
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X-Spam-Score: -100 USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.51 on 207.4.219.18

Good Afternoon Stuart,

Again, thanks for the projected schedule! Stuart, when we reach the Remedial Action Plan phase I would like to "for the record" request the Authority be included in all meetings, conf. calls and correspondences. The actions agreed to in this phase will directly impact any future activities the Port may have for this site, not only in operations but also in design, construction and maintenance.

thanks!

Subject: Re: SWP Schedule
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Wed, 09 Mar 2005 12:21:00 -0500
To: Layton Bedsole <Layton_Bedsole@ncports.com>
CC: William.Arrants@rayonier.com, gkuntz@schnabel-eng.com, James Bateson <James.Bateson@ncmail.net>, Lucas.Ken@epamail.epa.gov
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00800000
Message-ID: <422F307C.1030706@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
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In-Reply-To: <OF764560B3.2585F6B3-ON85256FBF.0045686F-85256FBF.0046B07B@ncports.com>
Content-Type: multipart/alternative; boundary="----------050406090904040004010200"

Gentlemen,

Regarding the RI and Remediation schedule (the long view):

1) The AOC specifies that the Division of Waste Management shall notify SWP when the RI is complete. Work remaining consists of completion of the bioaccumulation study (May 2005) and integration of the data into final Risk Assessment. Ms Hanna Assefa is currently reviewing the latest (March 7 2005) submittal by SWP regarding exposure assessment.

2) To facilitate review, the Division requests that the final RI be presented as a comprehensive (rather than supplemental) report, integrating the RI and Supplemental RI contents and incorporating the additional work (e.g., hydrogeologic investigation) that has been done. However, it will not be necessary to physically re-submit pre-existing RI References (1-75), provided 1) they are cited in the final report in the same manner and sequence, and 2) their factual content has not changed. A 30-day deadline is specified for addressing RI deficiencies. However, Division will grant additional time, upon prior written request by SWP, for completion of the report .

3) Submittal of the Remedial Action Plan is due within 90 days of Division's notice of completion of the RI . During this 90-day interval, SWP and Division will meet as needed to review the basis for cleanup standards, risk levels, remedial alternatives, design, end use of site, and institutional controls. Upon notice of deficiency in the RAP, SWP will have another 30 days to make corrections. Within 60 days of Division's Notification of RAP Approval, Southern Wood Piedmont is due to begin implementing the RAP.

Once the Risk Assessment issues are settled, it will be easier to lay out a time schedule. I have not discussed schedule directly with Bill Arrants. However based on the AOC, and work progress and communications to date, I currently estimate the following timeline:

Mid-Late May 2005: SWP collects Bioaccumulation Study field data.
Late June, 2005: SWP receives Bioaccumulation Study results.
Late August 2005: SWP submits Revised Risk Assessment to Division.
October 2005: SWP submits draft final RI Report
Early December 2005: Division approves final RI.

Early March 2006: SWP submits Proposed Remedial Action Plan (additional copies disbursed as per Section VI, L, 11 of the AOC).
April 2006: Division approves RAP.
June 2006: SWP begins Implementation of the RAP.

If you have any questions, please contact me.

Sincerely,
Stuart Parker

Layton Bedsole wrote:

> Good Morning,
>
> Gentlemen, I hate to keep bugging you but I am getting bugged so misery loves company. Would you please provide me a schedule of remaining milestones and potential range of dates that remain for the SWP site.
>
> thanks!

Bill Arrants wrote

> Stuart,
>
> FYI. I will be out of the office after noon today, returning on the 16th.
>
> Bill

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

March 2, 2005

RECEIVED
MAR 7 2005
SUPERFUND SECTION

Mr. Stuart F. Parker, Jr.
Hydrogeologist
NC DENR
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605

Re: AUF Calculation at SWP – Wilmington (NCD058517467)
Hanna Assefa's Memo of 2/23/05

Dear Mr. Parker:

The attached document prepared by AMEC provides additional information regarding the Area Use Factor (AUF) proposed for use in ecological risk calculations for the Eastern Kingbird at the SWP-Wilmington (NCD058517467) site. To address Ms. Assefa's comment in the subject memo, this additional information is provided to explain in greater detail the validity of using an AUF of less than one for the Kingbird's lifetime exposure to stressor areas at the site.

Thank you in advance for your review of the additional information provided herein. I can schedule a teleconference to include the risk experts if you would like to discuss this further. Please contact me at 864-599-1070, extension 103 if you have any questions or comments.

Sincerely,

W. P. Arrants
General Manager

Enclosure

cc: G. Kuntz – Schnabel Engineering
J. H. Samuelian – AMEC

050302 AUF Calculation

Subject: Re: Field work at SWP Wilmington
From: Lucas.Ken@epamail.epa.gov
Date: Mon, 28 Feb 2005 14:23:57 -0500
To: Stuart Parker <stuart.parker@ncmail.net>
CC: Sudweeks.Scott@epamail.epa.gov, Campbell.Richard@epamail.epa.gov
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <Lucas.Ken@epamail.epa.gov>
Received: from scc074.its.state.nc.us (207.4.22.38) by ms01.ncmail.net (7.2.052) id 421C05DA00035BD8 for STUART.PARKER@dwm.denr.ncmail.net; Mon, 28 Feb 2005 14:24:08 -0500
Received: from scc074.its.state.nc.us (127.0.0.1) by scc074.its.state.nc.us (6.5.029) id 41F3B66E001DA971 for STUART.PARKER@dwm.denr.ncmail.net; Mon, 28 Feb 2005 14:24:07 -0500
Received: from scc097.its.state.nc.us (207.4.219.18) by scc074.its.state.nc.us (6.5.029) id 41F3B66A001DEE59 for stuart.parker@ncmail.net; Mon, 28 Feb 2005 14:24:07 -0500
Received: from myrtle.rtpnc.epa.gov (myrtle.rtpnc.epa.gov [134.67.208.33]) by scc097.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j1SJPpFL029569 for <stuart.parker@ncmail.net>; Mon, 28 Feb 2005 14:25:56 -0500 (EST)
Received: from epahub11.rtp.epa.gov (epahub11.rtp.epa.gov [134.67.213.52]) by epamail.epa.gov (PMDF V5.2-32 #42055) with ESMTP id <0ICM001GOZ7X6V@epamail.epa.gov> for stuart.parker@ncmail.net; Mon, 28 Feb 2005 14:23:58 -0500 (EST)
In-reply-to: <421E1139.9030908@ncmail.net>
Message-ID: <OF112FBF83.0C7AD1E9-ON85256FB6.006A7536-85256FB6.006A9081@epamail.epa.gov>
MIME-Version: 1.0
X-Mailer: Lotus Notes Release 6.0.2CF1 June 9, 2003
Content-type: text/plain; charset=US-ASCII
X-MIMETrack: Serialize by Router on EPAHUB11/USEPA/US(653HF66|November 02, 2004) at 02/28/2005 02:23:57 PM
X-Spam-Status: Yes, hits=-99.876 required=6
X-Spam-Score: -99.876 NO_REAL_NAME,USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.44

Stuart:

Looks like we are getting near the end of the RI.
I am going to share this information with our eco risk person.
We may come down to overview some of the work.

Thanks for keeping me posted.

Kenneth A. Lucas
Remedial Project Manager
Superfund Remedial Site Evaluation Branch
U. S. Environmental Protection Agency, R4
Sam Nunn - Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303

phone: 404-562-8953
fax : 404-562-8788

Stuart Parker
<stuart.parker@n
cmail.net>

02/24/2005 12:39
PM

To Ken Lucas/R4/USEPA/US@EPA

cc

Subject
Field work at SWP Wilmington

Ken

I also just mailed copies of some correspondences that you might not have received, and which were rather large for FAXing.

FYI - the following:
Stuart,

As per your request, here is the proposed schedule of sampling, analytical
and reporting activities for the ecological risk study at Wilmington.

With your approval, we will move forward as indicated below.

Bill

William P. Arrants
General Manager
We were planning on beginning the field collections during the weeks of
5/16/05 or 5/23/05,
weather permitting. Insects should be readily available during this period
in the Wilmington area. This period also coincides with when the Eastern
Kingbird returns to the area, based on sightings reported by Audubon
birders. We will have a more accurate estimate of when the field work will
begin as we get closer to May. Field sampling should be completed in a few
days, depending on sampling success. If Stuart or other NCDENR staff would
like to provide oversight please recall that the samplers are set up at
dusk to run overnight. The following day the collected insects are examined and
placed in sample bottles for subsequent chemical analysis.

Subject: Field work at SWP Wilmington
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Thu, 24 Feb 2005 12:39:05 -0500
To: Lucas.Ken@epamail.epa.gov
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00800000
Message-ID: <421E1139.9030908@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
Content-Type: multipart/alternative; boundary="----------090204020003030805030409"

Ken

I also just mailed copies of some correspondences that you might not have received, and which were rather large for FAXing.

FYI - the following:

> Stuart,
>
> As per your request, here is the proposed schedule of sampling, analytical and reporting activities for the ecological risk study at Wilmington.
>
> With your approval, we will move forward as indicated below.
>
> Bill
>
> William P. Arrants
> General Manager

> We were planning on beginning the field collections during the weeks of 5/16/05 or 5/23/05,
> weather permitting. Insects should be readily available during this period in the Wilmington area. This period also coincides with when the Eastern Kingbird returns to the area, based on sightings reported by Audubon birders. We will have a more accurate estimate of when the field work will begin as we get closer to May. Field sampling should be completed in a few days, depending on sampling success. **If Stuart or other NCDENR staff would like to provide oversight please recall that the samplers are set up at dusk to run overnight. The following day the collected insects are examined and placed in sample bottles for subsequent chemical analysis.**

Subject: Fw: SWP Timeline
From: William.Arrants@rayonier.com
Date: Thu, 24 Feb 2005 11:23:12 -0500
To: stuart.parker@ncmail.net
CC: john.samuelian@amec.com, gkuntz@schnabel-eng.com
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Received: from scc076.its.state.nc.us (207.4.22.40) by ms01.ncmail.net (7.2.052) id 421C05DA0001487B for STUART.PARKER@dwm.denr.ncmail.net; Thu, 24 Feb 2005 11:23:24 -0500
Received: from scc076.its.state.nc.us (127.0.0.1) by scc076.its.state.nc.us (6.5.029) id 41F3A03F001A08F4 for STUART.PARKER@dwm.denr.ncmail.net; Thu, 24 Feb 2005 11:23:24 -0500
Received: from scc097.its.state.nc.us (207.4.219.18) by scc076.its.state.nc.us (6.5.029) id 41F3A03C001A269E for stuart.parker@ncmail.net; Thu, 24 Feb 2005 11:23:24 -0500
Received: from swpmail.rayonier.com ([208.63.80.237]) by scc097.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j1OGP9cK017164 for <stuart.parker@ncmail.net>; Thu, 24 Feb 2005 11:25:10 -0500 (EST)
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OFCEC7FBBC.42675F9B-ON85256FB2.0059CE3B-85256FB2.005A03BC@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.1IF1|March 16, 2004) at 02/24/2005 11:23:15 AM
MIME-Version: 1.0
Content-type: text/plain; charset=ISO-8859-1
Content-transfer-encoding: quoted-printable
X-Spam-Status: Yes, hits=0.124 required=6
X-Spam-Score: 0.124 NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.44

Stuart,

As per your request, here is the proposed schedule of sampling, analytical and reporting activities for the ecological risk study at Wilmington.

With your approval, we will move forward as indicated below.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087 ----- Forwarded by William Arrants/RaySW/Rayonier on 02/24/2005 11:20 AM -----

John Samuelian <john.samuelian@amec.com>		To
02/24/2005 11:15 AM	"'William.Arrants@rayonier.com'" <William.Arrants@rayonier.com>	
		cc
	'Greg Kuntz' <gkuntz@schnabel-eng.com>	

Subject

RE: SWP Timeline

Bill -

Here's some feedback on the field schedule for SWP per Stuart's email message below:

We were planning on beginning the field collections during the weeks of 5/16/05 or 5/23/05,
weather permitting. Insects should be readily available during this period in the Wilmington area. This period also coincides with when the Eastern Kingbird returns to the area, based on sightings reported by Audubon birders. We will have a more accurate estimate of when the field work will begin as we get closer to May. Field sampling should be completed in a few days, depending on sampling success. If Stuart or other NCDENR staff would like to provide oversight please recall that the samplers are set up at dusk
to run overnight. The following day the collected insects are examined and placed in sample bottles for subsequent chemical analysis.

Following completion of the field sampling there will be a 3 week turnaround
from the analytical laboratory. A tabulation of the analytical results from
the insect sampling and a figure showing the sampling locations will be provided to NCDENR within a week of receiving the analytical results from the laboratory. We will then provide NCDENR a revised ERA report that incorporates these results, the risk calculations for the Eastern Kingbird, and the other edits presented in our responses to comments and subsequent teleconferences within 60 days of reciept of the analytical results.

Please call with any questions.

John

John Samuelian, Ph.D.
AMEC Earth & Environmental
15 Franklin Street
Portland, ME 04101
207-879-4222
207-879-4223 (fax)
john.samuelian@amec.com

-----Original Message-----
From: William.Arrants@rayonier.com [mailto:William.Arrants@rayonier.com]
Sent: Monday, February 21, 2005 5:20 PM
To: Stuart Parker
Cc: John Samuelian; gkuntz@schnabel-eng.com
Subject: Re: SWP Timeline

Stuart,

No, we have not set a firm timetable. I'll request, by copy of this letter, that AMEC provide to you a timetable for the study.

Bill

February 23, 2005

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Assessment and Remediation Branch

From: Hanna Assefa
Environmental Toxicologist
Inactive Hazardous Sites Branch

RE: Southern Wood Piedmont

I have reviewed the proposal by AMEC to use the AUF of 1 assumption for the insectivorous bird in the uncertainty section. That is not acceptable. The consultant can present a conservative scenario AUF of one, and an alternative scenario of less than one and explain why an AUF of less than one is more likely. I did not see a valid explanation in the December 28th correspondence referenced that justifies a smaller AUF.

Post-it® Fax Note 7671	Date 2/24/05 # of pages ▶ 1
To BILL ARMANTS	From STUART PARKER
Co./Dept. SOUTHERN WOOD	Co. NCDENR Superfund
Phone #	Phone # 919 733 2801
Fax # 864 599 1087	Fax #

Post-it® Fax Note 7671	Date 2/24/05 # of pages ▶ 4
To LAYTON BEDSOLE	From STUART PARKER
Co./Dept. NC PORTS AUTH	Co. NCDENR SUPERFUND
Phone #	Phone # 919 733 2801
Fax # 910 790 2334	Fax #

Post-it® Fax Note 7671	Date 2/24/05 # of pages ▶ 1
To KEN LUKAS	From STUART PARKER
Co./Dept. USEPA REGION IV	Co. NCDENR, SUPERFUND
Phone #	Phone # 919 733 2801
Fax # 404 562 8788	Fax #

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087

Stuart Parker
<stuart.parker@nc
mail.net>

02/21/2005 04:10
PM

To
william.arrants@rayonier.com

cc

Subject
Re: SWP Timeline

Hello Bill:

Received the following request from Layton Bedsole at NC Ports.
I understand that the risk assessment particulars are still
back-and-forth (our latest comment will be later this week). However,
the emergent insect fieldwork is upcoming (depending on weather); have
the contractors established a timetable for the following months ?

Thanks,

Stuart

> Good Afternoon Stuart,
>
> Stuart, recently the Authority has hired several new individuals in Executive level positions. In an effort to bring these individuals up to speed on SWP, would you please provide me a bulleted overview and likely timeline of the remaining regulatory milestones at the SWP site.
>
> This data will supplement my responses to recent in house queries, such as the military staging scenario.
>
> thanks!

The information contained in this e-mail is intended only for the
individual or entity to whom it is addressed.
Its contents (including any attachments) may contain confidential and/or
privileged information.
If you are not an intended recipient you must not use, disclose,
disseminate, copy or print its contents.
If you receive this e-mail in error, please notify the sender by reply
e-mail and delete and destroy the message.

Subject: SWP Timeline
From: Layton Bedsole <Layton_Bedsole@ncports.com>
Date: Mon, 21 Feb 2005 12:39:01 -0500
To: stuart.parker@ncmail.net
CC: Bill Bennett <Bill_Bennett@ncports.com>, William.Arrants@rayonier.com, gkuntz@schnabel-eng.com
X-Mozilla-Status: 0003
X-Mozilla-Status2: 00000000
Return-Path: <Layton_Bedsole@ncports.com>
Received: from scc075.its.state.nc.us (207.4.22.39) by ms01.ncmail.net (7.2.052) id 4218699600009304 for STUART.PARKER@dwm.denr.ncmail.net; Mon, 21 Feb 2005 12:45:36 -0500
Received: from scc075.its.state.nc.us (127.0.0.1) by scc075.its.state.nc.us (6.5.029) id 41F3A8370017746A for STUART.PARKER@dwm.denr.ncmail.net; Mon, 21 Feb 2005 12:45:35 -0500
Received: from scc097.its.state.nc.us (207.4.219.18) by scc075.its.state.nc.us (6.5.029) id 41F3A8330016B970 for stuart.parker@ncmail.net; Mon, 21 Feb 2005 12:45:35 -0500
Received: from ncports.com (ncports.com [152.34.149.100]) by scc097.its.state.nc.us (8.13.3/8.13.3/DFR) with SMTP id j1LHlJBd015558 for <stuart.parker@ncmail.net>; Mon, 21 Feb 2005 12:47:20 -0500 (EST)
Message-ID: <OFC8F4DFA1.C5DA3FB5-ON85256FAF.005FF1D3-85256FAF.00618826@ncports.com>
MIME-Version: 1.0
Content-type: text/plain; charset=US-ASCII
X-Spam-Status: Yes, hits=-100 required=6
X-Spam-Score: -100 USER_IN_WHITELIST
X-Scanned-By: MIMEDefang 2.44

Good Afternoon Stuart,

Stuart, recently the Authority has hired several new individuals in Executive level positions. In an effort to bring these individuals up to speed on SWP, would you please provide me a bulleted overview and likely timeline of the remaining regulatory milestones at the SWP site.

This data will supplement my responses to recent in house queries, such as the military staging scenario.

thanks!

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

28 January 2005

RECEIVED
JAN 31 2005
SUPERFUND SECTION

Mr. Stuart Parker
Inactive Hazardous Sites Branch
Superfund Section
NC Department of Environment and Natural Resources
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Re: Response to January 21, 2005 Comments Concerning
Insectivorous Bird Exposure Assessment
Supplemental Remedial Investigation Report
Southern Wood Piedmont Company
Wilmington, New Hanover County, NC
USEPA ID# NCD 058517467

Dear Mr. Parker:

In regard to your Hanna Assaefa's memo of January 20, 2005 which you faxed to me on January 21, 2005, SWP appreciates the approval by NCDENR for the use of the Eastern Kingbird as an appropriate representative receptor for insectivorous birds.

My consultant AMEC, however, recommends that it would be more appropriate to assume an area use factor (AUF) of 1 as part of the uncertainty section of the ERA rather than in the main risk characterization section. This is principally because the AUF of 1 assumes that the evaluated species would spend its entire life on the evaluated areas and forage for prey from these same areas. Clearly, this is not likely based on the environmental settings of the evaluated areas, as discussed in our correspondence dated 28 December 2004. As noted in the transmittal from NCDENR, and in our December correspondence, the AUF for the main risk characterization will be calculated based on the ratio of the evaluated areas and the home range of this species. SWP will include the assumption of an AUF of 1 in the uncertainty assessment where it can be used as an upper bounding estimate for the exposure to this receptor.

Please contact me at 864-599-1070, extension 103, or Greg Kuntz of Schnabel Engineering if you would like to discuss this further.

Sincerely,

William Arrants
General Manager

cc: Greg Kuntz – Schnabel
John Samuelian – AMEC

050128 Response to 1/21/05 Comments

January 20, 2005

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Assessment and Remediation Branch

From: Hanna Assefa
Environmental Toxicologist
Inactive Hazardous Sites Branch

RE: Southern Wood Piedmont
Exposure Assessment for Insectivorous Birds

I have reviewed the proposed exposure assessment for the insectivorous bird at the Southern Wood Piedmont site. I concur with the choice of the eastern kingbird as representative insectivorous bird however at this stage of the assessment the area use factor must be one. One alternative is to calculate exposure using both an AUF of 1 and a fraction on one based on the ratio of the bird's home range to the smaller areas in question.

WILL ALSO MAIL YOU 2 REPORTS, SEPTEMBER 28, 2004 - DECEMBER 15, 2004.
Stuart

Post-it® Fax Note 7671	Date 1/31/05 # of pages ▶ 6
To KEN LUCAS	From STUART PARKER
Co./Dept. USEPA REGION IV	Co. NCDENR
Phone #	Phone # 919 733 2801
Fax # 404 562 8788	Fax #

Post-it® Fax Note 7671	Date 1/21/05 # of pages ▶ 1
To LAYTON BEDSOLE	From STUART PARKER
Co./Dept. NC PORTS AUTH	Co. NC SUPERFUND
Phone #	Phone # 919 733 2801
Fax # 910 790 2334	Fax #

Post-it® Fax Note 7671	Date 1/21/05 # of pages ▶ 1
To BILL ARRANS	From STUART PARKER
Co./Dept. SOUTHERN WD PIED	Co. NC SUPERFUND
Phone #	Phone # 919 733 2801
Fax # 864 599 1087	Fax #

JOB STATUS REPORT

TIME : 01/31/2005 14:44
NAME : SUPERFUND SECTION
FAX# : 9197334811
TEL# :
SER.# : BRO3J1503210

DATE,TIME	01/31 14:43
FAX NO./NAME	914045628788
DURATION	00:01:37
PAGE(S)	06
RESULT	OK
MODE	STANDARD ECM

January 20, 2005

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Assessment and Remediation Branch

From: Hanna Assefa
Environmental Toxicologist
Inactive Hazardous Sites Branch

RE: Southern Wood Piedmont
Exposure Assessment for Insectivorous Birds

WILL ALSO MAIL YOU 2 REPORTS, SEPTEMBER 28, 2004, DECEMBER 15, 2004.

I have reviewed the proposed exposure assessment for the insectivorous bird at the Southern Wood Piedmont site. I concur with the choice of the eastern kingbird as representative insectivorous bird however at this stage of the assessment the area use factor must be one. One alternative is to calculate exposure using both an AUF of 1 and a fraction on one based on the ratio of the bird's home range to the smaller areas in question.

Post-it® Fax Note 7671	Date 1/31/05 # of pages ▸ 6
To KEN LUCAS	From STUART PARKER
Co./Dept. USEPA REGION IV	Co. NCDENR
Phone #	Phone # 919 733 2801
Fax # [illegible]	Fax #

January 20, 2005

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Assessment and Remediation Branch

From: Hanna Assefa
Environmental Toxicologist
Inactive Hazardous Sites Branch

RE: Southern Wood Piedmont
Exposure Assessment for Insectivorous Birds

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P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

December 28, 2004

RECEIVED
DEC 29 2004
SUPERFUND SECTION

Mr. Stuart F. Parker
Inactive Hazardous Sites Branch
Superfund Section
NC Dept. of Environment and Natural Resources
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Re: Insectivorous Bird Exposure Assessment
Supplemental Remedial Investigation Report
Southern Wood Piedmont Company
Wilmington, New Hanover County, NC
USEPA ID # NCD 058517467

Dear Mr. Parker;

An exposure assessment for an insectivorous bird as a new receptor for the Southern Wood Piedmont-Wilmington, NC (USEPA ID #NCD 058517467) facility is enclosed for your review. The proposal was prepared by AMEC Earth and Environmental, Inc.

Please contact me at 864-599-1070, extension 103 or Greg Kuntz of Schnabel Engineering if you have questions or comments.

Sincerely,

William P. Arrants /lak

William Arrants
General Manager

Attachment

cc: Gregory B. Kuntz - Schnabel
John Samuelian – AMEC
Layton Bedsole – NCSPA

041228 Insectivorous Bird Exposure Assessment

Subject: Reply Re: risk study
From: William.Arrants@rayonier.com
Date: Wed, 10 Nov 2004 11:26:37 -0500
To: stuart.parker@ncmail.net
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Original-Recipient: rfc822;stuart.parker@ncmail.net
Received: from scc076.its.state.nc.us (207.4.22.40) by ms01.ncmail.net (6.5.029) id 4166DA090014EC05 for STUART.PARKER@dwm.denr.ncmail.net; Wed, 10 Nov 2004 11:26:46 -0500
Received: from scc076.its.state.nc.us (127.0.0.1) by scc076.its.state.nc.us (6.5.029) id 41813CB3000998E1 for STUART.PARKER@dwm.denr.ncmail.net; Wed, 10 Nov 2004 11:26:46 -0500
Received: from scc098.its.state.nc.us (207.4.219.13) by scc076.its.state.nc.us (6.5.029) id 41813CB000098603 for stuart.parker@ncmail.net; Wed, 10 Nov 2004 11:26:45 -0500
Received: from swpmail.rayonier.com ([208.63.80.226]) by scc098.its.state.nc.us (8.13.1/8.13.1/DFR) with SMTP id iAAGSLwH001017 for <stuart.parker@ncmail.net>; Wed, 10 Nov 2004 11:28:21 -0500 (EST)
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OF0F6D01B9.3504D236-ON85256F48.0059E490-85256F48.005A5443@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.1IF1|March 16, 2004) at 11/10/2004 11:26:40 AM
MIME-Version: 1.0
Content-type: text/plain; charset=ISO-8859-1
Content-transfer-encoding: quoted-printable
X-Spam-Status: Yes, hits=0.124 required=6
X-Spam-Score: 0.124 NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.44

Stuart,

As a timetable, we will attempt to get a response to you regarding the sampling scope for the avian species/insect collection in early December. This should hopefully allow time for critical assessment and comment, if any, from the Department with any necessary SWP replies before the sample collection season begins.

Based on my brief emails with John Samuelian today, insect collection will have to occur in the next warm season. As to whether that is spring or summer, I'll have to await his comments.

Regards,

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road

Subject: Re: re-send
From: William.Arrants@rayonier.com
Date: Tue, 9 Nov 2004 16:11:38 -0500
To: Stuart Parker <stuart.parker@ncmail.net>
X-Mozilla-Status: 0013
X-Mozilla-Status2: 00000000
Return-Path: <William.Arrants@rayonier.com>
Original-Recipient: rfc822;stuart.parker@ncmail.net
Received: from scc075.its.state.nc.us (207.4.22.39) by ms01.ncmail.net (6.5.029) id 4166DA0900146973 for STUART.PARKER@dwm.denr.ncmail.net; Tue, 9 Nov 2004 16:11:56 -0500
Received: from scc075.its.state.nc.us (127.0.0.1) by scc075.its.state.nc.us (6.5.029) id 4180459000098008 for STUART.PARKER@dwm.denr.ncmail.net; Tue, 9 Nov 2004 16:11:55 -0500
Received: from scc098.its.state.nc.us (207.4.219.13) by scc075.its.state.nc.us (6.5.029) id 4180458D0008F9D4 for stuart.parker@ncmail.net; Tue, 9 Nov 2004 16:11:53 -0500
Received: from swpmail.rayonier.com ([208.63.80.226]) by scc098.its.state.nc.us (8.13.1/8.13.1/DFR) with SMTP id iA9LDStT010794 for <stuart.parker@ncmail.net>; Tue, 9 Nov 2004 16:13:28 -0500 (EST)
In-Reply-To: <41912E30.3060707@ncmail.net>
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OFEC33A5DE.20EEF60B-ON85256F47.0073F6D6-85256F47.00746F62@rayonier.com>
X-MIMETrack: Serialize by Router on SWPMAIL/Servers/Rayonier(Release 6.5.1IF1|March 16, 2004) at 11/09/2004 04:11:41 PM
MIME-Version: 1.0
Content-type: text/plain; charset=US-ASCII
X-Spam-Status: Yes, hits=0.124 required=6
X-Spam-Score: 0.124 NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.44

Thanks Stuart. I received it this time. I'll forward it on to Greg and John Samuelian of Amec for their review.

The comments look favorable to me. I agree with Hanna that sampling for insects is a warm weather event. I'll await Greg and John's comments and will get back with you on selection of the avian species and the timing of the event.

Bill

Stuart Parker <stuart.parker@ncmail.net>		To
11/09/2004 03:53 PM	william.arrants@rayonier.com	cc
		Subject
	re-send	

Subject: Re: Request to change time of Fri. SWP sampling event
From: Layton_Bedsole@ncports.com
Date: Wed, 17 Nov 2004 14:19:20 -0500
To: Brad Atkinson <brad.atkinson@ncmail.net>
CC: Donnie_Long@ncports.com, Karen_Fox@ncports.com, Jerry_Moore@ncports.com

Good Afternoon Brad,

2:00 should be fine. Please plan to stop at the South Gate (Shipyard Blvd.) and check in with Security for access to the site. Please remember to have picture IDs for all and a logoed or State vehicle if possible. I will be in Mhc tomorrow so please send me a summary of the days activities next week.

Brad Atkinson <brad.atkinson@ncmail.net> 11/17/2004 02:15 PM	
To	Layton Bedsole@ncports.com
cc	
Subject	Request to change time of Fri. SWP sampling event

Layton,

Something has come up that is making it difficult for us to be at the
SWP site by 10:00 this Friday. I was wondering if we could change our
sampling time to around 2:00 pm Friday instead of 10:00 am? We may be
able to be there sooner, but should be no later than 2:00.

Sorry for the late request to change.

Thanks,

Brad

Layton_Bedsole@ncports.com wrote:

Good Morning Brad,

The 19th sounds okay to me; I may be in town or I may be in Ral, I
don't know yet.. You will need to go to our South Gate on Shipyard to be
escorted on site by security. Please make sure everyone has a picture ID
and all vehicles are logoed if not State tagged.

Please let security know when you have completed your soil sampling
and left the site. Thanks for the update!

Brad Atkinson

<brad.atkinson@nc

mail.net>

To

Layton Bedsole@ncports.com

10/27/2004 04:49

cc

PM

Subject

SWP sampling event

Layton,

The OSU people are planning to be in NC in late Nov. We currently would like to sample the site on Friday, Nov. 19th and would likely arrive Wilmington between 10 am - noon. Site evaluation and sampling shouldn't take more than an hour or two. I wanted to let you know early. Let me know if this works for you.

Thanks,
Brad
--
Brad Atkinson
NPS Pollution Program Coordinator
NC Division of Waste Management
401 Oberlin Rd. Raleigh, NC 27605
ph. 919-733-0692 x267
fax 919-733-4810
brad.atkinson@ncmail.net

--
Brad Atkinson
NPS Pollution Program Coordinator
NC Division of Waste Management
401 Oberlin Rd. Raleigh, NC 27605
ph. 919-733-0692 x267
fax 919-733-4810
brad.atkinson@ncmail.net

Subject: Re: [Fwd: [Fwd: Fw: SWP - Wilmington Site Bioaccumulation Questions]]
From: Stuart Parker <stuart.parker@ncmail.net>
Date: Tue, 09 Nov 2004 14:13:46 -0500
To: William.Arrants@rayonier.com
X-Mozilla-Status: 0001
X-Mozilla-Status2: 00800000
Message-ID: <419116EA.2050608@ncmail.net>
User-Agent: Mozilla Thunderbird 0.5 (Windows/20040207)
X-Accept-Language: en-us, en
MIME-Version: 1.0
References: <OFD9188289.37F70845-ON85256F23.005E0087-85256F23.005E37FE@rayonier.com> <41618F9C.8000305@ncmail.net>
In-Reply-To: <41618F9C.8000305@ncmail.net>
Content-Type: multipart/alternative; boundary="----------030808000903050408030501"

Hello Bill,

Attached is Hanna Assefa's response to AMEC's proposal to collect emergent aquatic insects (as an alternative to Lumbriculus bioaccumulation testing), based on her discussions with EPA. I will also mail you a hard copy if you wish.

Sincerely,
Stuart F. Parker,
Hydrogeologist
NC Superfund Section

Stuart Parker wrote:

> Thanks. I'll watch for the letter.
>
> William.Arrants@rayonier.com wrote:
>
>> Stuart,
>>
>> I sent a letter to you on September 28th with an attachement from AMEC regarding the risk assessment. We had some questions/comments we would like your opinion on. There is also a schedule included.
>>
>> You should receive it soon. If you would like for me to email a copy of it, I will.
>>
>> Bill

November 8, 2004

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Assessment and Remediation Branch

From: Hanna Assefa
Environmental Toxicologist
Inactive Hazardous Sites Branch

RE: Southern Wood Piedmont
Emergent Insect Sampling Plan

I have reviewed the proposed plan to sample emergent insects on at Greenfield Creek and the drainage ditch. The concerns I have are:

1: It is my understanding the best season to sample emergent insects is spring. Sample mass may not be adequate this time of the year.

2. There has been no proposal for the representative species of insectivorous bird that is going to be evaluated.

If AMEC thinks they can collect enough sample mass they can proceed with the sampling. They however, also need to propose an insectivorous bird for the evaluation.

Post-it® Fax Note 7671	Date	# of pages ▶
To KEN LUCAS	From STUART PARKER	
Co./Dept.	Co.	
Phone #	Phone # 919 508 8469	
Fax # 404 562 8788	Fax #	

P.O. Box 5447
Spartanburg, S.C. 29304
Phone: (864) 599-1070
FAX: (864) 599-1087

Southern Wood Piedmont Company

September 28, 2004

Mr. Stuart F. Parker
Inactive Hazardous Sites Branch
Superfund Section
NC Dept. of Environment and Natural Resources
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

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OCT 01 2004
N.C. DEPT. OF COMMERCE
Community Assistance

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OCT - 5 2004
SUPERFUND SECTION

Re: Additional Response to April 29, 2004 Comments
Insectivorous Bird Risk Assessment
Supplemental Remedial Investigation Report
Southern Wood Piedmont Site
NCD 058 517 467
Wilmington, New Hanover County, NC

Dear Mr. Parker;

Southern Wood Piedmont Company (SWP) is pleased to provide an additional response to the North Carolina Department of Environment and Natural Resources' (NCDENR) April 28, 2004 comments on the Supplemental Remedial Investigation (SRI) Human Health and Ecological Risk Assessment reports for the site located in Wilmington, New Hanover County, North Carolina.

The first response to the NCDENR April 28, 2004 comments occurred on June 7, 2004. Presented in this response to comments was an updated human health risk assessment for a hypothetical construction worker. In addition, SWP indicated that the requested insectivorous bird risk assessment was not warranted.

A conference call between SWP, NCDENR, Region IV EPA, Schnabel, AMEC and NCPORTS concerning the insectivorous bird risk assessment was conducted on July 20, 2004. The outcome of the conference call was that NCDENR determined that the insectivorous bird assessment is required. NCDENR also suggested that, at a minimum a laboratory bioaccumulation test (28 day) be performed using a species like *Lumbriculus variegatus.*

Considering the site, in our evaluation the *Lumbriculus variegatus* bioaccumulation test will not be representative of the true risk to the insectivorous bird that consumes emergent aquatic flying insects. The extrapolations from *Lumbriculus* will likely overestimate a realistic accumulation by the emergent aquatic flying insects. It is, therefore, recommended that in lieu of completing the insectivorous risk assessment using *Lumbriculus* that field collections of insects be

performed and evaluated for the risk assessment. A black light trap is recommended for insect collections at areas adjacent to the drainage ditch and Greenfield Creek.

Attached to this letter is AMEC's evaluation of the *Lumbriculus* bioaccumulation bioassay and recommendations for field collections of insects to support the risk assessment. In addition, this attachment includes an outline for the proposed scope of work to complete the insectivorous risk assessment for review by NCDENR.

Southern Wood Piedmont Company appreciates the opportunity to provide our responses to your comments on the SRI Human Health and Ecological Risk Assessment for the SWP Wilmington, North Carolina facility. If you have any questions, please feel free to contact me at 864-599-1070 ext. 103.

Sincerely,

William Arrants
General Manager

Attachment – Evaluation of *Lumbriculus* Bioaccumulation Bioassay

cc: Gregory B. Kuntz - Schnabel
John Samuelian – AMEC
Layton Bedsole – NCSPA

040928 NC DENR Addtl. Response

amec

27 September 2004

RECEIVED
SEP 28 2004
SOUTHERN WOOD PIEDMONT

William P. Arrants
General Manager
Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303

RE: Assessment of the *Lumbriculus* Bioaccumulation Bioassay and Proposed Alternate Work Plan

Dear Bill:

We have attached our assessment of the use of the *Lumbriculus* bioaccumulation bioassay as a surrogate to derive site-specific accumulation of chemicals by flying insects at the former Southern Wood Piedmont facility in Wilmington, North Carolina.

If you have any questions about this assessment please do not hesitate to contact me in the Portland office.

Sincerely,

John H. Samuelian, Ph.D.
Senior Environmental Scientist/
Project Manager

WB

AMEC Earth & Environmental, Inc.
15 Franklin Street
Portland, ME 04101
Tel (207) 879-4222
Fax (207) 879-4223

amec

SWP – Wilmington Site
Evaluation of the *Lumbriculus* Bioaccumulation Bioassay to Estimate Chemical Uptake by Emergent Insects

The draft BERA (AMEC, 2001) did not include the assessment of an insectivorous bird. Piscivororous birds were selected in lieu of insectivorous birds as a receptor of interest based on the review of the environmental setting and structure of the waterbodies (Greenfield Creek and a drainage ditch) that flow through the site. The rationale for this was based on several components. First, the adjoining areas to Greenfield Creek and the drainage ditch are substantially wooded and represent narrow flyways that preclude easy access to the area by insectivorous birds that may prey on the adult life stage of emergent aquatic insects[1]. For example, the tree swallow, an insectivorous bird, prefers more open areas to seek prey than is offered by Greenfield Creek and the drainage ditch (e.g., USGS, 2003). Second, the piscivorous birds prey on fish species that can accumulate COPECs from the ingestion of benthic invertebrates (including aquatic life stages of insects, such as chironomid larvae). Consequently, they have a greater potential for exposure to higher concentrations of persistent, bioaccumulative COPECs (i.e., a longer food-chain) than insectivorous birds that can prey on the adult life stage of emergent aquatic insects. Therefore, it was concluded that the using the avian piscivorous receptor would result in more conservative risks. However, in further discussion with NCDENR, it was agreed to further assess the insectivorous bird for the revised BERA.

Consistent with the approach taken with the piscivorous bird, it is preferable for the assessment of the insectivorous bird to include the collection of their prey items (i.e., insects) to calculate potential risks. A key issue with this is that many of the insect sampling methods use equipment that is not rugged or has the potential to collect an insufficient mass of insects for chemical analysis. In lieu of collecting site-specific data on insects, NCDENR proposed the use of a modified *Lumbriculus variegatus* laboratory bioaccumulation bioassay to estimate the uptake factors from sediments for insects that may spend part of their life stages in or near the site sediments. The proposed approach included the evaluation of sediments across a concentration gradient of COPECs (low, medium and high concentrations). This discussion evaluates the application of this laboratory bioassay to derive estimates of COPEC concentrations in flying insects and includes a re-assessment of the suitability of different collection methods for insects.

Summary of the Lumbriculus Bioaccumulation Bioassay

The aquatic oligochaete *Lumbriculus* has been used for some time to assess the toxicity and potential bioaccumulation of chemicals in freshwater sediments (Phipps et al., 1993; EPA, 1994; Brunson et al., 1998; ASTM, 2001). This oligochaete burrows through sediments while actively feeding and therefore is exposed to chemicals both via the pore water and also through ingestion of sediments (EPA/USACE, 1998). Briefly, the bioaccumulation bioassay involves exposing the organisms to test sediments for a period of 28 days. Conductivity, hardness, alkalinity, ammonia, pH, and dissolved oxygen are monitored throughout the test period[2]. After the exposure is completed the test organisms are removed by sieving, and allowed to clear their

[1] The exception to this is the area near the juncture of Greenfield Creek and the Cape Fear River.

[2] Additional metrics may also be collected, such as oxidation-reduction potential for metals.

gut contents of any sediment for 24 hours in clean water[3]. Purging is performed to prevent any sediment-bound chemicals in the gut from being measured as a part of the tissue concentrations. The organisms are then analyzed for the chemical(s) of interest. EPA Region IV Science and Ecosystem Support Division (SESD) have recently modified the *Lumbriculus* bioaccumulation bioassay and are assessing its use to estimate site-specific BSAFs. Generally, these modifications were developed to ensure sufficient test organism mass for chemical residue analysis.

There are several issues with using the *Lumbriculus* bioaccumulation bioassay as a surrogate to predict the potential bioaccumulation of flying insects, including the following:

- Comparability of the laboratory test to bioaccumulation results in field-collected oligochaetes;
- Uncertainty in oligochaete biota-sediment accumulation factors (BSAFs)[4] and extrapolation to the potential bioaccumulation by aquatic insects; and
- Effect of metamorphosis from larval to adult life stages on chemical body burdens in aquatic insects.

These are discussed below.

Comparability of the Lumbriculus Laboratory Test to Bioaccumulation Results in Field-Collected Oligochaetes

Several studies have compared the results from laboratory bioaccumulation studies conducted with *Lumbriculus* and chemical concentrations in field collected oligochaetes. Ankley et al. (1992a, 1992b) calculated similar lipid-normalized BSAFs between total PCBs and PCB homologue groups using sediments and co-located oligochaete samples collected from the lower Fox River/Green Bay area. The mean (± SD) BSAF for total PCBs for the laboratory-exposed oligochaetes was 0.84 (± 0.35), while the value from the field collected oligochaetes was 0.87 (± 0.38).

Brunson et al. (1998) and Dwyer et al. (1997) performed a similar comparison using sediments collected from a number of locations in the Upper Mississippi River. For PAHs, the ratio of laboratory to field lipid-normalized concentrations ranged from 0.09 to 5.5, with an average of 1.12[5]. For PCBs, the ratio of laboratory to field lipid-normalized concentrations ranged from 0.14 to 8.5, with an average of 1.99. The authors reported that about 90% of the lipid-normalized PAH and PCB concentrations of laboratory-exposed *Lumbriculus* were within a

---

[3] This approach is appropriate to assess uptake in a laboratory setting but does not reflect the potential exposures by any organisms that may prey on this species.

[4] BSAFs are normally calculated as the lipid-normalized chemical concentration in the organism divided by the organic carbon-normalized chemical concentration in the sediment. If lipid or TOC data are not used, then the term bioaccumulation factor (BAF) is most commonly used for this ratio. The BAF can also be calculated as the ratio of the assimilation and elimination rate constants in a toxicokinetic study. An advantage of the latter approach is that the potential accumulation can be determined under non-steady-state conditions.

[5] The data were provided in the report by Dwyer et al (1997) from which the paper by Brunson et al (1998) was developed.

factor of three of the results from oligochaetes collected from the same sediment locations, which they concluded represented a reasonable agreement. Some of the variability in these results may have been due to varying organic carbon contents of the sediments. The BSAFs, calculated as the ratio of the lipid-normalized PAH concentration in the oligochaete and the TOC-normalized PAH concentration in the sediment, ranged from 0.4 to 10.1 for the laboratory exposed oligochaetes and 0.3 to 26.6 for the field-exposed oligochaetes (Brunson et al., 1998). Based on these results, the authors recommended applying a "generic" BSAF for PAHs of 1.7.

The results suggest that the *Lumbriculus* bioaccumulation bioassay would be a reasonable surrogate to assess uptake in species that reside and burrow their entire lives in sediments, or if the particular life stage is relevant to assessing potential risk to a receptor. It would be appropriate to use this bioassay to estimate potential uptake by aquatic worms that serve as a prey base for certain avian and fish species, but not necessarily for insectivorous birds that prey on flying insects.

Uncertainty in Potential Oligochaete Bioaccumulation and Bioaccumulation by Aquatic Insects

There is also some uncertainty in the predictive reliability of BSAFs generated using this method for use with insects that may reside in sediments for only a portion of their lives. One key issue is the stability of the BSAFs across a concentration gradient. In a toxicokinetic study of PAH uptake by *Lumbriculus*, Landrum et al. (2002) exposed the test organisms to five different fluoranthene concentrations in sediments (59, 95, 108, 252 and 355 mg/Kg). The BAFs, calculated as the ratio of the wet weight PAH in organism divided by dry weight in sediment, ranged from 0.92 to 1.88 for a 10-day exposure and from 0.65 to 0.99 for a 28-day exposure. Thus, the BAFs declined with increasing duration of exposure. Furthermore, the BAFs were not consistent with those generated by using the ratio of the uptake and elimination rate constants, which ranged from 1 to 3.3. The uptake and elimination rate constants decreased with increasing sediment PAH concentrations. Thus, depending upon the exposure duration, BAFs differing by as much as a factor of 2 or 3 may be calculated.

In a laboratory toxicokinetic study of benzo(a)pyrene uptake using chironomid larvae and *Lumbriculus*, the BAF (calculated as the ratio of the dietary uptake and elimination rate constants) ranged from 0.11 to 0.16 for the chironomid larvae and 0.84 to 0.95 for *Lumbriculus* (Shuler et al., 2003). The durations for the exposure and depuration phases for the chironomid larvae were both 72 hours, and for the oligochaete were both 240 hours. This result suggests that using the *Lumbriculus* bioaccumulation study can overestimate the potential uptake by aquatic insect larvae by about a factor of 4, and that *Lumbriculus* would not be an ideal surrogate for aquatic insects.

In a laboratory study, Larsson (1984) exposed chironomid larvae to sediments containing PCBs (range of 0.3 to 70 mg/Kg, dry weight basis) for 10 weeks, collecting larvae (week 10), emerged adults (from week 8 to 10), and their pupal remnants (exuviae) for total PCBs. PCBs were detected in all of the chironomid samples. The BAFs (ratio of wet weight PCB concentration in organism and the dry weight PCB concentration in sediment) for the larvae ranged from 0.83 to 2.05 (mean: 1.27) and for the adults the BAFs ranged from 2.15 to 9.28 (mean: 5.48). The BAFs were generally higher with the lower PCB concentrations.

In a laboratory study using field collected sediments, Wood et al. (1997) exposed chironomid larvae to sediment concentrations of PAHs ranging from 0.2 to 75 mg/Kg (dry weight) and total

PCBs concentrations in sediments ranging from 0.1 to 22 mg/Kg. The BAFs, calculated as the wet weight concentration in biota divided by the dry weight sediment concentration, ranged from 0.037 to 1.0 (mean: 0.29) for total PAHs and from 0.22 to 1.42 (mean: 0.51) for total PCBs. Assuming a lipid content of 1% for chironomid larvae (Larsson, 1984), and the TOC reported by the authors, these values can be converted to BSAFs using the lipid-normalized concentration in the chironomids and the organic carbon content normalized concentration in the sediments. For PAHs, the BSAFs ranged from 0.10 to 2.6 (mean: 0.71) and for PCBs the BSAFs ranged from 0.45 to 3.45 (mean: 1.18). Therefore, despite the typically applied normalizing approaches, there can be significant variation in BAFs or BSAFs even within the same species.

There is also the potential for species-specific variation in uptake of chemicals from sediment by insects based on their life history. Bush et al. (1985) reported different patterns of PCB congeners in different species of caddisfly larvae collected from different locations in the upper Hudson River, which also differed from the PCB congener patterns in the co-located sediments. Furthermore, the congeners were not accumulated in proportion to the concentrations in these co-located sediments. Genus-specific differences in PCB and pesticide uptake have also been reported in caddisflys that reflects difference in their larval habits and feeding preferences (Kovats and Ciborowski, 1993).

Effect of Metamorphosis from Larval to Adult Life Stage on Chemical Body Burdens in Insects

Although the *Lumbriculus* bioaccumulation bioassay would be a reasonable predictor of the potential accumulation of chemicals in aquatic worms, its application to estimate the body burdens to flying insects that may reside for parts of their lives in sediments (e.g., adult chironomids) may not be entirely appropriate since it does not reflect the physiological and dietary changes associated with metamorphosis that may affect chemical body burdens.

Changes in the body burdens during metamorphosis may be species and chemical specific. In a laboratory study, Larsson (1984) exposed chironomid larvae to sediments containing PCBs (range of 0.3 to 70 mg/Kg, dry weight basis) for 10 weeks, collecting larvae (week 10), emerged adults (from week 8 to 10), and their pupal remnants (exuviae) for total PCBs. PCBs were detected in all of the chironomid samples. On a wet weight concentration basis, the exuviae retained an average of 16% (range: 6.9-31%) of the total PCBs. Higher PCB concentrations were observed in the emerged adults when compared to the larval stage on a wet weight basis. The concentration ratios of adult-to-larval chironomid PCB concentrations averaged 4.6 (range: 2.3 to 8.3) on a wet weight basis, and 1.8 (range: 0.9 to 3.2) on a lipid weight basis. The apparent increase in concentration was due to a decrease in the average body weights from the larval stage (27.8 mg) to the adult stage (7.3 mg). When evaluated on a mass basis, there was an average percent loss of the PCB body burdens (calculated as a percent difference) between the larval and adult stages of 37.5%.

In another field study using chironomids, Reinhold et al. (1999) reported that the adult to larvae lipid-normalized concentration ratios of PAHs ranged from 0.2 to 0.6.

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Summary

In summary:

- Comparing the laboratory test bioaccumulation results to bioaccumulation in field-collected oligochaetes shows that while there is some similarity in the uptake estimates, the field results are typically higher than the laboratory results;

- Oligochaete BSAFs and BAFs were typically higher than the aquatic insect BSAFs and BAFs, and extrapolation from *Lumbriculus* to aquatic insects overestimates the accumulation by aquatic insects; and

- There is uncertainty concerning whether the accumulation in larval stages of aquatic insects is comparable, lower, or higher than the accumulation in adult life stages of aquatic insects.

Consequently, there are compounding conservatisms from each of these factors that can result in an overestimate and increased uncertainty in estimating the potential accumulation in adult (flying) life stages of aquatic insects. Therefore, a re-assessment of the suitability of different collection methods for insects was performed.

Evaluation of Insect Collection Methods

Some insect collection methods require an extensive collection period to provide a representative sample. Furthermore, different methods may be used based on the overall project objectives (e.g., McEwen, 1997; Schauff, 1997). The three principal methods used to collect flying insects include (1) hand-held nets, (2) passive intercept traps, such as malaise, window, or sticky traps, and (3) attractant traps, such as those that use a specific insect pheromone, or lights (e.g., mercury vapor, UV lights, etc).

Two of the principal concerns with collecting insects for chemical analyses are the low sample mass that is typically collected by some of the methods, and the lack of ruggedness of the sampling equipment. For example, insects can be collected by using a large sail-like screen back-lit with a light. Although this has a large surface area to attract the insects, the large set-up is not sufficiently rugged to withstand disturbance from wind and can be cumbersome to handle in the field. Recently for another project located in EPA Region IV where PAHs were in stream sediments, AMEC used an updated version of the UV attractant trap (called a Universal Black Light trap[6]) that proved to be very successful in collecting a large number of insects. This portable, battery-operated sampler uses a black light (ultraviolet light) to attract insects into a collection container. The light attracts flying insects to the device, where a small fan draws the insects into a collection jar. This technique enables the collection of large numbers of insects at one time and minimizes the chance of trap predation, vandalism, or theft. Figure 1 shows a deployed insect collector.

Based on the availability of robust and reliable insect collection equipment, and the uncertainty associated with applying the *Lumbriculus* bioaccumulation bioassay for adult (flying) aquatic insects, SWP recommends the collection of insects using the Universal Black Light trap from

[6] These are manufactured by BioQuip Products (Rancho Dominguez, California).

Greenfield Creek and the Drainage Ditch at the former SWP facility to assess potential exposure and risks to insectivorous birds.

Proposed Field Program

It is proposed to collect flying insects from the following locations:

- An upstream (but on property) location in Greenfield Creek that will serve as a background area. This sample will be located near prior sampling station SD-47-COMP that had been used for toxicity testing.
- Three additional samples from Greenfield Creek. These samples will be located near prior sampling locations SD-30, SS-10, and SS-9.
- Two samples from within the drainage ditch. These samples will be located near prior sampling locations SD-24 and SD-28.

Each day, the light traps will be deployed at the sampling locations at least four hours prior to the start of sampling, to ensure that flying insects are not scared away by disturbances just prior to trapping. Just after sunset, the black lights will be turned on and programmed to run until dawn. The following morning, the insects will be collected and stored in glass sample bottles provided by the laboratory, labeled with respect to sampling location, date, and time, and placed in a cooler on ice at 4° C.

After collection of insects from a particular location, the insects will be enumerated at the order level (e.g., Trichoptera) and noted in the field notebook. The insects collected using the light trap will then be placed into one container (provided by the analytical laboratory) for tissue analysis for a given location for subsequent laboratory analysis.

Analytical Program

Insect samples will be collected and analyzed for a subset of COPECs – PAHs, Aroclor PCBs, and PCDD/Fs. The insect samples will also be analyzed for percent lipid. Collection of percent lipid in conjunction with the data on the organic carbon content and chemical concentrations of nearby sediments will allow calculation of site-specific BSAFs using TOC- and lipid-normalized concentrations, which are the standard units for BSAFs (EPA, 1995, 2000).

The results from these insect collections will be used (1) to calculate site-specific BSAFs for comparison to literature values, and (2) to provide relevant exposure information to assess the insectivorous bird exposure pathway for the updated BERA.

References

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Figure 1. Deployed Flying Insect Sampler
(Universal Black Light trap)

Schnabel
Schnabel Engineering South, LLC

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June 7, 2004

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SUPERFUND SECTION

Mr. Stuart F. Parker
Inactive Hazardous Sites Branch
Superfund Section
NC Dept. of Environment and Natural Resources
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Re: Response to April 29, 2004 Comments
Supplemental Remedial Investigation Report
Southern Wood Piedmont Site
NCD 058 517 467
Wilmington, New Hanover County, NC

Dear Mr. Parker;

Schnabel Engineering South, LLC (Schnabel) on behalf of Southern Wood Piedmont Company (SWP) is pleased to respond to the North Carolina Department of Environment and Natural Resources' (NCDENR) April 28, 2004 comments on the Supplemental Remedial Investigation (SRI) Human Health and Ecological Risk Assessment reports for the site located in Wilmington, New Hanover County, North Carolina. Presented below is the comment provided by NCDENR followed by SWP's response to the NCDENR comment.

RESPONSE TO COMMENTS

Comment #8: Hanna Assefa of NCDENR suggested that an updated EPA model for inhalation of particulates be utilized to evaluate the human health risk for a hypothetical construction worker.

Response #8: Please find attached a risk evaluation addendum for a hypothetical construction worker prepared by AMEC Earth and Environmental on April 30, 2004. The USEPA's *2002 Supplemental Guidance for Developing Soil Screening Levels (SSLs) for Superfund Sites* was used to evaluate potential carcinogenic and noncarcinogenic risk to future construction workers at the Wilmington site. The risks from direct ingestion, dermal contact, and inhalation of dust were evaluated.

Comment #10-1: How is it that this area is accessible to piscivorous birds and not to insectivorous birds?

Response #10-1: Insectivorous birds were not selected as a receptor of interest (ROI) for two reasons. First, the ROIs for the Baseline Ecological Risk Assessment (BERA) were selected to represent higher trophic level predators that would likely utilize the area of interest (i.e., Greenfield Creek and drainage ditch) as part of their forage areas. Although some insectivorous birds could forage in and along some portions of the creek (although other areas in the general vicinity may be more attractive foraging areas), AMEC weighted this possibility with the likelihood of greater potential accumulation of COPECs in fish as opposed to aquatic invertebrate prey (insects). Therefore, it was concluded that herons - which can walk into some of these areas (in their present condition) and do not require a flyway like insectivorous birds - would be an appropriate target receptor to reflect the potential risks to avian species from exposures related to chemical residues in Greenfield Creek and the drainage ditch. Herons were also observed during the qualitative ecological community survey performed as part of the screening-level ecological risk assessment (ChemRisk, 1996). Second, as a component of the Department-approved Supplemental Remediation Investigation (SRI), the BERA included a sediment toxicity evaluation that assessed the potential effects of direct contact with sediments. Sediment toxicity testing represents a more conservative analysis of the potential problems associated with constituents in creek and ditch sediment compared to assessing potential indirect effects to a receptor (like an insectivorous bird) that may only forage in the area part of the time. Moreover, because the degree of contamination in a particular creek/ditch sample appears to correlate with severity of toxicity observed, such information also provides useful guidance during consideration of potential remedial options.

Risk management decisions are based on multiple lines-of-evidence. Although the BERA showed no significant risks to the evaluated upper trophic level receptors based on the HQ calculations, the addition of another receptor or exposure pathway will not result in any change in the overall conclusion that remedial measures may be required for some of the sediments in Greenfield Creek and drainage ditch where toxicity was exhibited. Sediment toxicity testing assesses potential impacts to benthic organisms, although they may yield "false positive" results due to the presence of non-target chemicals such as ammonia. Since this lower trophic level community serves indirectly as a prey base for the evaluated higher trophic levels, improvements to the sediment quality in some of the areas would enhance the desirable upper trophic level receptor populations. The improvements to sediment quality would also enhance other receptor populations not specifically addressed in the BERA, such as the insectivorous birds.

Comment #10-2: It is also possible that the trees in the area would someday be removed thus making contamination accessible.

Response #10-3: SWP cannot be held responsible to assess all future-use scenarios for this property and we are not aware of any specific plans for the future use of the Site by the North Carolina Ports Authority other than that it will be used for commercial and industrial purposes. That said, the removal of the trees bounding Greenfield Creek and the drainage ditch has the potential to affect the types of species that may use the area for foraging (although the extensive wetland areas may preclude significant disturbance of these areas). If sediments currently did not exhibit any toxicity then including other receptors (such as the insectivorous birds) would not be unreasonable under this future-use scenario (although such an assessment is more relevant to a FS rather than a BERA, since the latter only assesses current-site conditions). However, since some of the sediments do exhibit toxicity, and it is likely that some remedial measures may be required, removal of trees post-remediation would have no affect on any of the avian receptors related to chemical exposure since contact with the higher risk sediments will likely be reduced.

Comment #10-3: At best I am uncertain that evaluating a piscivorous bird can substitute for evaluating an insectivorous bird. I recommend that, at a minimum a laboratory bioaccumulation test (28 day) be performed using a species like *Lumbriculus variegatus*. The test should be performed on sediments of low, medium, and high relative concentration of contaminants. The results of the bioaccumulation tests can be used in the food chain model as a surrogate for emergent aquatic insects. A letter work-plan outlining the sampling procedure and the laboratory process must be submitted for approval prior to execution.

Response #10-3: Use of the results from the 28-day *Lumbriculus* bioaccumulation test in lieu of collecting empirical data on emergent insects would be a suitable approach to assessing risks to insectivorous birds if this assessment were needed. Whether the risk results calculated from the *Lumbriculus* bioaccumulation study shows an exceedance of the risk threshold or not, there would be no change in the risk management decision for the sediments of Greenfield Creek and the drainage ditch. Therefore the development of a work plan addressing this specific issue is not warranted.

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Schnabel Engineering South, LLC appreciates the opportunity to provide responses to your comments on the SRI Human Health and Ecological Risk Assessment for the SWP Wilmington, North Carolina facility. If you have any questions, please feel free to contact Bill Arrants of SWP at 864-599-1070 ext. 103 or myself at 803-796-6240.

Sincerely,

SCHNABEL ENGINEERING SOUTH, LLC

Gregory B. Kuntz, P.G.
Associate

Attachment – Hypothetical Construction Worker Risk Evaluation Addendum

Cc: William Arrants – SWP
Layton Bedsole – NCSPA
Mark Maritato – AMEC

Post-It® Fax Note 7671	Date	# of pages ▶
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Southern Wood Piedmont Company

September 28, 2004

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N.C. DEPT. OF COMMERCE
Community Assistance

Mr. Stuart F. Parker
Inactive Hazardous Sites Branch
Superfund Section
NC Dept. of Environment and Natural Resources
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

RECEIVED
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SUPERFUND SECTION

Re: Additional Response to April 29, 2004 Comments
Insectivorous Bird Risk Assessment
Supplemental Remedial Investigation Report
Southern Wood Piedmont Site
NCD 058 517 467
Wilmington, New Hanover County, NC

Dear Mr. Parker;

Southern Wood Piedmont Company (SWP) is pleased to provide an additional response to the North Carolina Department of Environment and Natural Resources' (NCDENR) April 28, 2004 comments on the Supplemental Remedial Investigation (SRI) Human Health and Ecological Risk Assessment reports for the site located in Wilmington, New Hanover County, North Carolina.

The first response to the NCDENR April 28, 2004 comments occurred on June 7, 2004. Presented in this response to comments was an updated human health risk assessment for a hypothetical construction worker. In addition, SWP indicated that the requested insectivorous bird risk assessment was not warranted.

A conference call between SWP, NCDENR, Region IV EPA, Schnabel, AMEC and NCPORTS concerning the insectivorous bird risk assessment was conducted on July 20, 2004. The outcome of the conference call was that NCDENR determined that the insectivorous bird assessment is required. NCDENR also suggested that, at a minimum a laboratory bioaccumulation test (28 day) be performed using a species like *Lumbriculus variegatus.*

Considering the site, in our evaluation the *Lumbriculus variegatus* bioaccumulation test will not be representative of the true risk to the insectivorous bird that consumes emergent aquatic flying insects. The extrapolations from *Lumbriculus* will likely overestimate a realistic accumulation by the emergent aquatic flying insects. It is, therefore, recommended that in lieu of completing the insectivorous risk assessment using *Lumbriculus* that field collections of insects be

performed and evaluated for the risk assessment. A black light trap is recommended for insect collections at areas adjacent to the drainage ditch and Greenfield Creek.

Attached to this letter is AMEC's evaluation of the *Lumbriculus* bioaccumulation bioassay and recommendations for field collections of insects to support the risk assessment. In addition, this attachment includes an outline for the proposed scope of work to complete the insectivorous risk assessment for review by NCDENR.

Southern Wood Piedmont Company appreciates the opportunity to provide our responses to your comments on the SRI Human Health and Ecological Risk Assessment for the SWP Wilmington, North Carolina facility. If you have any questions, please feel free to contact me at 864-599-1070 ext. 103.

Sincerely,

William Arrants
General Manager

Attachment – Evaluation of *Lumbriculus* Bioaccumulation Bioassay

cc: Gregory B. Kuntz - Schnabel
John Samuelian – AMEC
Layton Bedsole – NCSPA

040928 NC DENR Addtl. Response

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27 September 2004

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SOUTHERN WOOD PIEDMONT

William P. Arrants
General Manager
Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303

RE: Assessment of the *Lumbriculus* Bioaccumulation Bioassay and Proposed Alternate Work Plan

Dear Bill:

We have attached our assessment of the use of the *Lumbriculus* bioaccumulation bioassay as a surrogate to derive site-specific accumulation of chemicals by flying insects at the former Southern Wood Piedmont facility in Wilmington, North Carolina.

If you have any questions about this assessment please do not hesitate to contact me in the Portland office.

Sincerely,

John H. Samuelian, Ph.D.
Senior Environmental Scientist/
Project Manager

WB

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SWP – Wilmington Site
Evaluation of the *Lumbriculus* Bioaccumulation Bioassay to Estimate Chemical Uptake by Emergent Insects

The draft BERA (AMEC, 2001) did not include the assessment of an insectivorous bird. Piscivororous birds were selected in lieu of insectivorous birds as a receptor of interest based on the review of the environmental setting and structure of the waterbodies (Greenfield Creek and a drainage ditch) that flow through the site. The rationale for this was based on several components. First, the adjoining areas to Greenfield Creek and the drainage ditch are substantially wooded and represent narrow flyways that preclude easy access to the area by insectivorous birds that may prey on the adult life stage of emergent aquatic insects[1]. For example, the tree swallow, an insectivorous bird, prefers more open areas to seek prey than is offered by Greenfield Creek and the drainage ditch (e.g., USGS, 2003). Second, the piscivorous birds prey on fish species that can accumulate COPECs from the ingestion of benthic invertebrates (including aquatic life stages of insects, such as chironomid larvae). Consequently, they have a greater potential for exposure to higher concentrations of persistent, bioaccumulative COPECs (i.e., a longer food-chain) than insectivorous birds that can prey on the adult life stage of emergent aquatic insects. Therefore, it was concluded that the using the avian piscivorous receptor would result in more conservative risks. However, in further discussion with NCDENR, it was agreed to further assess the insectivorous bird for the revised BERA.

Consistent with the approach taken with the piscivorous bird, it is preferable for the assessment of the insectivorous bird to include the collection of their prey items (i.e., insects) to calculate potential risks. A key issue with this is that many of the insect sampling methods use equipment that is not rugged or has the potential to collect an insufficient mass of insects for chemical analysis. In lieu of collecting site-specific data on insects, NCDENR proposed the use of a modified *Lumbriculus variegatus* laboratory bioaccumulation bioassay to estimate the uptake factors from sediments for insects that may spend part of their life stages in or near the site sediments. The proposed approach included the evaluation of sediments across a concentration gradient of COPECs (low, medium and high concentrations). This discussion evaluates the application of this laboratory bioassay to derive estimates of COPEC concentrations in flying insects and includes a re-assessment of the suitability of different collection methods for insects.

Summary of the Lumbriculus Bioaccumulation Bioassay

The aquatic oligochaete *Lumbriculus* has been used for some time to assess the toxicity and potential bioaccumulation of chemicals in freshwater sediments (Phipps et al., 1993; EPA, 1994; Brunson et al., 1998; ASTM, 2001). This oligochaete burrows through sediments while actively feeding and therefore is exposed to chemicals both via the pore water and also through ingestion of sediments (EPA/USACE, 1998). Briefly, the bioaccumulation bioassay involves exposing the organisms to test sediments for a period of 28 days. Conductivity, hardness, alkalinity, ammonia, pH, and dissolved oxygen are monitored throughout the test period[2]. After the exposure is completed the test organisms are removed by sieving, and allowed to clear their

[1] The exception to this is the area near the juncture of Greenfield Creek and the Cape Fear River.

[2] Additional metrics may also be collected, such as oxidation-reduction potential for metals.

gut contents of any sediment for 24 hours in clean water[3]. Purging is performed to prevent any sediment-bound chemicals in the gut from being measured as a part of the tissue concentrations. The organisms are then analyzed for the chemical(s) of interest. EPA Region IV Science and Ecosystem Support Division (SESD) have recently modified the *Lumbriculus* bioaccumulation bioassay and are assessing its use to estimate site-specific BSAFs. Generally, these modifications were developed to ensure sufficient test organism mass for chemical residue analysis.

There are several issues with using the *Lumbriculus* bioaccumulation bioassay as a surrogate to predict the potential bioaccumulation of flying insects, including the following:

- Comparability of the laboratory test to bioaccumulation results in field-collected oligochaetes;
- Uncertainty in oligochaete biota-sediment accumulation factors (BSAFs)[4] and extrapolation to the potential bioaccumulation by aquatic insects; and
- Effect of metamorphosis from larval to adult life stages on chemical body burdens in aquatic insects.

These are discussed below.

Comparability of the Lumbriculus Laboratory Test to Bioaccumulation Results in Field-Collected Oligochaetes

Several studies have compared the results from laboratory bioaccumulation studies conducted with *Lumbriculus* and chemical concentrations in field collected oligochaetes. Ankley et al. (1992a, 1992b) calculated similar lipid-normalized BSAFs between total PCBs and PCB homologue groups using sediments and co-located oligochaete samples collected from the lower Fox River/Green Bay area. The mean (± SD) BSAF for total PCBs for the laboratory-exposed oligochaetes was 0.84 (± 0.35), while the value from the field collected oligochaetes was 0.87 (± 0.38).

Brunson et al. (1998) and Dwyer et al. (1997) performed a similar comparison using sediments collected from a number of locations in the Upper Mississippi River. For PAHs, the ratio of laboratory to field lipid-normalized concentrations ranged from 0.09 to 5.5, with an average of 1.12[5]. For PCBs, the ratio of laboratory to field lipid-normalized concentrations ranged from 0.14 to 8.5, with an average of 1.99. The authors reported that about 90% of the lipid-normalized PAH and PCB concentrations of laboratory-exposed *Lumbriculus* were within a

[3] This approach is appropriate to assess uptake in a laboratory setting but does not reflect the potential exposures by any organisms that may prey on this species.

[4] BSAFs are normally calculated as the lipid-normalized chemical concentration in the organism divided by the organic carbon-normalized chemical concentration in the sediment. If lipid or TOC data are not used, then the term bioaccumulation factor (BAF) is most commonly used for this ratio. The BAF can also be calculated as the ratio of the assimilation and elimination rate constants in a toxicokinetic study. An advantage of the latter approach is that the potential accumulation can be determined under non-steady-state conditions.

[5] The data were provided in the report by Dwyer et al (1997) from which the paper by Brunson et al (1998) was developed.

factor of three of the results from oligochaetes collected from the same sediment locations, which they concluded represented a reasonable agreement. Some of the variability in these results may have been due to varying organic carbon contents of the sediments. The BSAFs, calculated as the ratio of the lipid-normalized PAH concentration in the oligochaete and the TOC-normalized PAH concentration in the sediment, ranged from 0.4 to 10.1 for the laboratory exposed oligochaetes and 0.3 to 26.6 for the field-exposed oligochaetes (Brunson et al., 1998). Based on these results, the authors recommended applying a "generic" BSAF for PAHs of 1.7.

The results suggest that the *Lumbriculus* bioaccumulation bioassay would be a reasonable surrogate to assess uptake in species that reside and burrow their entire lives in sediments, or if the particular life stage is relevant to assessing potential risk to a receptor. It would be appropriate to use this bioassay to estimate potential uptake by aquatic worms that serve as a prey base for certain avian and fish species, but not necessarily for insectivorous birds that prey on flying insects.

Uncertainty in Potential Oligochaete Bioaccumulation and Bioaccumulation by Aquatic Insects

There is also some uncertainty in the predictive reliability of BSAFs generated using this method for use with insects that may reside in sediments for only a portion of their lives. One key issue is the stability of the BSAFs across a concentration gradient. In a toxicokinetic study of PAH uptake by *Lumbriculus*, Landrum et al. (2002) exposed the test organisms to five different fluoranthene concentrations in sediments (59, 95, 108, 252 and 355 mg/Kg). The BAFs, calculated as the ratio of the wet weight PAH in organism divided by dry weight in sediment, ranged from 0.92 to 1.88 for a 10-day exposure and from 0.65 to 0.99 for a 28-day exposure. Thus, the BAFs declined with increasing duration of exposure. Furthermore, the BAFs were not consistent with those generated by using the ratio of the uptake and elimination rate constants, which ranged from 1 to 3.3. The uptake and elimination rate constants decreased with increasing sediment PAH concentrations. Thus, depending upon the exposure duration, BAFs differing by as much as a factor of 2 or 3 may be calculated.

In a laboratory toxicokinetic study of benzo(a)pyrene uptake using chironomid larvae and *Lumbriculus*, the BAF (calculated as the ratio of the dietary uptake and elimination rate constants) ranged from 0.11 to 0.16 for the chironomid larvae and 0.84 to 0.95 for *Lumbriculus* (Shuler et al., 2003). The durations for the exposure and depuration phases for the chironomid larvae were both 72 hours, and for the oligochaete were both 240 hours. This result suggests that using the *Lumbriculus* bioaccumulation study can overestimate the potential uptake by aquatic insect larvae by about a factor of 4, and that *Lumbriculus* would not be an ideal surrogate for aquatic insects.

In a laboratory study, Larsson (1984) exposed chironomid larvae to sediments containing PCBs (range of 0.3 to 70 mg/Kg, dry weight basis) for 10 weeks, collecting larvae (week 10), emerged adults (from week 8 to 10), and their pupal remnants (exuviae) for total PCBs. PCBs were detected in all of the chironomid samples. The BAFs (ratio of wet weight PCB concentration in organism and the dry weight PCB concentration in sediment) for the larvae ranged from 0.83 to 2.05 (mean: 1.27) and for the adults the BAFs ranged from 2.15 to 9.28 (mean: 5.48). The BAFs were generally higher with the lower PCB concentrations.

In a laboratory study using field collected sediments, Wood et al. (1997) exposed chironomid larvae to sediment concentrations of PAHs ranging from 0.2 to 75 mg/Kg (dry weight) and total

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PCBs concentrations in sediments ranging from 0.1 to 22 mg/Kg. The BAFs, calculated as the wet weight concentration in biota divided by the dry weight sediment concentration, ranged from 0.037 to 1.0 (mean: 0.29) for total PAHs and from 0.22 to 1.42 (mean: 0.51) for total PCBs. Assuming a lipid content of 1% for chironomid larvae (Larsson, 1984), and the TOC reported by the authors, these values can be converted to BSAFs using the lipid-normalized concentration in the chironomids and the organic carbon content normalized concentration in the sediments. For PAHs, the BSAFs ranged from 0.10 to 2.6 (mean: 0.71) and for PCBs the BSAFs ranged from 0.45 to 3.45 (mean: 1.18). Therefore, despite the typically applied normalizing approaches, there can be significant variation in BAFs or BSAFs even within the same species.

There is also the potential for species-specific variation in uptake of chemicals from sediment by insects based on their life history. Bush et al. (1985) reported different patterns of PCB congeners in different species of caddisfly larvae collected from different locations in the upper Hudson River, which also differed from the PCB congener patterns in the co-located sediments. Furthermore, the congeners were not accumulated in proportion to the concentrations in these co-located sediments. Genus-specific differences in PCB and pesticide uptake have also been reported in caddisflys that reflects difference in their larval habits and feeding preferences (Kovats and Ciborowski, 1993).

Effect of Metamorphosis from Larval to Adult Life Stage on Chemical Body Burdens in Insects

Although the *Lumbriculus* bioaccumulation bioassay would be a reasonable predictor of the potential accumulation of chemicals in aquatic worms, its application to estimate the body burdens to flying insects that may reside for parts of their lives in sediments (e.g., adult chironomids) may not be entirely appropriate since it does not reflect the physiological and dietary changes associated with metamorphosis that may affect chemical body burdens.

Changes in the body burdens during metamorphosis may be species and chemical specific. In a laboratory study, Larsson (1984) exposed chironomid larvae to sediments containing PCBs (range of 0.3 to 70 mg/Kg, dry weight basis) for 10 weeks, collecting larvae (week 10), emerged adults (from week 8 to 10), and their pupal remnants (exuviae) for total PCBs. PCBs were detected in all of the chironomid samples. On a wet weight concentration basis, the exuviae retained an average of 16% (range: 6.9-31%) of the total PCBs. Higher PCB concentrations were observed in the emerged adults when compared to the larval stage on a wet weight basis. The concentration ratios of adult-to-larval chironomid PCB concentrations averaged 4.6 (range: 2.3 to 8.3) on a wet weight basis, and 1.8 (range: 0.9 to 3.2) on a lipid weight basis. The apparent increase in concentration was due to a decrease in the average body weights from the larval stage (27.8 mg) to the adult stage (7.3 mg). When evaluated on a mass basis, there was an average percent loss of the PCB body burdens (calculated as a percent difference) between the larval and adult stages of 37.5%.

In another field study using chironomids, Reinhold et al. (1999) reported that the adult to larvae lipid-normalized concentration ratios of PAHs ranged from 0.2 to 0.6.

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Summary

In summary:

- Comparing the laboratory test bioaccumulation results to bioaccumulation in field-collected oligochaetes shows that while there is some similarity in the uptake estimates, the field results are typically higher than the laboratory results;
- Oligochaete BSAFs and BAFs were typically higher than the aquatic insect BSAFs and BAFs, and extrapolation from *Lumbriculus* to aquatic insects overestimates the accumulation by aquatic insects; and
- There is uncertainty concerning whether the accumulation in larval stages of aquatic insects is comparable, lower, or higher than the accumulation in adult life stages of aquatic insects.

Consequently, there are compounding conservatisms from each of these factors that can result in an overestimate and increased uncertainty in estimating the potential accumulation in adult (flying) life stages of aquatic insects. Therefore, a re-assessment of the suitability of different collection methods for insects was performed.

Evaluation of Insect Collection Methods

Some insect collection methods require an extensive collection period to provide a representative sample. Furthermore, different methods may be used based on the overall project objectives (e.g., McEwen, 1997; Schauff, 1997). The three principal methods used to collect flying insects include (1) hand-held nets, (2) passive intercept traps, such as malaise, window, or sticky traps, and (3) attractant traps, such as those that use a specific insect pheromone, or lights (e.g., mercury vapor, UV lights, etc).

Two of the principal concerns with collecting insects for chemical analyses are the low sample mass that is typically collected by some of the methods, and the lack of ruggedness of the sampling equipment. For example, insects can be collected by using a large sail-like screen back-lit with a light. Although this has a large surface area to attract the insects, the large set-up is not sufficiently rugged to withstand disturbance from wind and can be cumbersome to handle in the field. Recently for another project located in EPA Region IV where PAHs were in stream sediments, AMEC used an updated version of the UV attractant trap (called a Universal Black Light trap[6]) that proved to be very successful in collecting a large number of insects. This portable, battery-operated sampler uses a black light (ultraviolet light) to attract insects into a collection container. The light attracts flying insects to the device, where a small fan draws the insects into a collection jar. This technique enables the collection of large numbers of insects at one time and minimizes the chance of trap predation, vandalism, or theft. Figure 1 shows a deployed insect collector.

Based on the availability of robust and reliable insect collection equipment, and the uncertainty associated with applying the *Lumbriculus* bioaccumulation bioassay for adult (flying) aquatic insects, SWP recommends the collection of insects using the Universal Black Light trap from

[6] These are manufactured by BioQuip Products (Rancho Dominguez, California).

Greenfield Creek and the Drainage Ditch at the former SWP facility to assess potential exposure and risks to insectivorous birds.

Proposed Field Program

It is proposed to collect flying insects from the following locations:

- An upstream (but on property) location in Greenfield Creek that will serve as a background area. This sample will be located near prior sampling station SD-47-COMP that had been used for toxicity testing.
- Three additional samples from Greenfield Creek. These samples will be located near prior sampling locations SD-30, SS-10, and SS-9.
- Two samples from within the drainage ditch. These samples will be located near prior sampling locations SD-24 and SD-28.

Each day, the light traps will be deployed at the sampling locations at least four hours prior to the start of sampling, to ensure that flying insects are not scared away by disturbances just prior to trapping. Just after sunset, the black lights will be turned on and programmed to run until dawn. The following morning, the insects will be collected and stored in glass sample bottles provided by the laboratory, labeled with respect to sampling location, date, and time, and placed in a cooler on ice at 4° C.

After collection of insects from a particular location, the insects will be enumerated at the order level (e.g., Trichoptera) and noted in the field notebook. The insects collected using the light trap will then be placed into one container (provided by the analytical laboratory) for tissue analysis for a given location for subsequent laboratory analysis.

Analytical Program

Insect samples will be collected and analyzed for a subset of COPECs – PAHs, Aroclor PCBs, and PCDD/Fs. The insect samples will also be analyzed for percent lipid. Collection of percent lipid in conjunction with the data on the organic carbon content and chemical concentrations of nearby sediments will allow calculation of site-specific BSAFs using TOC- and lipid-normalized concentrations, which are the standard units for BSAFs (EPA, 1995, 2000).

The results from these insect collections will be used (1) to calculate site-specific BSAFs for comparison to literature values, and (2) to provide relevant exposure information to assess the insectivorous bird exposure pathway for the updated BERA.

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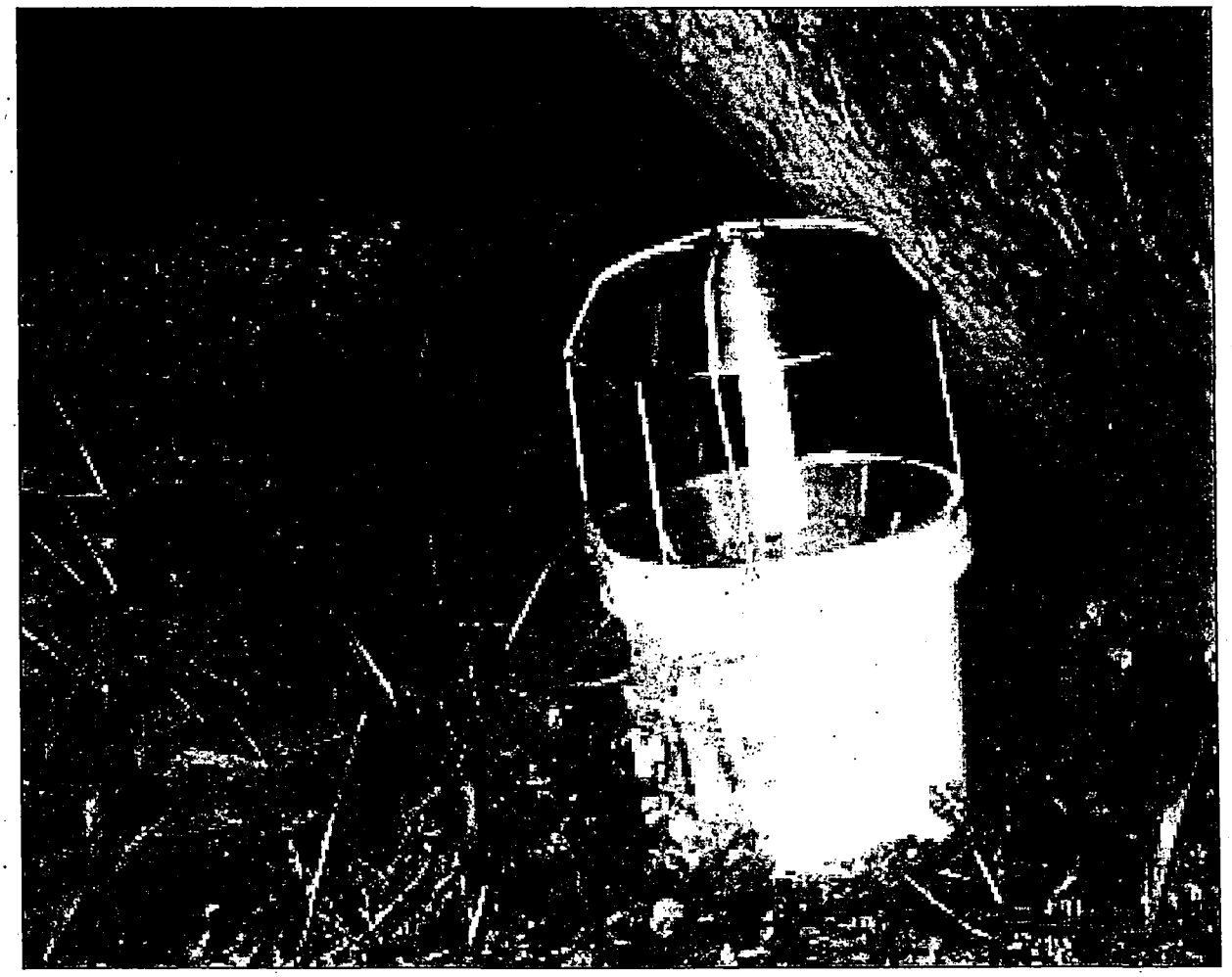

Figure 1. Deployed Flying Insect Sampler
(Universal Black Light trap)

Subject: [Fwd: Fw: SWP - Wilmington Site Bioaccumulation Questions]
From: Hanna Assefa <hanna.assefa@ncmail.net>
Date: Wed, 11 Aug 2004 17:18:38 -0400
To: stuart.parker@ncmail.net

-------- Original Message --------
Subject: Fw: SWP - Wilmington Site Bioaccumulation Questions
Date: Wed, 11 Aug 2004 10:07:26 -0400
From: Carter.Bobbi@epamail.epa.gov
To:hanna.assefa@ncmail.net, Wendel.Jennifer@epamail.epa.gov
CC: George.Linda@epamail.epa.gov, Lewis.Bobby@epamail.epa.gov

Hanna,

Dr. Joe Owusu, ESAT Toxicologist for EPA Region 4 has prepared written responses to the Wilmington Site Bioaccumulation Questions (attached below).

Please let us know if you require additional assistance.

Bobbi Carter
Science and Ecosystems Support Division
U.S. EPA, Region 4
980 College Station Rd.
Athens, GA 30605
(706) 355-8708
Carter.Bobbi@epa.gov
----- Forwarded by Bobbi Carter/R4/USEPA/US on 08/11/2004 10:02 AM -----

Joe Owusu		
	To:	Bobbi Carter/R4/USEPA/US@EPA
08/10/2004 11:05 AM	cc:	Bobby Lewis/R4/USEPA/US@EPA
	Subject:	SWP - Wilmington Site Bioaccumulation Questions

Hi Bobbi:

Please find attached, my response to the questions on the above-referenced site. Let me know if you have any questions or require any clarification.

Thanks, Joe.

(See attached file: Responce_NCDENR_LumbriculusTestQuestions.doc)

Responce_NCDENR_LumbriculusTestQuestions.doc	**Content-Type:** application/msword **Content-Encoding:** base64

ATTACHMENT TO 8/11/04
From Bobbi Carter, SESD

Dr Joe Owusu :
EPA SESD

SWP – Wilmington Site
Follow-Up Questions Concerning Bioaccumulation Test

As part of our assessment for using the *Lumbriculus* bioaccumulation test to derive an approximate sediment-invertebrate bioaccumulation factor for the SWP site, and following discussions with AMEC's Aquatic Toxicity Testing Laboratory, a few questions have developed that Southern Wood Piedmont requests clarification and input from NCDENR.

1. The test organisms used in the standard *Lumbriculus* bioaccumulation test are quite small (several cm at best) which would require a very large number of exposure chambers to collect sufficient mass to analyze for all of the chemicals assessed in the draft Baseline Ecological Risk Assessment. During our teleconference call on 20 July 2004 it was mentioned that the staff at SESD are currently using *Lumbriculus* to quantify Biota-Sediment Accumulation Factors. Have they modified the method to allow the use of later life stages of *Lumbriculus* in order to have sufficient mass for chemical analysis? And if so, would it be possible for Southern Wood Piedmont to have a copy of this modification (or an individual to contact) so that a similar method modification could be considered?

Answer: The *Lumbriculus variegatus* used in the sediment bioaccumulation tests are adults and do not get any bigger than a few centimeters. The method used at SESD has been modified to use larger test containers (5 gallon aquaria) with about 2 kilograms of sediment (depending on the TOC) and 4 liters of overlying water (well water). Four replicates of each sample are set up with approximately 20 grams (wet weight) of *L. variegatus* added to each replicate. Alternatively, smaller containers (e.g. 2 liter battery jars) may be used with about 500 grams sediment, 5 to 10 grams (wet weight) of *Lumbriculus*, and more replicates (10 to 12) per sample. The most difficult part is getting enough *Lumbriculus* gram weight to start the tests (they should all be from the same source) and collecting the gram weight required for chemical analyses after the 28-day exposure period. The analytical lab should be contacted to determine how much gram weight is needed to perform the required analyses. Of course, you must concentrate mostly on the bioaccumulative chemicals. SESD typically shoots for a minimum final weight of 50 grams (composite wet weight) per sample.

2. Some of the sediments that may be used for this test exhibited toxicity with more sensitive test organisms. How has SESD addressed potential toxicity of the test media for these tests? Have they established a tolerance level for toxicity (say, lethal to 25% of the test organisms) before the test results should not be used? One approach is to "dilute" any toxic sediment with clean sand if the original "high" sample proved toxic (analogous to the dilution that may occur in an analytical laboratory). Although atypical

for toxicity testing, would such an approach be acceptable to NCDENR for this modified bioaccumulation test if the "high" sediments exhibited toxicity above a particular limit?

Answer: *Lumbriculus variegatus* are usually less sensitive to chemical contaminants than other organisms such as *Hyalella azteca* that is the reason for their use in bioaccumulation tests. Therefore, samples that are toxic to *H. azteca* may not necessarily be toxic to *L. variegatus*. It should also be borne in mind that the *L. variegatus* 28-day test is a bioaccumulative test and not a direct toxicity test. The test should be used for mainly bioaccumulative chemicals. However, if the samples are determined to be toxic to other organisms such as *H. azteca* or *Chironomus tentans*, a simple 4-day or 7-day toxicity screen test may be performed with *L. variegatus* prior to initiating the *Lumbriculus* bioaccumulation tests. This screen test should be similar to the *H. azteca* tests but should only use 4 replicates of each sample with 10 *Lumbriculus* per replicate. The *Lumbriculus* should not be fed during the test.

If the samples are determined to be toxic to *Lumbriculus* after the screen tests, then consideration may be given to diluting the samples. Dilutions may be performed with a reference sediment, laboratory control sediment, or a less contaminated sediment sample from the site (probably preferred). There are several uncertainties associated with diluting sediments therefore the sample used for dilution should have similar physical/chemical characteristics as the one being diluted (e.g. moisture content, TOC, pH, grain size, etc.). For example, using a sample with a higher TOC content may result in a decrease in toxicity due to binding. Changes in pH can influence toxicity and bioavailability, etc. Therefore, the uncertainties associated with diluting the sediments should be discussed in the risk assessment.

Subject: Wilmington Risk Assessment Questions
From: William.Arrants@rayonier.com
Date: Wed, 28 Jul 2004 12:05:12 -0400
To: stuart.parker@ncmail.net
CC: john.samuelian@amec.com, gkuntz@schnabel-eng.com, hanna.assefa@ncmail.net
Return-Path: <William.Arrants@rayonier.com>
Original-Recipient: rfc822;stuart.parker@ncmail.net
Received: from scc074.its.state.nc.us (207.4.22.38) by ms01.ncmail.net (6.5.029) id 40FA7D4700088F5D; Wed, 28 Jul 2004 12:30:15 -0400
Received: from scc074.its.state.nc.us (127.0.0.1) by scc074.its.state.nc.us (6.5.029) id 4105C1750001AF6A; Wed, 28 Jul 2004 12:30:15 -0400
Received: from scc033.its.state.nc.us (207.4.219.13) by scc074.its.state.nc.us (6.5.029) id 4105C1740001B123; Wed, 28 Jul 2004 12:30:14 -0400
Received: from HQMAIL.rayonier.com ([159.69.250.14]) by scc033.its.state.nc.us (8.13.0/8.13.0/DFR) with SMTP id i6SG8wxk002498; Wed, 28 Jul 2004 12:09:03 -0400 (EDT)
X-Mailer: Lotus Notes Release 6.5 September 26, 2003
Message-ID: <OF9A49FD68.E4F00871-ON85256EDF.0056628F-85256EDF.00585E32@rayonier.com>
X-MIMETrack: Serialize by Router on HQMAIL/Servers/Rayonier(Release 6.5|September 26, 2003) at 07/28/2004 12:09:19 PM
MIME-Version: 1.0
Content-type: multipart/mixed;
Boundary="0__=0ABBE44CDFC5E41F8f9e8a93df938690918c0ABBE44CDFC5E41F"
Content-Disposition: inline
X-Spam-Status: Yes, hits=0.339 required=5.25
X-Spam-Score: 0.339 NO_REAL_NAME
X-Scanned-By: MIMEDefang 2.39

Stuart,

John Samuelian of AMEC has some questions in regard to the proposed risk assessment for Wilmington. They are included in the attached document. Please provide information regarding these questions to help in the assessment plan development

Thanks.

Bill

William P. Arrants
General Manager

Southern Wood Piedmont Company
591 Springfield Road
Spartanburg, South Carolina 29303
Phone: (864)-599-1070 Ext. 103
Fax: (864)-599-1087
(See attached file: NCDENR_LumbriculusTestQuestions.doc)
=

NCDENR_LumbriculusTestQuestions.doc	**Content-Type:** application/msword **Content-Encoding:** base64

SWP – Wilmington Site
Follow-Up Questions Concerning Bioaccumulation Test

As part of our assessment for using the *Lumbriculus* bioaccumulation test to derive an approximate sediment-invertebrate bioaccumulation factor for the SWP site, and following discussions with AMEC's Aquatic Toxicity Testing Laboratory, a few questions have developed that Southern Wood Piedmont requests clarification and input from NCDENR.

1. The test organisms used in the standard *Lumbriculus* bioaccumulation test are quite small (several cm at best) which would require a very large number of exposure chambers to collect sufficient mass to analyze for all of the chemicals assessed in the draft Baseline Ecological Risk Assessment. During our teleconference call on 20 July 2004 it was mentioned that the staff at SESD are currently using *Lumbriculus* to quantify Biota-Sediment Accumulation Factors. Have they modified the method to allow the use of later life stages of *Lumbriculus* in order to have sufficient mass for chemical analysis? And if so, would it be possible for Southern Wood Piedmont to have a copy of this modification (or an individual to contact) so that a similar method modification could be considered?

2. Some of the sediments that may be used for this test exhibited toxicity with more sensitive test organisms. How has SESD addressed potential toxicity of the test media for these tests? Have they established a tolerance level for toxicity (say, lethal to 25% of the test organisms) before the test results should not be used? One approach is to "dilute" any toxic sediment with clean sand if the original "high" sample proved toxic (analogous to the dilution that may occur in an analytical laboratory). Although atypical for toxicity testing, would such an approach be acceptable to NCDENR for this modified bioaccumulation test if the "high" sediments exhibited toxicity above a particular limit?

Subject: RE: Conference call concerning SWP-Wilmington, NC
From: Gregory Kuntz <gkuntz@schnabel-eng.com>
Date: Tue, 13 Jul 2004 07:56:28 -0400
To: Gregory Kuntz <gkuntz@schnabel-eng.com>, "'Stuart Parker'" <stuart.parker@ncmail.net>
CC: "'HANNA ASSEFA'" <HANNA.ASSEFA@ncmail.net>, "'william.arrants@rayonier.com'" <william.arrants@rayonier.com>, "'Layton_Bedsole@ncports.com'" <Layton_Bedsole@ncports.com>, "'Lucas.Ken@epamail.epa.gov'" <Lucas.Ken@epamail.epa.gov>, "'James Bateson'" <James.Bateson@ncmail.net>, "'john.samuelian@amec.com'" <john.samuelian@amec.com>, Raymond Knox <rknox@schnabel-eng.com>
Return-Path: <gkuntz@schnabel-eng.com>
Original-Recipient: rfc822;stuart.parker@ncmail.net
Received: from scc075.its.state.nc.us (207.4.22.39) by ms01.ncmail.net (6.5.029) id 40BC830D0017D2F2; Tue, 13 Jul 2004 07:56:50 -0400
Received: from scc075.its.state.nc.us (127.0.0.1) by scc075.its.state.nc.us (6.5.029) id 40F31A6600002E4F; Tue, 13 Jul 2004 07:56:50 -0400
Received: from scc028.its.state.nc.us (207.192.32.78) by scc075.its.state.nc.us (6.5.029) id 40F31A630000301B; Tue, 13 Jul 2004 07:56:49 -0400
Received: from mail_svr1.schnabel-eng.com (uslec-66-255-139-152.cust.uslec.net [66.255.139.152]) by scc028.its.state.nc.us (8.13.0/8.13.0/DFR) with SMTP id i6DBuh09021594; Tue, 13 Jul 2004 07:56:44 -0400 (EDT)
Received: from mail_svr1.schnabel-eng.com [192.168.4.242] by mail_svr1.schnabel-eng.com [192.168.4.242] (CMSPraetor 5.10.4411) with ESMTP id BEC378F8F4CD4BEAB732000806E59D7E ; Tue, 13 Jul 2004 07:56:34 -0400
Received: by MAIL_SVR1 with Internet Mail Service (5.5.2657.72) id <NQD6R0CN>; Tue, 13 Jul 2004 07:56:33 -0400
Message-ID: <8A962AC3C079D311BF1C00902788637004 1AE2A4@MAIL_SVR1>
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2657.72)
Content-Type: multipart/alternative; boundary="----_=_NextPart_001_01C468D0.6E268140"
X-Spam-Status: Yes, hits=1.461 required=5.25
X-Spam-Score: 1.461
EXCUSE_16,HTML_20_30,HTML_FONTCOLOR_BLUE,HTML_MESSAGE,HTML_TITLE_EMPTY
X-Scanned-By: MIMEDefang 2.39

Hi everyone,

The conference call is now scheduled for Tuesday July 20, 2004 at 1:30 pm.

To enter the conference please call 1-888-462-0998. Enter conference code 0477520811.

Let me know if you have any questions.

Thanks,

Gregory B. Kuntz, P.G.
Schnabel Engineering South, LLC
104 Corporate Blvd., Suite 420
West Columbia, South Carolina 29169
803-796-6240

803-796-6250 (fax)
803-960-0641 (mobile)
gkuntz@schnabel-eng.com

-----Original Message-----
From: Gregory Kuntz
Sent: Monday, July 12, 2004 3:27 PM
To: Gregory Kuntz; Stuart Parker
Cc: HANNA ASSEFA; william.arrants@rayonier.com; Layton_Bedsole@ncports.com; Lucas.Ken@epamail.epa.gov; James Bateson; john.samuelian@amec.com; Raymond Knox
Subject: RE: Conference call concerning SWP-Wilmington, NC

We need to reschedule the conference call. Does Tuesday July 20 at 1:30 pm sound good to everyone?

Gregory B. Kuntz, P.G.
Schnabel Engineering South, LLC
104 Corporate Blvd., Suite 420
West Columbia, South Carolina 29169
803-796-6240
803-796-6250 (fax)
803-960-0641 (mobile)
gkuntz@schnabel-eng.com

-----Original Message-----
From: Gregory Kuntz
Sent: Monday, July 12, 2004 2:27 PM
To: 'Stuart Parker'; Gregory Kuntz
Cc: HANNA ASSEFA; william.arrants@rayonier.com; Layton_Bedsole@ncports.com; Lucas.Ken@epamail.epa.gov; James Bateson; 'john.samuelian@amec.com'; Raymond Knox
Subject: Conference call concerning SWP-Wilmington, NC

A conference call is scheduled for 1:30 pm on Wednesday July 14, 2004 to discuss the issues listed below. Please let me know if this is not convenient for any of the parties involved.

To enter the conference please call 1-888-462-0998. Enter conference code 0477520811.

Let me know if you have any questions.

Thanks,

Gregory B. Kuntz, P.G.
Schnabel Engineering South, LLC
104 Corporate Blvd., Suite 420
West Columbia, South Carolina 29169
803-796-6240
803-796-6250 (fax)
803-960-0641 (mobile)
gkuntz@schnabel-eng.com

-----Original Message-----
From: Stuart Parker [mailto:stuart.parker@ncmail.net]
Sent: Friday, July 02, 2004 11:06 AM
To: Gregory Kuntz

Cc: HANNA ASSEFA; william.arrants@rayonier.com; Layton_Bedsole@ncports.com; Lucas.Ken@epamail.epa.gov; James Bateson; mark.maritato@amec.com
Subject: Re: SWP Wilmington: June 7, 2004 correspondence

Greg,

I have reviewed your comments, after spending four weekdays on Jury duty.

I am available all of the week of July 12, except for Friday July 16.
I will determine Ms. Assefa's availability when she returns to the office on July 6.

Sincerely,
Stuart Parker
NC Superfund Section

Gregory Kuntz wrote:

> Stuart,
>
> Schnabel Engineering and Southern Wood Piedmont are pleased to respond to your e-mailed comments requesting a conference call to discuss ecological risk assessment issues for sediments. Prior to responding directly to your comments, we would like to discuss the fact that multiple PRPs likely have contributed to the contamination observed in Greenfield Creek sediments. In addition, it is not clear how NCDENR will address the issue of multiple PRP source contributions, if and when clean-up of Greenfield Creek occurs.
>
> Southern Wood Piedmont (SWP) has allocated significant resources to the investigation of the on-site drainage ditch, Greenfield Creek, and the Cape Fear River through the collection and analysis of sediment samples and through ecotoxicity testing. SWP has assessed Greenfield Creek and the Cape Fear River despite the understanding that multiple PRPs likely exist. Evidence for the presence of multiple PRP source contributions to Greenfield Creek include the following :
>
> 1. The presence of pesticides and PCBs in Greenfield Creek sediments. Pesticides have been detected in the background sample below Greenfield Creek dam (BK-S1). PCB's have been detected along the south bank of Greenfield Creek (SD-08 and SD-09). These chemicals were not identified at other locations from the property where historical operations had occurred.
>
> 2. The southern tributary to Greenfield Creek, immediately west of the railroad track (off and upstream of the SWP property), has been observed to have a bluish gray tint typical of sewage. In addition, PAH contamination has been detected in sediments from this tributary (SS-12 and SS-13). A background wetland sample was collected upgradient of this tributary, but was not submitted to the lab due to observed tar-like substance that adhered to the sampling equipment. A different background sample location was selected on the east side of Greenfield Lake.
>
> 3. Upgradient Greenfield Creek sample SS-1 immediately east of the railroad track bridge (off and upstream of the SWP property) is impacted with PAH constituents.
>
> 4. Chevron USA Products Company (PacTank, VOPAK) was formerly located along the south bank of Greenfield Creek at the elbow bend. PAH contamination was identified in the soil and groundwater at the site (Ref. #3 of 2001 SRI Report). Groundwater flow is toward Greenfield Creek from Chevron during the entire tidal cycle. Chevron reportedly had historical discharges through a discharge pipe to Greenfield Creek at the elbow bend.
>
> 5. The PAH concentration gradient (pattern of contamination) indicates a source area on site in the vicinity of the former covered ditch and drainage ditch with concentrations decreasing down the drainage ditch to Greenfield Creek. In Greenfield Creek just downstream of the drainage ditch, the PAH

concentrations decrease significantly and toxicity testing indicated the survival of the amphipod and midge. Further downstream in Greenfield Creek at the elbow bend, the concentrations increase to the highest levels observed in Greenfield Creek - which also resulted in 100% mortality in the amphipod and midge toxicity tests - suggesting an additional source area (i.e. Chevron discharge point). From the elbow bend the concentration gradient again decreases proceeding toward the tidal gate.

6. Raw sewage has historically been discharged by the City into the Cape Fear River. Pipes may have leaked as indicated by the detection of chloroform in the groundwater along the old discharge pipes.

It appears that the source of contamination observed in the drainage ditch is the result of wood treating operations performed on site by the City of Wilmington, North State Creosoting Company, Taylor Colquitt Creosoting Company, and Southern Wood Piedmont. It is not apparent that wood treating operations are responsible for the contamination observed in Greenfield Creek. As such, a suggested risk management approach for the sediments impacted by the wood treating operations might include:

1. Area of sediment remediation to include the on-site drainage ditch from its termination with Greenfield Creek to Greenfield Street. It also includes the western ditch south of the covered ditch and to the east under the railroad track turning north half way toward Greenfield Street. No active remediation is suggested for Greenfield Creek.

2. Remediation of the drainage ditch may consist of capping via concrete drainage structures along shallow areas of drainage ditch and cemented sand mixtures in deeper areas adjacent to Greenfield Creek. Since contaminated sediments could be capped to the top of each bank , the development of clean-up numbers is not necessary. The cap materials will cover the contaminated materials. Cemented materials will prevent r econtamination of the sediments in the future.

SWP, Schnabel and AMEC are available to conference with NCDENR at your request. Because of the 4th of July holiday, several of us will be on vacation the rest of this week and next week. We can be available again to discuss these issues beginning the week of July 12th. Please advise and we will let you know when we can be available to discuss further .

Sincerely,

Gregory B. Kuntz, P.G.
Schnabel Engineering South, LLC
104 Corporate Blvd., Suite 420
West Columbia, South Carolina 29169
803-796-6240
803-796-6250 (fax)
803-960-0641 (mobile)
gkuntz@schnabel-eng.com

-----Original Message-----
From: Stuart Parker [mailto:stuart.parker@ncmail.net]
Sent: Thursday, June 24, 2004 4:51 PM
To: Gregory Kuntz; HANNA ASSEFA
Cc: william.arrants@rayonier.com; Layton_Bedsole@ncports.com; Lucas.Ken@epamail.epa.gov; James Bateson
Subject: Re: SWP Wilmington: June 7, 2004 correspondence

Gentlemen:

I recently received a voice mail from Layton, citing Schnabel Engineering's June 7, 2004 response to comments, and expressing concern over the potential for additional RI time expenditure at the site. Ms. Assefa has reviewed the submittal.

We concur with your desire that the RI be completed as soon as possible. However, I am also

responsible for ensuring that assumptions made by the contractors do not result in omissions that would shortcut the risk assessment process. To this end, I am requesting a direct discussion, to determine where we differ in our assumptions. The issue of sediment bioaccumulation, and its ecological risk to piscivorous birds, is the only sticking point left, and I am anxious to resolve it in a timely manner. Issues include:

1) The contention that collection and bioaccumulation (*Lumbriculus*) testing of contaminated sediments will impose an unjustified additional expenditure of time and resources, given the anticipated effort to remediate ditch sediments. This does not explain what criteria will be used to determine the cleanup numbers.

2) The statement "Whether the risk results calculated from the *Lumbriculus* bioaccumulation study shows an exceedence of the risk threshold or not, *there would be no change in the risk management decision* for the sediments of Greenfield Creek or the drainage ditch". What is the rationale for this conclusion. ?

3) We would like to discuss where sediments will be proposed for cleanup, what criteria will be used, and the rationale thereof.

I would like to have a technical teleconference, between myself, Ms. Assefa, Schnabel Engineering, and AMEC. We are available tomorrow and through Thursday of next week (unless I am called to jury duty, to be determined this coming Sunday). If Schnabel would be good enough to coordinate with AMEC, we will look forward to hearing proposed conference times. Cc:d parties are welcome to participate, however, this call is intended specifically to discuss technical issues related to risk assessment.

Sincerely,

Stuart Parker,
Hydrogeologist,
NC Superfund Section

This e-mail including attached files is confidential. Its transmission is solely as an accommodation for the benefit of the recipient. The recipient bears the responsibility for checking its accuracy against corresponding originally signed documents provided by Schnabel Engineering. If you received this e-mail in error, its use is prohibited. Please destroy it and immediately notify postmaster@schnabel-eng.com

This e-mail including attached files is confidential. Its transmission is solely as an accommodation for the benefit of the recipient. The recipient bears the responsibility for checking its accuracy against corresponding originally signed documents provided by Schnabel Engineering. If you received this e-mail in error, its use is prohibited. Please destroy it and immediately notify postmaster@schnabel-eng.com

Subject: RE: SWP Wilmington: June 7, 2004 correspondence
From: Gregory Kuntz <gkuntz@schnabel-eng.com>
Date: Thu, 1 Jul 2004 07:46:02 -0400
To: Stuart Parker <stuart.parker@ncmail.net>, Gregory Kuntz <gkuntz@schnabel-eng.com>, HANNA ASSEFA <HANNA.ASSEFA@ncmail.net>
CC: <william.arrants@rayonier.com>, <Layton_Bedsole@ncports.com>, <Lucas.Ken@epamail.epa.gov>, James Bateson <James.Bateson@ncmail.net>, <mark.maritato@amec.com>
Return-Path: <gkuntz@schnabel-eng.com>
Original-Recipient: rfc822;stuart.parker@ncmail.net
Received: from scc074.its.state.nc.us (207.4.22.38) by ms01.ncmail.net (6.5.029) id 40BC830D0012175C; Thu, 1 Jul 2004 07:46:24 -0400
Received: from scc074.its.state.nc.us (127.0.0.1) by scc074.its.state.nc.us (6.5.029) id 401CD58300656047; Thu, 1 Jul 2004 07:46:22 -0400
Received: from scc031.its.state.nc.us (207.4.219.18) by scc074.its.state.nc.us (6.5.029) id 401CD58000645074; Thu, 1 Jul 2004 07:46:22 -0400
Received: from mail_svr1.schnabel-eng.com (uslec-66-255-139-152.cust.uslec.net [66.255.139.152]) by scc031.its.state.nc.us (8.13.0/8.13.0/DFR) with ESMTP id i61BkJLx004277; Thu, 1 Jul 2004 07:46:20 -0400 (EDT)
Received: from mail_svr1.schnabel-eng.com [192.168.4.242] by mail_svr1.schnabel-eng.com [192.168.4.242] (CMSPraetor 5.10.4411) with ESMTP id 134D56A4C07F42C9A51A7EED5A083ACF ; Thu, 01 Jul 2004 07:46:10 -0400
Received: by MAIL_SVR1 with Internet Mail Service (5.5.2657.72) id <NQD6RSL5>; Thu, 1 Jul 2004 07:46:09 -0400
Message-ID: <8A962AC3C079D311BF1C009027886370041AE12C@MAIL_SVR1>
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X-Scanned-By: MIMEDefang 2.39

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Gregory B. Kuntz, P.G.
Schnabel Engineering South, LLC
104 Corporate Blvd., Suite 420
West Columbia, South Carolina 29169

Subject: RE: SWP Wilmington: June 7, 2004 correspondence
From: Gregory Kuntz <gkuntz@schnabel-eng.com>
Date: Thu, 1 Jul 2004 07:46:02 -0400
To: Stuart Parker <stuart.parker@ncmail.net>, Gregory Kuntz <gkuntz@schnabel-eng.com>, HANNA ASSEFA <HANNA.ASSEFA@ncmail.net>
CC: <william.arrants@rayonier.com>, <Layton_Bedsole@ncports.com>, <Lucas.Ken@epamail.epa.gov>, James Bateson <James.Bateson@ncmail.net>, <mark.maritato@amec.com>
Return-Path: <gkuntz@schnabel-eng.com>
Original-Recipient: rfc822;stuart.parker@ncmail.net
Received: from scc074.its.state.nc.us (207.4.22.38) by ms01.ncmail.net (6.5.029) id 40BC830D0012175C; Thu, 1 Jul 2004 07:46:24 -0400
Received: from scc074.its.state.nc.us (127.0.0.1) by scc074.its.state.nc.us (6.5.029) id 401CD58300656047; Thu, 1 Jul 2004 07:46:22 -0400
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X-Spam-Status: Yes, hits=1.461 required=5.25
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PARTIAL LOOK AT CLEANUP LEVEL

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From: Stuart Parker [mailto:stuart.parker@ncmail.net]
Sent: Thursday, June 24, 2004 4:51 PM
To: Gregory Kuntz; HANNA ASSEFA
Cc: william.arrants@rayonier.com; Layton_Bedsole@ncports.com; Lucas.Ken@epamail.epa.gov; James Bateson
Subject: Re: SWP Wilmington: June 7, 2004 correspondence

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Subject: Re: SWP Wilmington: June 7, 2004 correspondence

Greg,

I have reviewed your comments, after spending four weekdays on Jury duty.

I am available all of the week of July 12, except for Friday July 16.
I will determine Ms. Assefa's availability when she returns to the office on July 6.

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NC Superfund Section

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Schnabel
Schnabel Engineering South, LLC

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Phone (803) 796-6240
Fax (803) 796-6250
www.schnabel-eng.com

June 7, 2004

RECEIVED
JUN 09 2004
SUPERFUND SECTION

Mr. Stuart F. Parker
Inactive Hazardous Sites Branch
Superfund Section
NC Dept. of Environment and Natural Resources
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Re: Response to April 29, 2004 Comments
Supplemental Remedial Investigation Report
Southern Wood Piedmont Site
NCD 058 517 467
Wilmington, New Hanover County, NC

Dear Mr. Parker;

Schnabel Engineering South, LLC (Schnabel) on behalf of Southern Wood Piedmont Company (SWP) is pleased to respond to the North Carolina Department of Environment and Natural Resources' (NCDENR) April 28, 2004 comments on the Supplemental Remedial Investigation (SRI) Human Health and Ecological Risk Assessment reports for the site located in Wilmington, New Hanover County, North Carolina. Presented below is the comment provided by NCDENR followed by SWP's response to the NCDENR comment.

RESPONSE TO COMMENTS

Comment #8: Hanna Assefa of NCDENR suggested that an updated EPA model for inhalation of particulates be utilized to evaluate the human health risk for a hypothetical construction worker.

Response #8: Please find attached a risk evaluation addendum for a hypothetical construction worker prepared by AMEC Earth and Environmental on April 30, 2004. The USEPA's *2002 Supplemental Guidance for Developing Soil Screening Levels (SSLs) for Superfund Sites* was used to evaluate potential carcinogenic and noncarcinogenic risk to future construction workers at the Wilmington site. The risks from direct ingestion, dermal contact, and inhalation of dust were evaluated.

Comment #10-1: How is it that this area is accessible to piscivorous birds and not to insectivorous birds?

Response #10-1: Insectivorous birds were not selected as a receptor of interest (ROI) for two reasons. First, the ROIs for the Baseline Ecological Risk Assessment (BERA) were selected to represent higher trophic level predators that would likely utilize the area of interest (i.e., Greenfield Creek and drainage ditch) as part of their forage areas. Although some insectivorous birds could forage in and along some portions of the creek (although other areas in the general vicinity may be more attractive foraging areas), AMEC weighted this possibility with the likelihood of greater potential accumulation of COPECs in fish as opposed to aquatic invertebrate prey (insects). Therefore, it was concluded that herons - which can walk into some of these areas (in their present condition) and do not require a flyway like insectivorous birds - would be an appropriate target receptor to reflect the potential risks to avian species from exposures related to chemical residues in Greenfield Creek and the drainage ditch. Herons were also observed during the qualitative ecological community survey performed as part of the screening-level ecological risk assessment (ChemRisk, 1996). Second, as a component of the Department-approved Supplemental Remediation Investigation (SRI), the BERA included a sediment toxicity evaluation that assessed the potential effects of direct contact with sediments. Sediment toxicity testing represents a more conservative analysis of the potential problems associated with constituents in creek and ditch sediment compared to assessing potential indirect effects to a receptor (like an insectivorous bird) that may only forage in the area part of the time. Moreover, because the degree of contamination in a particular creek/ditch sample appears to correlate with severity of toxicity observed, such information also provides useful guidance during consideration of potential remedial options.

Risk management decisions are based on multiple lines-of-evidence. Although the BERA showed no significant risks to the evaluated upper trophic level receptors based on the HQ calculations, the addition of another receptor or exposure pathway will not result in any change in the overall conclusion that remedial measures may be required for some of the sediments in Greenfield Creek and drainage ditch where toxicity was exhibited. Sediment toxicity testing assesses potential impacts to benthic organisms, although they may yield "false positive" results due to the presence of non-target chemicals such as ammonia. Since this lower trophic level community serves indirectly as a prey base for the evaluated higher trophic levels, improvements to the sediment quality in some of the areas would enhance the desirable upper trophic level receptor populations. The improvements to sediment quality would also enhance other receptor populations not specifically addressed in the BERA, such as the insectivorous birds.

Comment #10-2: It is also possible that the trees in the area would someday be removed thus making contamination accessible.

Response #10-3: SWP cannot be held responsible to assess all future-use scenarios for this property and we are not aware of any specific plans for the future use of the Site by the North Carolina Ports Authority other than that it will be used for commercial and industrial purposes. That said, the removal of the trees bounding Greenfield Creek and the drainage ditch has the potential to affect the types of species that may use the area for foraging (although the extensive wetland areas may preclude significant disturbance of these areas). If sediments currently did not exhibit any toxicity then including other receptors (such as the insectivorous birds) would not be unreasonable under this future-use scenario (although such an assessment is more relevant to a FS rather than a BERA, since the latter only assesses current-site conditions). However, since some of the sediments do exhibit toxicity, and it is likely that some remedial measures may be required, removal of trees post-remediation would have no affect on any of the avian receptors related to chemical exposure since contact with the higher risk sediments will likely be reduced.

Comment #10-3: At best I am uncertain that evaluating a piscivorous bird can substitute for evaluating an insectivorous bird. I recommend that, at a minimum a laboratory bioaccumulation test (28 day) be performed using a species like *Lumbriculus variegatus*. The test should be performed on sediments of low, medium, and high relative concentration of contaminants. The results of the bioaccumulation tests can be used in the food chain model as a surrogate for emergent aquatic insects. A letter work-plan outlining the sampling procedure and the laboratory process must be submitted for approval prior to execution.

Response #10-3: Use of the results from the 28-day *Lumbriculus* bioaccumulation test in lieu of collecting empirical data on emergent insects would be a suitable approach to assessing risks to insectivorous birds if this assessment were needed. Whether the risk results calculated from the *Lumbriculus* bioaccumulation study shows an exceedance of the risk threshold or not, there would be no change in the risk management decision for the sediments of Greenfield Creek and the drainage ditch. Therefore the development of a work plan addressing this specific issue is not warranted.

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Schnabel Engineering South, LLC appreciates the opportunity to provide responses to your comments on the SRI Human Health and Ecological Risk Assessment for the SWP Wilmington, North Carolina facility. If you have any questions, please feel free to contact Bill Arrants of SWP at 864-599-1070 ext. 103 or myself at 803-796-6240.

Sincerely,

SCHNABEL ENGINEERING SOUTH, LLC

Gregory B. Kuntz, P.G.
Associate

Attachment – Hypothetical Construction Worker Risk Evaluation Addendum

Cc: William Arrants – SWP
Layton Bedsole – NCSPA
Mark Maritato – AMEC

HYPOTHETICAL CONSTRUCTION WORKER RISK EVALUATION ADDENDUM SOUTHERN WOOD PIEDMONT AND NORTH CAROLINA STATE PORTS AUTHORITY SITE (NCD 058517467) WILMINGTON, N.C.

SUBMITTED TO:

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

SUBMITTED BY:

AMEC Earth & Environmental
15 Franklin Street
Portland, ME 04101

April 30, 2004

HYPOTHETICAL CONSTRUCTION WORKER RISK EVALUATION ADDENDUM SOUTHERN WOOD PIEDMONT AND NORTH CAROLINA STATE PORTS AUTHORITY WILMINGTON, N.C. SITE

Introduction

At the request of DENR, on behalf of Southern Wood Piedmont (SWP), AMEC Earth & Environmental (AMEC) has prepared this supplemental analysis of hypothetical construction worker exposures to surface and subsurface soil at the SWP/North Carolina State Ports Authority Wilmington, N.C. site (referred to as "Site"). Specifically, in various correspondences with the Department regarding AMEC's submission of a *Supplemental Human Health Risk Evaluation*, which was a component of the Site's *Supplemental Remedial Investigation* (SRI) report prepared by Schnabel Engineering Associates, Inc., and submitted to the Department on October 30, 2001, DENR requested that the methodology contained in USEPA's (2002) *Supplemental Guidance for Developing Soil Screening Levels (SSLs) for Superfund Sites* be used to evaluate hypothetical construction worker risks at the Wilmington Site. SWP agreed to conduct this supplemental analysis and submit it as an addendum to the human health risk assessment contained in the SRI report.

Methods

Section 5.3 of EPA's (2002) Soil Screening Level (SSL) guidance document presents a detailed explanation regarding why default construction-based SSLs are not published[1]. In essence, due to the variability in possible exposure conditions among construction workers at a given site, EPA believes that it is not prudent to provide a single list of SSLs values for the construction worker receptor. Alternatively, EPA provides a series of equations in its (2002) guidance beginning in Section 5.3.2 that can be used to derive construction worker SSLs with the input of Site-specific data (Table 1 [Equations 1a and 1b]).

[1] Default SSLs are provided for the residential and commercial/industrial exposure groups. However, due to the unique nature of construction activities, these SSL values would not necessarily be protective of the health of construction workers. Alternatively, site-specific values are to be derived.

This addendum shows the first two equations presented in Section 5.3.2 of EPA's (2002) guidance. Equations 1a is used to derive cancer-risk based SSLs for a hypothetical construction worker for the incidental ingestion and dermal contact with soils exposure pathways. Equation 1b is used to derive cancer-based SSLs for the inhalation exposure pathway where workers could breathe Site-derived dust from truck traffic on unpaved roads and from wind-blown/equipment-generated dust (backhoes/bulldozers digging, etc.). In Equation 1b, Particulate Emission Factors (PEFs) [7.74E+05 m^3/kg relating to simulated truck traffic dust and 3.61E+07 m^3/kg related to wind-blown erosion and excavation-related dust, respectively] derived in Appendix E of EPA's (2002) guidance document were applied to the Site. Although conservative, these PEF values were deemed plausible for a reasonable maximum exposure (RME) scenario after review of the specific input assumptions that went into their derivation as shown in Appendix E. Critical input assumptions for the truck traffic PEF include:

- A 20-foot wide by 467-foot long unpaved roadway (which is equivalent to a 5-acre "site")
- Estimated duration of truck traffic on this unpaved surface: 6 months (5 days/week, 8 hours/day, for 26 weeks)
- 30 vehicles per day (including 20 cars and 10 trucks) are assumed to traverse the entire length of the roadway each day
- 8.5% silt content and 0.2% moisture
- Soil contamination is evenly distributed along the length of the road

Default input assumptions for the wind erosion/other construction activity PEF include:

- A 5-acre bare (unvegetated) surface that acts as an unlimited reservoir of Site contaminants
- Mean wind speed of 10.5 miles per hour
- An active excavation area equal to 1-acre surface area (1 meter deep)
- Entire 5-acre parcel assumed to be bulldozed and graded three times over the course of construction

- Soil contamination is evenly distributed over the entire 5-acre portion of the Site

Table 2 (equations 2a and 2b) present the derivation of noncarcinogenic ingestion/dermal contact and inhalation-derived construction-related SSLs. Default exposure values presented in EPA (2002) are also shown in Table 2. Table 3 presents the chemical-specific toxicity factors (including exposure route-specific cancer slope factors [CSFs], inhalation unit risk factors [URFs], exposure route-specific noncancer reference doses [RfDs] and noncancer inhalation reference concentrations [RfCs]) used in the RME SSL calculations, along with references for the source of each chemical's toxicity information. Table 4 presents a summary of chemical-specific oral and dermal absorption factors, along with their respective sources.

Results

Tables 5 and 6 present the results of the cancer and noncancer construction worker SSL analysis, respectively. With the exception of hexavalent chromium and naphthalene, the lowest (most conservative) SSLs were derived for the carcinogenic ingestion/dermal contact exposure pathways. The lowest value for hexavalent chromium (21 mg/kg) resulted from the simulated truck traffic exposure analysis. For naphthalene, the noncarcinogenic ingestion/dermal contact exposure pathway resulted in the lowest derived SSL (19,356 mg/kg).

Discussion

Relative to the risk-based soil cleanup levels shown in Table 5-2 of AMEC's previous HHRA for the Site (AMEC, 2001), the newly derived SSLs based on EPA's (2002) conservative methodology for the construction worker are lower. Generally, this is due to the use of different target cancer risk levels (10^{-6} vs. 10^{-5}) used to derive the SSLs. In some cases, the difference between the previous Table 5-2 values and the new Table 5 and Table 6 values can be explained by the vehicular traffic and earth moving generated dust assumptions in combination with more conservative exposure assumptions incorporated in EPA's construction worker ingestion/dermal contact exposure model.

The importance of these numerical changes is less significant for surface soil (top 6 inches). For surface soils, SSLs previously derived for the hypothetical facility worker (Table 5-3 of AMEC, 2001) are, with the exception of chromium, lower for all Site chemicals of potential concern. Thus, excluding chromium, the facility worker-derived soil values should remain the risk-based targets for surficial soil. For chromium, the newly derived value of 21 mg/kg should serve as the replacement target value in both surface and subsurface soil. Finally, bold values shown on Table 5 and 6 of this analysis should be used to replace subsurface soil risk-based values previously derived in Table 5-2 of the HHRA (AMEC, 2001).

It should be noted that, for the construction worker inhalation exposure pathway, there are two critical factors that result in SSLs that are lower than they technically should be. The first has to do with the pre-determined assumption regarding the volume of air breathed in by a receptor that is "built into" the inhalation toxicity factors (unit risk factors [URFs] for carcinogens and reference concentrations [RfCs] for noncarcinogens). EPA (1989) indicates that an inhalation URF and RfC assume an air intake rate of 20 m^3/day (20 cubic meters of air over a 24-hour period). Because a construction worker typically works on a site 8 to 10 hours per day, that inhalation rate should be "pro-rated" over the actual duration spent on a site (in other words, reduced by a factor of approximately 8/24 or 0.33). Such a reduction in volume of air assumed to be breathed in at a site would directly translate to an increase in the derived soil SSL based on the inhalation exposure route.

The second critical factor that applies to noncarcinogenic compounds across all the construction worker exposure routes (dermal, soil ingestion and inhalation) concerns the issue of sub-chronic verses chronic exposures. The construction worker scenario typically reflects a short-term degree of exposure (on the order of 3 to 6 months). However, few, if any, sub-chronic-based noncarcinogenic toxicity criteria are available for use in risk assessments. Consequently, the analyst must rely upon chronic based values that are lower because they assume continuous exposure over a long exposure duration. SSLs derived using these lower chronic values result in artificially low cleanup goals for a subchronic analysis like a construction worker.

In summary, many levels of conservatism are built into the process of deriving SSLs according to EPA's (2002) protocol. The net result is that the derived SSLs are likely significantly health protective. Other factors also influence the degree to which the derived SSLs may be overly conservative (lower than necessary to protect the health of a given receptor). For example, if the active excavation area is less than the one acre EPA has assumed in the calculations, or if dust suppression techniques are employed (such as periodic spraying of the roadway), actual exposures would be lower than assumed by EPA's protocol. Similarly, if a construction worker wore gloves or other apparel that acted as an effective barrier to direct contact with soil, the degree of exposure assumed by EPA's SSL modeling approach would be far lower and may even be zero.

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Table 1 - Construction Risk Based Concentrations [RBCs] (Carcinogenic, subchronic exposures)

Direct ingestion and dermal contact exposure

Eqn. 1a

$$SSL\ (mg/kg) = \frac{TR \times BW \times AT \times 365\ d/yr}{((EF \times ED \times 10^{-6}\ kg/mg) \times ((Sfo \times IR) + (SF_{ABS} \times AF \times ABS_d \times SA \times EV)))}$$

Parameter/Definition (units)	Default Values
TR/target cancer risk (unitless)	1.00E-06
BW/body weight (kg)	70
AT/averaging time (years)	70
EF/exposure frequency (days/year)	80
ED/exposure duration (years)	1
SF_o/oral cancer slope factor $(mg/kg\text{-}d)^{-1}$	Chemical specific (see Table 3)
IR/soil ingestion rate (mg/d)	330
SFabs/dermally adjusted cancer slope factor $(mg/kg\text{-}d)^{-1}$	Chemical specific (see Table 3)
AF/skin-soil adherence factor (mg/cm^2-event)	0.3
ABS_d/dermal absorption fraction (unitless)	Chemical specific (see Table 4)
SA/skin surface area exposed (cm^2)	3,300
EV/event frequency (events/day)	1

Inhalation of Dust Exposure

Eqn. 1b

$$SSL\ (mg/kg) = \frac{TR \times AT \times 365\ d/yr}{URF \times EF \times ED \times 1/PEF_{SC}}$$

Parameter/Definition (units)	Default Values
TR/target cancer risk (unitless)	1.00E-06
AT/averaging time (years)	70
URF/inhalation unit risk factor $(mg/m^3)^{-1}$	Chemical specific (see Table 3)
EF/exposure frequency (days/year)	80
ED/exposure duration (years)	1
PEF_{SC}/subchronic road particulate emission factor (m^3/kg) (Source: EPA, 2002)	7.74E+05
PEF_{SC}/subchronic windblown dust particulate emission factor (m^3/kg) (Source: EPA, 2002)	3.61E+07

Table 2 - Construction Risk Based Concentrations [RBCs] (Noncarcinogenic, subchronic exposures)

Direct ingestion and dermal contact exposure

Eqn. 2a

$$SSL\ (mg/kg) = \frac{THQ \times BW \times AT \times 365\ d/yr}{((EF \times ED \times 10^{-6}\ kg/mg) \times ((1/HBL_{CS} \times IR) + (1/HBL_{ABS} \times AF \times ABS_d \times SA \times EV)))}$$

Parameter/Definition (units)	Default Values
THQ/target hazard quotiens (unitless)	1
BW/body weight (kg)	70
AT/averaging time (years)	1
EF/exposure frequency (days/year)	80
ED/exposure duration (years)	1
HBL_{SC}/subchronic health-based limit (mg/kg-d)	chemical specific (see Table 3)
IR/soil ingestion rate (mg/d)	330
HBL_{ABS}/subchronic health-based limit [RfD] (mg/kg-d)	chemical specific (see Table 3)
AF/skin-soil adherence factor (mg/cm^2-event)	0.3
ABS_d/dermal absorption fraction (unitless)	chemical specific (see Table 2)
SA/skin surface area exposed (cm^2)	3,300
EV/event frequency (events/day)	1

Inhalation of Dust exposure

Eqn. 2b

$$SSL\ (mg/kg) = \frac{THQ \times AT \times 365\ d/yr}{EF \times ED \times (1/HBL_{SC} \times 1/PEF_{SC})}$$

THQ/target hazard quotiens (unitless)	1
AT/averaging time (years)	1
EF/exposure frequency (days/year)	80
ED/exposure duration (years)	1
HBL_{SC}/subchronic health-based limit [RfC] (mg/kg-d)	chemical specific (see Table 3)
PEF_{SC}/subchronic road particulate emission factor (m^3/kg) (Source: EPA, 2002)	7.74E+05
PEF_{SC}/subchronic windblown dust particulate emission factor (m^3/kg) (Source: EPA, 2002)	3.61E+07

Table 3 - Summary of COPC Toxicological Data

		Cancer Slope Factors (CSF)		Unit Risk Factor	Reference Doses (RfD)		Reference Concentration (RfC)	
		$(mg/kg\text{-}d)^{-1}$		(mg/m^3)-1	(mg/kg-d)		(mg/m^3)	
Chemical	Weight-of-Evidence	Oral	Dermal[a]	Inhalation	Oral	Dermal[a]	Inhalation	Source
Arsenic	A	1.5	1.88	4.3	0.0003	0.0002	–	IRIS, 2004; RAIS, 2004
Chromium	A	–	–	12.0	0.003	0.0001	0.0001	IRIS, 2004; RAIS, 2004
Benz(a)Anthracene	B2	0.73	2.52	0.088	–	–	–	IRIS, 2004; RAIS, 2004
Benzo(a)Pyrene	B2	7.3	25.2	0.88	–	–	–	IRIS, 2004; RAIS, 2004
Benzo(b)Fluoranthene	B2	0.73	2.52	0.088	–	–	–	IRIS, 2004; RAIS, 2004
Benzo(k) Fluoranthene	B2	0.073	0.25	0.0088	–	–	–	IRIS, 2004; RAIS, 2004
Carbazole	B2	0.02	0.0286	0.0000057	–	–	–	RAIS, 2004; EPA, 1996a
Chrysene	B2	0.0073	0.025	0.00088	–	–	–	IRIS, 2004; RAIS, 2004
Dibenzo(a,h)Anthracene	B2	7.3	25.2	0.88	–	–	–	IRIS, 2004; RAIS, 2004
Indeno(1,2,3-cd)Pyrene	B2	0.73	2.52	0.088	–	–	–	IRIS, 2004; RAIS, 2004
Naphthalene	C	–	–	–	0.02	0.0058	0.14	IRIS, 2004; EPA, 1996a
TCDD TEQ[c,d]	B2	150,000	150,000	3.3E+04	0.000000001	0.000000001	–	EPA, 2003; ATSDR, 1998

a - CSFs and RfDs for the dermal exposure route have been adjusted based on the oral absorption factors shown in Table 4. Dividing the oral CSF and/or RfD by the chemical-specific absorption factor in Table 4 results in the adjusted values presented in the dermal columns above
b - Inhalation Unit Risk Factors were obtained from EPA's IRIS chemical database and RAIS Toxicity Profiles
c - The cancer slope factor for TCDD is from EPA's Health Effects Summary Tables (HEAST) (EPA, 1995)
d - The reference dose is based on a minimum risk level (MRL) of 1 pg/kg-day as cited in ATSDR (1998)

Table 4 - Summary of Oral and Dermal Absorption Factors

	Oral Exposure		Dermal Exposure	
Chemical	Absorption Factor	Source	Absorption Factor	Source
Arsenic	0.8	EPA, 1996b	0.01	EPA, 1996b
Chromium	0.037	ATSDR, 2000	0.01	EPA, 1996b
Benz(a)Anthracene	0.29	Magee et al. 1996	0.02	Magee et al. 1996
Benzo(a)Pyrene	0.29	Magee et al. 1996	0.02	Magee et al. 1996
Benzo(b)Fluoranthene	0.29	Magee et al. 1996	0.02	Magee et al. 1996
Benzo(k)Fluoranthene	0.29	Magee et al. 1996	0.02	Magee et al. 1996
Carbazole	0.29	Magee et al. 1996	0.02	Magee et al. 1996
Chrysene	0.29	Magee et al. 1996	0.02	Magee et al. 1996
Dibenzo(a,h)Anthracene	0.29	Magee et al. 1996	0.02	Magee et al. 1996
Indeno(1,2,3-cd)Pyrene	0.29	Magee et al. 1996	0.02	Magee et al. 1996
Naphthalene	0.29	Magee et al. 1996	0.1	Magee et al. 1996
TCDD TEQ	0.5	Bonaccorsi et al., 1984; Shu et al., 1988 a,b	0.02	Shu et al., 1987; 1988 a,b

Table 5 - Construction Worker Carcinogenic Ingestion/Dermal Contact and Inhalation-Based SSLs

	Ingest/dermal SSL (mg/kg)	Inhalation (truck traffic dust) SSL (mg/kg)	Inhalation (wind erosion and other construction) SSL (mg/kg)
Arsenic	**45**	57	2,681
Chromium	NA[1]	**21**	961
Benz(a)Anthracene	**93**	2,809	131,016
Benzo(a)Pyrene	**9**	281	13,102
Benzo(b)Fluoranthene	**93**	2,809	131,016
Benzo(k)Fluoranthene	**928**	28,090	1,310,163
Carbazole	**3,384**	43,367,763	2,022,708,333
Chrysene	**9,257**	280,905	13,101,634
Dibenzo(a,h)Anthracene	**9**	281	13,102
Indeno(1,2,3-cd)Pyrene	**93**	2,809	131,016
Naphthalene	NA[2]	NA[2]	NA[2]
TCDD TEQ	**0.000452**	0.00749	0.34938

NA[1]: Chromium (specifically the hexavalent form) is only carcinogenic by the inhalation pathway

NA[2]: Naphthalene is not a carcinogenic compound

Table 6 - Construction Worker Noncarcinogenic Ingestion/Dermal Contact and Inhalation-Based SSLs

	Ingest/dermal SSL (mg/kg)	Inhalation (truck traffic dust) SSL (mg/kg)	Inhalation (wind erosion and other construction) SSL (mg/kg)
Arsenic	290	NA	NA
Chromium	2,903	353	16,471
Benz(a)Anthracene	NA	NA	NA
Benzo(a)Pyrene	NA	NA	NA
Benzo(b)Fluoranthene	NA	NA	NA
Benzo(k)Fluoranthene	NA	NA	NA
Carbazole	NA	NA	NA
Chrysene	NA	NA	NA
Dibenzo(a,h)Anthracene	NA	NA	NA
Indeno(1,2,3-cd)Pyrene	NA	NA	NA
Naphthalene	**19,356**	494,393	23,058,875
TCDD TEQ	0.000968	NA	NA

NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

April 29, 2004

Mr. Gregory B. Kuntz, P. G., Associate
Schnabel Engineering Associates, Inc.
104 Corporate Boulevard, Suite 420
W. Columbia, South Carolina 29169

Dear Mr. Kuntz,

Hanna Assefa, NC Superfund Section, and Sandra Mort, NC Division of Water Quality, Aquatic Toxicology Unit (ATU) have provided me with responses to the items outlined in your February 11, 2004 submittal to the NC Superfund Section. Their brief comments are attached.

In summary, the ATU is satisfied with the responses to their comments. However, they did include procedural recommendations for future sediment ecotoxicity testing.

Ms. Assefa has discussed Item # 8 (particulate inhalation exposure) with Schnabel Engineering Associates and their risk assessment subcontractor. Her comments on Item # 10 (evaluation of insectivorous bird exposure) include an outline of additional laboratory data and modeling that will be required for completion of the Ecological Risk Assessment.

Following the successful completion of the above tasks, and the NC Superfund Section's approval of submitted 10^{-6} cleanup levels, Southern Wood Piedmont Co will be directed to assemble and submit its (draft) Final Remedial Investigation Report. If you have any questions, please contact me at (919) 733-2801, Ext. 280.

Sincerely,

Stuart F. Parker, Hydrogeologist
NC Superfund Section

cc: William B Arrants, Southern Wood Piedmont Co.
James Bateson, NC Superfund Section
H. Layton Bedsole, NC Ports Authority
Ken Lucas, USEPA Region IV

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April 28, 2004

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Assessment and Remediation Branch

From: Hanna Assefa
Environmental Toxicologist
Inactive Hazardous Sites Branch

RE: Southern Wood Piedmont
Human Health and Ecological Risk Assessment

The following is my response to the February 11, 2004 response to comments submitted by schnabel engineering:

Response # 8 – I have discussed this response with the risk assessor for schnabel and we have agreed that they would use the updated EPA model for inhalation of particulates in the construction worker scenario. All chemicals that have exceeded the USEPA Region 9 preliminary remediation goals will have remediation goals determined using the combined oral, dermal, and inhalation pathway. As I explained in my e-mail to Greg Kuntz of Schnabel Engineering, the generic soil screening levels found in the 1996 USEPA Soil Screening Guidance must not be used to screen.

Response # 10 - The statement is made that "adjoining areas to Greenfield Creek and the drainage ditch are substantially wooded and represent narrow flyways that preclude easy access to the area by insectivorous birds that may prey on the adult life stage of emergent aquatic insects".

1. How is it that the area is accessible to piscivourous birds and not to insectiverous birds?

2. It is also possible that the trees in the area would someday be removed thus making the contamination accessible.

3. At best I am uncertain that evaluating a piscivorous bird can substitute for evaluating an insectivorous bird.

I recommend that, at minimum a laboratory bioaccumilation test (28 day) be performed using a species like Lumbriculus Variegatus. The test should be performed on sediments of low, medium, and high relative concentration of contaminants. The results of the bioaccumilation tests can be used in the food chain model as a surrogate for emmergent aquatic insects. A letter work-plan outlining the sampling procedure and the laboratory process must be submitted for approval prior to execution.

Subject: Construction worker scenario- Inhalation of particulates
From: Hanna Assefa <hanna.assefa@ncmail.net>
Date: Wed, 28 Apr 2004 15:53:38 -0400
To: gkuntz@schnabel-eng.com
CC: STUART PARKER <STUART.PARKER@ncmail.net>

Greg the reason that one should not use the appendix A soil screening levels is that:

1. They are old (1996); toxicological data may have changed since then.
2. They only cover ingestion and inhaltion pathway. The dermal pathway is also important for the construction worker.

You have already screened using the region 9 PRGs. No reason to screen again. Just calculate surface soil cleanup levels using the the equation for the inhalation of particulates for the construction worker scenario (USEPA 2002 Soil Screening Guidance) in combination with the oral and dermal equations. Please have your risk assessor call me if he has any questions.

Subject: RE: RI Finalization
From: Gregory Kuntz <gkuntz@schnabel-eng.com>
Date: Wed, 14 Apr 2004 14:40:55 -0400
To: Stuart Parker <stuart.parker@ncmail.net>
CC: <hanna.assefa@ncmail.net>, <william.arrants@rayonier.com>

Stuart/Hanna,

We will use EPA's (2002) dust model to calculate hypothetical construction worker risks, but will rely on the default Appendix A residential/commercial & industrial worker values for those pathways? We could offer this follow-up as an addendum to the RA report so as not to hold up the process.

Is this ok with NCDENR?

Thanks,

Gregory B. Kuntz, P.G.
Schnabel Engineering South, LLC
104 Corporate Blvd., Suite 420
West Columbia, South Carolina 29169
803-796-6240
803-796-6250 (fax)
803-960-0641 (mobile)
gkuntz@schnabel-eng.com

-----Original Message-----
From: Stuart Parker [mailto:stuart.parker@ncmail.net]
Sent: Monday, April 12, 2004 1:05 PM
To: Gregory Kuntz
Subject: Re: RI Finalization

Hello Greg,

We are ready to give the go-ahead for RI finalization, but Hanna Assefa has just a couple of questions/clarifications on the Risk Assessment; She was wondering if would be OK for her to contact the subcontractor, and if so, whom to call, and where.
If that's OK that would expedite things; no need for a conference call.
The NC Water Quality people seem to be satisfied with the responses to their issues.

Thanks,
Stuart

This e-mail including attached files is confidential. Its transmission is solely as an accommodation for the benefit of the recipient. The recipient bears the responsibility for checking its accuracy against corresponding originally signed documents provided by Schnabel Engineering. If you received this e-mail in error, its use is prohibited. Please destroy it and immediately notify postmaster@schnabel-eng.com

NORTH CAROLINA PORTS®

WILLIAM C. BENNETT, P.E.
Director of Engineering

Received
APR 2004
Waste Management

April 8, 2004

Brad Atkinson
Non-Point Source Pollution Program Coordinator
N.C. Division of Waste Management
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Re: North Carolina State Ports Authority, Port of Wilmington
Phytoremediation Research, Polycyclic Aromatic Hydrocarbons
Media Sampling, Former Southern Wood Piedmont Site
Wilmington, North Carolina

Dear Mr. Atkinson:

Please accept this response to your letter of February 27, 2004 and your e-mail correspondence dated March 22, 2004 and Ms. Nichols' e-mail correspondence dated April 7, 2004, each related to the proposed media sampling from the former Southern Wood Piedmont site. The N.C. State Ports Authority is happy to cooperate in this endeavor. The success of this research project could conceivably be beneficial to impacted municipal, commercial and industrial sites adjacent to water bodies throughout the State and Nation. As I understand your request, there will be, on site, approximately four people from the Division of Waste Management and approximately four from NC State University and Ohio State University. They would probably be on site for no more than two days. The intent is to collect approximately ten cubic feet of contaminated soil, sediment pore and wetland water samples from various site locations. These collections will be by means of hand held tools, minimizing surface and sub-surface intrusion.

The permission of the Ports Authority for this undertaking is contingent on your acceptance of the following conditions:

1. The Ports Authority must have at least one working day's advance notice for access. I will be your contact for that notice. I will need to know the time access is requested, so that I can arrange physical entrance to the site. All individuals visiting the site will be required to have photo identification.

2. If any permitting or other regulatory requirements apply to these sampling efforts, the responsibility for complying with all federal, state or local laws or regulations will be entirely that of the Division of Waste Management and, if applicable, NC State University and Ohio State University. This specifically includes but is not limited to any regulatory requirements with regard to the transportation and disposal of the sampled material obtained from the site.

3. The sampling effort must be undertaken so as to cause as little disturbance to the soil surface and sub-surface as is possible.

4. There must be one individual, who is to be identified when the access notice is given, who will be in charge of the sampling effort and will be responsible for insuring that all of the personnel onsite conduct themselves responsibly and in accordance with these conditions.

5. Every person who comes on the site must be advised generally of the nature of the contamination on the site and the fact that they enter the premises at their own risk and by doing so waive any claims against the Ports Authority for any illness or injury which might befall them as a result of this sampling effort.

6. The N.C. Ports Authority will be included in the transmittal of any Draft and Final documentation resulting from this study.

If these conditions are acceptable, please so indicate by signing the enclosed copy of this letter and returning the same to me. I look forward to working with you in connection with this project.

Sincerely,
North Carolina State Ports Authority

H. Layton Bedsole Jr., R.E.M.
Environmental Manager

On behalf of the North Carolina Department of Environment and Natural Resources, Division of Waste Management, I accept the conditions stated above.

_____ Date: _____

Brad Atkinson
Non-Point Source Pollution Program Coordinator

Cc: Elizabeth G. Nichols, Ph.D., NCSU

NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

February 27, 2004

Mr. Layton Bedsole
Environmental Affairs Manager
North Carolina State Ports Authority
P.O. Box 9002
Wilmington, NC 28402

Re: Phytoremediation research on PAH contaminated soil

Dear Mr. Bedsole,

In January 2003, the Division of Waste Management's Non-Point Source Pollution Program cooperated with Dr. Elizabeth Nichols of the NCSU Forestry Department's Environmental Technology Program on a grant application. The grant application was to a joint interagency phytoremediation program funded by the National Science Foundation (NSF), Department of Energy (DOE), Office of Naval Research (ONR), and Strategic Environmental Research and Development Program (SERDP). The grant requested funds to perform mechanistic studies of the bioavailability of polycyclic aromatic hydrocarbons (PAHs) in vegetative system using isotopic tracer techniques. In August 2003, Dr. Nichols received confirmation that NSF would fund the grant.

After evaluating several sites, DWM and NCSU have chosen the Southern Wood Piedmont (SWP) site in Wilmington as a preferred site from which to collect contaminated soil. Samples from one other site in North Carolina and one site in Indiana will also be used in this research.

This work will require a relatively small amount of PAH contaminated soil from the SWP site. The samples will be collected by hand without the use of mechanical equipment. All research will be performed in the laboratory with no research-related restrictions placed on the site and at no expense to the site owner or responsible party. The duration of this research should be approximately three years and will provide needed information on a potential option to remediate soil contaminated by PAH compounds.

This letter is to formally request permission from the North Carolina State Ports Authority for NCSU faculty and students to access the site with DWM employees to collect the necessary samples and to proceed with the research. If approved, sample collection would need to take place in the summer or early fall of 2004. Should follow-up site visits be necessary, approval would first be sought from the Ports Authority.

If you or others have any questions, please do not hesitate to contact me. If needed, DWM staff and Dr. Nichols could meet with the you in Raleigh or possibly in Wilmington to discuss the proposed research.

Thank you for your consideration and I look forward to your response to this unique opportunity.

Sincerely,

Brad Atkinson
Non-Point Source Pollution Program Coordinator
NC Division of Waste Management

1646 Mail Service Center, Raleigh, North Carolina 27699-1646
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Division of Water Quality
- Aquatic Toxicology Unit

March 22, 2004

MEMORANDUM

To: Stuart Parker
Superfund Section, DWM

From: Sandy Mort
Environmental Biologist, Aquatic Toxicology Unit, DWQ

Subject: Review of Southern Wood Piedmont (Wilmington) –comments on Review of response to additional ATU comments

ATU has reviewed Schnabel's response to ATU's comments in the July 31, 2002 document regarding the sediment toxicity report. The additional information adequately addresses ATU's concerns regarding the sediment toxicity protocols, although concern is still expressed regarding the lack of over lying water renewal during the whole-sediment amphipod tests.

Schnabel identified ASTM E1382-93 as their protocol reference for the 10-day amphipod sediment toxicity tests, and that this document recommends static overlying water. ASTM E1383-93 was discontinued in 1995 and replaced with E1706 (their accreditation paperwork included in this package references E1706). The current edition of this method does recommend overlying water renewal rather than static tests, correctly stating over lying water quality may change profoundly during exposure in static tests. These changes in over lying water quality may negatively impact organism health or influence the toxicity of sediment contaminants. Increases in ammonia and changes in pH are typically identified as characteristics that likely may be significantly altered in static sediment tests. One means to monitor for undesired effects resulting from static over lying water is to closely monitor parameters that may impact organism sensitivity and contaminant bioavailability, such as TOC, pH, ammonia, conductivity, TSS or alkalinity. Schnabel identified in their original report that ammonia did not increase significantly over the coarse of the test. This is one assurance that the static water did not impact data reliability in this particular test. The reference toxicant data does not provide additional support for static water as they are performed in a water-only matrix. Nor does the control sediment treatment performed during the 10-day test sample tests, as they are a sand matrix, not likely to exhibit the same ammonia and pH changes as"real-world" sediments containing higher levels of organic matter.

In summary, although ATU expresses concern with the test methods employed for these whole-sediment amphipod tests, the ammonia data reported for these tests does not indicate that ammonia-associated water quality would have impacted organism suitability. ATU does recommend that further whole-sediment amphipod testing employ overlying water renewal as specified in current USEPA and ASTM methods, unless comprehensive data can be provided to indicate that non-renewal is appropriate.

Division of Water Quality
- Aquatic Toxicology Unit

March 22, 2004

MEMORANDUM

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Superfund Section, DWM

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Environmental Biologist, Aquatic Toxicology Unit, DWQ

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Schnabel
Schnabel Engineering South, LLC

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West Columbia, SC 29169

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Fax (803) 796-6250
www.schnabel-eng.com

February 11, 2004

RECEIVED
FEB ~~JAN~~ 1 2 2004
SUPERFUND SECTION

Mr. Stuart F. Parker
Inactive Hazardous Sites Branch
Superfund Section
NC Dept. of Environment and Natural Resources
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Re: Response to Comments on November 24, 2003 Letter
Supplemental Remedial Investigation
Southern Wood Piedmont Site
NCD 058 517 467
Wilmington, New Hanover County, NC

Dear Mr. Parker;

Schnabel Engineering South, LLC (Schnabel) on behalf of Southern Wood Piedmont Company (SWP) is pleased to respond to the November 24, 2003 North Carolina Department of Environment and Natural Resource's (NCDENR) letter on Supplemental Remedial Investigation (RI) activities for the Wilmington, North Carolina Site. The November letter from NCDENR is a response to our October 15, 2003 response to comments letter on the July 31, 2003 Additional DNAPL and Groundwater Delineation Report and on the Supplemental RI Risk Assessment to date. In each section the comment provided by NCDENR (some are paraphrased) is shown and is followed by Schnabel's response to the NCDENR comment. NCDENR's November 24, 2003 comment letter is attached to this document.

1. Page 1, Paragraph 2 of the November 24, 2003 letter:

Comment

The EPA noted a general concern that the Cape Fear River remains a potential receptor for site groundwater contaminants.

Response

The shallow aquifer plume as shown on Figure 12 (attached) of the July 31, 2003 Additional DNAPL and Groundwater Delineation Report suggests that a limited plume discharge to the Cape Fear River may be occurring in the southern slip area. However, tidal affects in the Cape Fear River limit this discharge.

The intermediate aquifer plume as shown on Figure 13 (attached) of the July 31, 2003 Additional DNAPL and Groundwater Delineation Report suggests that no plume

discharge is occurring to the Cape Fear River. The intermediate aquifer plume is located in the central and southern portions of the site. In this area of the site the groundwater flow is consistently to the southeast throughout the tidal cycles. It is unlikely that the intermediate aquifer plume would migrate to the Cape Fear River.

The bedrock aquifer plume as shown on Figure 14 (attached) of the July 31, 2003 Additional DNAPL and Groundwater Delineation Report suggests that no plume discharge is occurring to the Cape Fear River. The bedrock aquifer plume is located in the southeast portion of the site. Net transport in the bedrock aquifer is to the southwest toward the Cape Fear River. However, groundwater flow is retarded around high tide during the temporary reversal of flow in the bedrock aquifer in the southwestern portion of the site as discussed in the October 15, 2003 response to comments letter. The downgradient edge of the bedrock aquifer plume appears to be located approximately 1,000 feet from the Cape Fear River. A significant amount of time would be required for this plume to reach the Cape Fear River and plume equilibrium (steady state) would likely be achieved prior to the plume reaching the Cape Fear River.

2. Page 1, Paragraph 3 of the November 24, 2003 letter:

Comment

What are Schnabel's geophysical capabilities and their application at the site?

Response

Schnabel Engineering has conducted a number of geophysical investigations at environmental sites to support assessments and remediation. Our capabilities include a full range of geophysical methods, including seismic techniques, ground-penetrating radar (GPR), 2D resistivity imaging, electromagnetic induction (EM), and magnetometry. Example applications include locating buried tanks, drums, and pipelines, mapping geologic stratigraphy and structure, determining depth to bedrock, mapping diabase dikes, locating bedrock fracture zones, delineating buried municipal and hazardous waste, and mapping contamination plumes.

The potential applications for geophysics at this particular site include refining the maps of the stratigraphic units and the maps of the free product. The revised maps could be used to help determine locations for additional monitoring wells and/or remediation systems. The following methods may have some application at this site.

Ground-penetrating radar (GPR) – GPR has the potential to be used to map the top of the Peat layer and the overlying free product. However, if the water in the Upper Sand is too saline, then the GPR energy would be absorbed and attenuated and it would be difficult to obtain reflections from the water/free product interface and the Upper Sand/Peat interface. It would probably not be possible to obtain GPR reflections from the

top of the Lower Clay or of the free product on top of the Lower Clay. The effectiveness of GPR at this site could be determined by conducting a one-day test. However, given the relative completeness of the existing maps of the Peat and overlying free product, a GPR survey, even if successful, may not provide any additional information.

2D Resistivity Imaging – Resistivity imaging is often used to provide 2D cross-sections of major stratigraphic units, provided there is sufficient conductivity contrast between the units. Typically, the contrast between sand and clay units is sufficient to allow the 2D resistivity method to work. However, at this site, any high salinity areas would decrease the resistivity and make the aquifers as conductive as the Peat and the Lower Clay. As a result, there would be little conductivity contrast between the units decreasing the reliability of the data. It may be possible to image the approximate extent of the Peat and the overlying free product using resistivity. However, it would only be possible to determine the effectiveness of this method by conducting a one-day test. The peat and free product on top of the peat appears to be well defined and the resistivity data would most likely not provide any additional information than what is already known about the site. The intermediate aquifer and the lower clay could only be poorly defined, if at all.

Seismic Reflection – The seismic reflection method is commonly used to obtain images of subsurface geologic structure and stratigraphy. This method has potential to provide reflection images of the Lower Clay that can be used to refine the existing map. The free product overlying the Lower Clay is probably too thin to be imaged using this method. The top of the Peat and the overlying free product are probably too shallow to be imaged. While we have experience in seismic reflection data collection and interpretation, we would need to bring in a specialty contractor who would help us in the data collection and processing. The relatively high cost and unknown chance of success of this method would need to be compared to the cost of obtaining additional boring data. The level of completeness of the existing map of the Lower Clay and the need for additional resolution would also need to be considered.

To summarize, there are some geophysical methods that have the potential to be used on this site to help refine the maps of the Peat, Lower Clay, and the extent of the free product overlying the Peat. If the investigation of this site was just beginning and there were only a few or no existing borings, then it would definitely be worthwhile trying to obtain geophysical data that could guide an intrusive investigation. However, given that there is lot of existing information about the subsurface stratigraphy, and considering the low to medium chance of success of the various geophysical methods, then it is our opinion that this is not an appropriate application for geophysics.

3. Page 2, Paragraphs 1, 2 & 3 of the November 24, 2003 letter:

Comment

The NC Superfund Section anticipated that the HHRA would consist of forward risk calculation (incorporating the expanded data set) followed by calculation of Cleanup Goals for those compounds that exceeded acceptable risk levels. However, SWP instead submitted revised Cleanup Goal calculations based on 10^{-5} risk for each chemical, referring to the original (1996) Risk Assessment. The Superfund Section wishes to review the revised 10^{-6} risk level cleanup goals prior to draft finalization.

Response

The NCDENR comment appears to imply that risk-based media target levels were developed based on the results of the May 1996 baseline human health and ecological risk assessment. This is incorrect. Supplemental human health and ecological risk analyses (HHRA & ERA) were provided in the October 30, 2001 Supplemental Remedial Investigation Report for the Wilmington, NC Site (Reference 8 and 9, respectively). These analyses were prepared using contemporary data, including sampling data collected as recently as April 25, 2001. The 1996 baseline HHRA and ERA were referenced where exposure assessment issues remained the same, or where the new data were in agreement with earlier data. Consequently, the media-specific risk-based media concentrations derived in the 2001 HHRA reflect all that is known about the Site from a sampling standpoint, including pertinent information and data collected during EPA's 1997 Expanded Site Investigation.

With regard to a specific cancer risk management benchmark used in the HHRA in the determination of risk-based media concentrations, for the final Site HHRA document, we will comply with the Department's request to calculate cleanup targets using 1×10^{-6}. We will also provide cleanup levels corresponding to the other cancer risk targets associated with the 1990 National Contingency Plan (NCP) (1×10^{-5} and 1×10^{-4}). Thus, cleanup targets for carcinogenic compounds will be provided for all three NCP cancer risk levels (10^{-4}, 10^{-5}, and 10^{-6}).

We concur with the conclusion that the approach used in the human health risk assessment (calculation of risk-based cleanup goals) is reasonable in this case since it is protective of the human receptors. This approach was taken to facilitate the development of the remediation objectives for the site.

Please find attached as Tables 1 through 4 the 10^{-4}, 10^{-5}, and 10^{-6} cleanup goals for sediment, surface soil, subsurface soil, and fish consumption, respectively.

4. Page 1, Paragraphs 1 & 2 of the October 14, 2003 Memorandum to Stuart Parker from Hanna Assefa:

Comment

I recommend that the consultant submit the revised RGO calculation with the necessary changes incorporated.

Response

As noted above, SWP will provide the Department with risk-based media concentrations representative of a 1 x 10^{-6} cancer risk level in the final HHRA report.

5. Page 1, Response 3 of the January 27, 2003 Memorandum to Stuart Parker from Hanna Assefa:

Comment

Explain why these samples were chosen.

Response

Media- and location-specific chemical concentrations from the 1990s to the present were compared in Section 5.0 of the supplemental HHRA report to the risk based concentrations derived in Section 4.0. This was done on a sample-by-sample basis. Tables 5-1 through 5-3 presented the receptor-specific RBCs, while Tables 5-4 through 5-6 presented the results of medium-specific sample exceedances of their respective RBCs when individual data points were compared with the health-based RBCs. While in reality a person would not be exposed to a single sampling location, this sample-by-sample effort was undertaken to provide direction to the subsequent Site remedial action phase of the project.

6. Page 1, Response 8 of the January 27, 2003 Memorandum to Stuart Parker from Hanna Assefa:

Comment

Calculate RBC's for 10^{-6} target risk for all class A,B,C carcinogens.

Response

As noted above, SWP will comply with the Department's directive to calculate RBCs for carcinogenic compounds based on the 1 x 10^{-6} cancer risk level benchmark.

7. Page 1, Response 9 of the January 27, 2003 Memorandum to Stuart Parker from Hanna Assefa:

Comment

North Carolina Surface Water Standards have to be met.

Response

A table comparing Site surface water quality data to North Carolina Surface Water Quality Criteria was included as Table 9-1 and 9-2 in the October 30, 2001 Supplemental Remedial Investigation report. An updated table will be added to the Final RI Report to include any changes reflected by the April 1, 2003 revision as specified in NC Administrative Code 15A NCAC 02B.0100 & .0200.

8. Page 1, Response 10 of the January 27, 2003 Memorandum to Stuart Parker from Hanna Assefa:

Comment

USEPA does provide a methodology to evaluate the inhalation of particulates for the construction worker scenario in the March 2001, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Why is the approach you have taken more appropriate for this site?

Response

AMEC has reviewed EPA's modified dust model presented in the now final[1] (December 2002) *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24)*, as well as the default soil guidance values derived by the EPA using this model. While a different methodology was utilized in the 2001 draft SWP HHRA to be consistent with the approach set forth in the 1995 baseline HHRA, we believe that EPA's approach represents a suitable replacement for the model presented in the SWP 2001 supplemental HHRA. Accordingly, applicable surface and subsurface soil concentrations will be compared with Appendix A (Tables A-1 and A-2, respectively) Residential and Commercial/Industrial worker risk-based dust concentrations.

9. Page 2, Response 14 of the January 27, 2003 Memorandum to Stuart Parker from Hanna Assefa:

Comment

The 1995 baseline human health risk assessment was not based on the same data set as the Supplemental Human Health Risk Evaluation. Some of the exposure pathways were not the same. The advantages of a forward risk calculation are that it provides a total risk estimate based on a reasonable maximum exposure (RME). Remediation goals would only be calculated for those chemicals that cause the total risk to exceed acceptable levels.

Response

[1] This document was only available in draft form at the time the supplemental HHRA was prepared.

One of the stated purposes of the supplemental 2001 HHRA was to "...present media-specific, risk-based cleanup targets as an integral component of the SRI, in anticipation of the subsequent development of a site remedial action plan (RAP)." Based on the content of Hanna Aseffa's October 14, 2003 memo to Stuart Parker, it appears that, after consulting with EPA Region IV (Kevin Keporic), it was concluded that the current framework of the HHRA is acceptable provided that earlier mentioned changes (specifically providing risk based calculations for carcinogenic compounds at the 1×10^{-6} cancer risk level benchmark) are made. These changes will be reflected in the final supplemental HHRA report. SWP appreciates the Department's sensitivity to the fact that a significant amount of time and money have been expended on the HHRA, and having to re-cast the analysis into a revised baseline HHRA would, at this point in the project's life, not be of substantial benefit.

10. Page 2, Response 7 of the January 27, 2003 Memorandum to Stuart Parker from Hanna Assefa:

Comment

Some chemicals bioaccumulate more in fish than in insects because they store the chemicals in muscle and fat. However, insects tend to be closer to the contaminated sediment and could potentially have higher levels of contamination. If the COPEC's at the site likely accumulate more in fish than in insects please explain in the write-up and provide references. Otherwise evaluate insectivorous birds as a measurement endpoint. Why would fish eating birds be more important than insect eating birds?

Response

Receptors of interest (ROIs) were selected based on the five criteria included in the EPA (1998) ecological guidance: (1) Potential occurrence in the assessment area; (2) Potential for exposure to contaminants in the assessment area; (3) Reported sensitivities to the potential adverse effects of potential contaminants; (4) Representativeness as risk indicators for other similar or phylogenetically related species; and (5) Importance as recreational, economic, or protected species. Piscivororous birds were selected in lieu of insectivorous birds as a receptor of interest based on the review of the environmental setting and structure of the waterbodies (Greenfield Creek and a drainage ditch) that flow through the site. Briefly, the key items that lead to this conclusion include the following:

- The adjoining areas to Greenfield Creek and the drainage ditch are substantially wooded and represent narrow flyways that preclude easy access to the area by insectivorous birds that may prey on the adult life stage of emergent aquatic insects. For example, the tree swallow, an insectivorous bird, prefers more open areas to seek prey than is offered by Greenfield Creek and the drainage ditch (e.g., USGS, 2003).

- The piscivorous birds prey on fish species that can accumulate COPECs from the ingestion of benthic invertebrates (including aquatic life stages of insects, such as chironomid larvae). Consequently, they have a greater potential for exposure to higher concentrations of recalcitrant COPECs (i.e., a longer food-chain) than insectivorous birds that can prey on the adult life stage of emergent aquatic insects.

AMEC will include a similar discussion in the revised BERA as part of the receptor selection section.

11. Page 1, Response 1 of the January 6, 2003 Memorandum to Stuart Parker from Matt Matthews and Sandy Mort:

Comment

Include a description of sample collection and storage methods (depth of collection, equipment, number of sub-samples per composite, compositing procedures, temperature of storage).

Response

This question was previously answered in our October 9, 2002 Response to Comments letter. Listed below is our response from the 2002 letter:

> Bulk composite sediment samples (SD-42-Comp through SD-47-Comp) were collected from a depth of surface to 3-inches using a decontaminated stainless steel spoon. At each composite sample location, a total of 5 subsamples from equal distances across the width of the creek were homogenized. The sampling was accomplished by wading upstream into the surface water body. While facing upstream (into the current), the sample was obtained by scooping the sampler along the bottom of the surface water body in the upstream direction. Excess water was carefully removed from the spoon while limiting the loss of fine material associated with the bottom of the surface water body. Aliquots of the sample were placed in a glass pan and homogenized according to the quartering method. The material in the sample pan was divided into quarters and each quarter was mixed individually by turning the sample with the spoon. Two quarters were then mixed to form halves. The two halves were then mixed to form a homogenous matrix. This procedure was repeated several times until the sample was adequately mixed. The sample was then spooned into large polyethylene sample bags.
>
> The bulk sediment samples were collected on January 18 and 19, 2001 and placed on ice in coolers in the field for transport to Schnabel Engineering in West Columbia, South Carolina. Once at Schnabel Engineering the samples were removed from the

coolers and placed under refrigeration at 4 degrees C° until shipment to the laboratory for analysis on January 24, 2001. The samples were placed in 5-gallon buckets in large double lined clear polyethylene bags and shipped overnight to the laboratory. The samples were received cold by the laboratory on January 25, 2001 and placed in a 4 degree C cold room in the original sample containers until test initiation.

12. Page 1, Response 2 of the January 6, 2003 Memorandum to Stuart Parker from Matt Matthews and Sandy Mort:

Comment

Discuss the reduced number of replicates employed in the test relative to the number recommended by USEPA, and the potential impact on test sensitivity.

Response

As AMEC noted in its response of 11 September 2002, USEPA states that decisions regarding experimental design "*should be based on the purpose of the test and the methods of data analysis.*" Similar language is published in the ASTM reference used for these analyses. Further, USEPA requires a minimum of four replicates for 10-day exposures. Our decision to use five replicates in the absence of project-specific experimental design is based on the minimum amount of data required to complete an appropriate statistical evaluation of the data. A similar discussion will be added to the revised text.

13. Page 1, Response 3 of the January 6, 2003 Memorandum to Stuart Parker from Matt Matthews and Sandy Mort:

Comment

It was not clear if water renewals or slow introduction techniques were employed for this data set. If water renewal/introduction were used, describe the technique employed. If not used, provide a brief discussion to support this decision along with any other associated modifications or manipulations to maintain system viability. Discuss the use of aeration.

Response

As AMEC noted in its response of 11 September 2002, USEPA methods were not specified for use. Our laboratory Standard Operating Procedures (SOPs) – which were submitted with the Work Plan - are based on ASTM E 1383-93, a common reference for these assays. We have conducted testing in accordance with this reference for many years with consistent results and our control charts are based on these guidelines. ASTM does not recommend water renewals, rather including static methods with low-level

aeration or a diluter system. Our procedural decisions are based on experience with different methods and observations, some of which are discussed below.

Water renewals – Our observations and experience indicate that substantial water renewals, even when performed with great care, disturb the sediment surface and, consequently, the organisms burrowing within this medium. This disturbance may also change the matrix or properties of surficial sediments, potentially affecting the bioavailability and resultant toxicity of compounds that may be present. We typically restrict water renewals to limited volume or slow-introduction methods warranted by elevated levels of ammonia or conductivity.

Aeration – Dissolved oxygen levels can drop to low levels very quickly during sediment exposures. This may happen overnight, which can expose the organisms to low dissolved oxygen concentrations for extended periods. As recommended in ASTM, we supply consistent, low-level aeration (2-3 bubbles per second) equally to all chambers. This level of aeration serves to prevent sediment disturbance while providing slight water movement that we have observed to inhibit the development of fungal or bacterial mats on the sediment surface.

14. Page 1, Response 4 of the January 6, 2003 Memorandum to Stuart Parker from Matt Matthews and Sandy Mort:

Comment

Specify the water type (preparation) used for overlying water in the test. Is this the same water used for the reference toxicity test?

Response

As AMEC noted in its response of 11 September 2002, a city water line (tap water) is connected to a permanent series of Culligan filters, which are exchanged weekly. These are activated carbon and reverse osmosis filters. USEPA states that tap water can be used if it is "dechlorinated and passed through a deionizer and carbon filter." This is the same water used for the reference toxicant test. A similar discussion will be added to the revised text.

15. Page 1, Response 5 of the January 6, 2003 Memorandum to Stuart Parker from Matt Matthews and Sandy Mort:

Comment

Specify the method use to determine the growth dry weight endpoint (temperatures, drying time, data averaging).

Response

Growth was evaluated based on organism dry weights. Dry weight was determined by placing organisms in a drying oven at 65°C for 24 hours. Reported growth results reflect final dry weight from which average initial weight was subtracted. Average initial weight was determined by collecting a random subsample from the organism population on the day of test initiation and drying them as described to obtain a representative average weight for the batch of organisms used in testing. Surviving organisms in each replicate were pooled to obtain a total weight for each replicate. Total weight for each of the 5 replicates was then averaged to attain an overall mean for each sample tested. This will be clarified in the revised text.

16. Page 1, Response 6 of the January 6, 2003 Memorandum to Stuart Parker from Matt Matthews and Sandy Mort:

Comment

Provide a reference toxicant cusum chart with a recalculation of control limits with each successive data point, as described by USEPA. Also, include the cusum chart for the previous reference toxicant (last 20 data points, control limits recalculated with each data point) due to the recent change in toxicants and small number of data points with the current toxicant. Indicate any certifications the laboratory maintains for toxicity testing.

Response

The control chart provided (attached) is the format more commonly requested and is, therefore, used as our typical submittal. A cumulative reference toxicant chart for $CuCl_2$ has been included as an attachment for the Department's review.

A cumulative reference toxicant chart for our previous reference toxicant (KCl) has also been included for the Department's review. This chart includes only five data points, as 20 June 1997 was our first attempt at a Hyalella reference toxicant test. Although this chart will provide some insight into the consistency of our techniques and animal quality, it will not reveal any information on the relative sensitivity of the batch of animals used for SWP sample testing.

We have also included a cusum chart for *Hyalella* incorporating the last 20 tests from the current date. This does include testing performed for SWP samples in February 2001. This information will be added to the revised text.

Please find attached a copy of AMEC Earth & Environmental, Inc.'s accreditation papers issued by the State of California – Health and Human Services Agency, Department of

Health Services. Also please find attached AMEC's accredited bioassay ecology laboratory certificate issued by the State of Washington Department of Ecology.

References

EPA. 1998. Guidelines for Ecological Risk Assessment. U.S. Environmental Protection Agency, Risk Assessment Forum, Washington, D.C. EPA 630-R-95-002F.

USGS. 2003. *Biological and Ecotoxicological Characteristics of Terrestrial Vertebrate Species Residing in Estuaries: Tree Swallow.* http://www.pwrc.usgs.gov/bioeco/treeswal.htm. [Accessed: 12/19/2003]

Schnabel Engineering appreciates the opportunity to provide our response to NCDENR's November 24, 2003 comments on the Supplemental Remedial Investigation for the SWP Wilmington, North Carolina facility. In addition, as we discussed over the telephone, we have a few questions concerning long range plans and requirements by NCDENR for moving toward corrective action activities at the site.

1. SWP and Schnabel Engineering perceive that assessment activities are complete enough to prepare the final Remedial Investigation Report for the site. Any other additional assessment activities would only be necessary in support of proposed/selected corrective action activities for the site.

2. SWP and Schnabel wish to obtain agreement with NCDENR as to how we proceed from here. It is our understanding that we must finalize the RI and then proceed directly into the preparation of a Remedial Action Plan (RAP) for the site. However, it is not clear how it is going to be determined what areas and media on site will require remediation. We can only prepare the RAP after we have identified and reached an agreement with NCDENR as to what areas/media need to be remediated.

   Our current risk-based approach is to delineate site areas that may require remediation by calculating Target Cleanup Goals for those compounds that exceeded acceptable carcinogenic risk levels using the 1×10^{-6} benchmark. We also plan to provide cleanup levels corresponding to the other cancer risk targets associated with the 1990 National Contingency Plan (NCP) (1×10^{-5} and 1×10^{-4}) in the event that current available technologies cannot achieve the 1×10^{-6} criteria. Thus, cleanup targets for carcinogenic compounds will be provided for all three NCP cancer risk levels (10^{-4}, 10^{-5}, and 10^{-6}).

   For the Final RI we currently plan to do a point-to-point comparison for the various media to delineate hot-spot areas using the 10^{-6} criteria. This is what we did for the Supplemental RI previously submitted, except that we used the 10^{-5} criteria. This sample point-by-sample point approach is viewed as more

conservative (protective) as sample point locations would opt in the review process if a single sampling location exceeds its respective target cleanup goal. This was done to help pinpoint areas in the RI process that might need to be further assessed. However, for evaluating areas that may need remediation the point-by-point approach may not be realistic in that a person would not be exposed to a single sampling location.

An *exposure area average concentration* would likely be more realistic in that it takes in account that a person is exposed to the whole area not just a single location. Prior to developing area-specific exposure point concentrations (for example ditch/creek surface sediment levels) and comparing these upper 95% concentrations against the adolescent trespasser RBCs, we would like to receive NCDENR's acceptance of this approach. This could mean that discrete sampling areas may exceed the average concentration, but not the area as a whole, thus no active remediation would be required. If we go with an average area approach, and certain sub-areas exceed the RBCs, we could then work with NCDENR to evaluate the need for "hot-spot" remediation, if necessary. It will also be necessary for SWP and NCDNER to reach an agreement on the exposure areas (for example, covered ditch, drainage ditch, Greenfield Creek, landfarm, production area, treated wood storage area, etc.) used in the calculations.

If you have any questions or need further clarification on specific issues, please feel free to contact Bill Arrants of SWP at 864-599-1070 ext. 103 or myself at 803-796-6240.

Sincerely,

SCHNABEL ENGINEERING SOUTH, LLC

NORTH CAROLINA LICENSED SEAL 1203 GEOLOGIST GREGORY B. KUNTZ

Gregory B. Kuntz, P.G.
Associate

2/11/04

Attachments

1) NCDENR November 24, 2003 Comment Letter (6 pages)
2) Figure 12 of the July 31, 2003 DNAPL & Groundwater Delineation Report
3) Figure 13 of the July 31, 2003 DNAPL & Groundwater Delineation Report
4) Figure 14 of the July 31, 2003 DNAPL & Groundwater Delineation Report
5) Table 1 - Site-Specific Sediment Cleanup Levels
6) Table 2 - Site-Specific Surface Soil Cleanup Levels
7) Table 3 - Site-Specific Subsurface Soil Cleanup Levels
8) Table 4 - Health-Based TCDD TEQ Fish Tissue Levels for Trespasser Scenario
9) Table 5 - Reference Toxicant Control Chart – *Chironomus tentans* (2 pages)
10) Table 6 – Reference Toxicant Control Chart – *Hyalella azteca* (3 pages)
11) AMEC's Environmental Laboratory Accreditation – California (2 pages)
12) AMEC's Bioassay Laboratory Accreditation – Washington (5 pages)

Cc: William Arrants – SWP
Layton Bedsole – NCPORTS

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DEC 03 2003

NCDENR

North Carolina Department of Environment and Natural Resources
Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

November 24, 2003

Mr. Gregory B. Kuntz, P. G., Associate
Schnabel Engineering Associates, Inc.
104 Corporate Boulevard, Suite 410
W. Columbia, South Carolina 29169

Dear Mr. Kuntz,

The NC Superfund Section has reviewed your October 15, 2003 response to our comments on the July 31 2003 Additional DNAPL and Groundwater Delineation report on the SWP Wilmington Site. The Superfund Section has also evaluated responses to our comments on completion of Supplemental RI Risk Assessment to date.

Groundwater and DNAPL Issues:

Based on the October 15 response, the Superfund Section and SWP/Schnabel Engineering are in agreement that DNAPL and groundwater contaminant delineation is currently sufficient at the site. We have also discussed these findings with EPA Region IV. EPA noted a general concern that the Cape Fear River remains a potential receptor for site groundwater contaminants. The remainder of their comments were editorial in nature.

The Superfund Section agrees that recovery trenches could be instrumental in removal of DNAPL in the shallow aquifer, which apparently still contains the majority of free product present beneath the site. We look forward to hearing more about Schnabel's geophysical exploration capabilities and their potential applications at the site.

Completion of Risk Assessment:

Ms. Hanna Assefa, Industrial Hygienist with the NC Superfund Section, has previously exchanged detailed comments with Schnabel regarding the Supplemental RI's Human Health and Ecological Risk Assessments. SWP has addressed the majority of these comments, however, the scope of supplemental Risk Assessment to be completed remains a central issue.

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The original baseline HHRA and screening-level ERA were completed for SWP in 1996, prior to the EPA's 1997 Expanded Site Inspection. This HHRA/ERA was submitted (at SWP's initiative) to the NC Superfund Section as part of a Remedial Investigation report in 1999. In May 2000, SWP submitted its Supplemental Remedial Investigation workplan, including proposed additional Risk Assessmernt activities. Based on this workplan, the NC Superfund Section anticipated that the HHRA would consist of forward risk calculation (now incorporating the expanded data set) followed by calculation of Cleanup Goals for those compounds that exceeded acceptable risk levels. However, SWP instead submitted revised Cleanup Goal calculations based on 10^{-5} risk for each chemical, referring to the original (1996) Risk Assessment.

The 1995-1996 HHRA was completed prior to execution of the State Deferral Administrative Order between SWP and the NCDENR. Its scope of risk calculation would not be considered adequate if completed at present. However, in consideration of SWP's resource expenditures to date, Ms. Assefa conferred with EPA Region IV Risk Assessment personnel (see attachment) to determine under what circumstances EPA would accept the current HHRA configuration. The EPA representative indicated that a comprehensive risk recalculation would not be mandated in this case, provided that the current HHRA configuration remains protective of contaminant receptors. To this end, however, Cleanup Goal calculations for individual contaminants of concern must be completed based on 10^{-6} risk level, as per Ms. Assefa's comments.

Conclusion:

Based on the above discussions, the RI and incorporated Risk Assessments will soon be ready for collation and draft finalization. However, the Risk Assessments must address the attached comments from January 26, Jan 27 and October 14, 2003. In addition, the Superfund Section wishes to review the revised, 10^{-6} cleanup goals prior to draft finalization. If you have any questions, please contact Ms. Assefa or myself at 919-733-2801.

Sincerely.

Stuart F. Parker, Hydrogeologist
NC Superfund Section

Attachments
cc: Bill Arrants, Southern Wood Piedmont Co.
James Bateson
Information Repositories

October 14, 2003

Memorandum:

Stuart Parker
Hydrogeologist
Site Assessment and Remediation Branch

From: Hanna Assefa
Environmental Toxicologist
Inactive Hazardous Sites Branch

Southern Wood Piedmont

I have consulted by telephone with Kevin Keporic risk assessor with the USEPA Region IV with regard to comment 14 on my January 17, 2003 memorandum to you. Kevin concurred that the proper procedure for an NPL site is to conduct a risk assessment based on the chemicals of potential concern followed by an RGO calculation. However, he also stated that he would be comfortable making an occasional exception to the procedure under certain circumstances, if doing so does not result in under protection of receptors from toxic chemicals.

Therefore, since the consultant has already proceeded in doing the RGO calculation first (the 1995 risk assessment is not acceptable) I recommend the consultant submit the revised RGO calculation with the necessary changes incorporated.

January 27, 2003

Memorandum:

To: Stuart Parker
Hydrogeologist
Site Assessment and Remediation Branch

From: Hanna Assefa
Environmental Toxicologist
Inactive Hazardous Sites Branch

RE: Southern Wood Piedmont
Human Health and Ecological Risk Assessment

I have reviewed the response to my review comments for the October 2001 Human Health and Ecological Risk Assessment by AMEC Earth and Environmental. The following are my comments to the responses.

Human Health Risk Assessment

Response 3: Explain why these samples were chosen.

Response 8: Calculate site specific RBC's using 1E-06 target risk for all class A,B,C carcinogens.

Response 9: North Carolina Surface Water Standards have to be met.

Response 10: USEPA does provide a methodology to evaluate the inhalation of particulates for the construction worker scenario in the March 2001, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Why is the approach you have taken more appropriate for this site? If you consider it more appropriate then address the following:

1 Provide references for using the PM10 value to calculate acceptable concentrations in the inhalation of particulates pathway.

It appears that the PM10 value chosen for the construction worker would be higher than for a utility worker.

3. The exposure factors tables for the construction worker scenario shows an inhalation rate of 1.6 m^3/hr it is not clear where this has been incorporated in the soil HBCL.

4. It is also not clear what the 1 hour stands for in the soil HBCL calculation. Please clarify both the write up of the inhalation exposure pathway for both the utility worker and construction worker.

5 Make appropriate changes to the exposure assumption tables

Response 14: The 1995 baseline human health risk assessment was not based on the same data set as the Supplemental Human Health Risk Evaluation. Some of the exposure pathways were not the same. The advantages of a forward risk calculation are that it provides a total risk estimate based on an reasonable maximum exposure (RME). Remediation goals would only be calculated for those chemicals that cause the total risk to exceed acceptable levels.

Ecological Risk Assessment

Response 7: Some chemicals bioaccumulate in fish more than in insects because they store in muscle and fat. However, insects tend to be much more closer to the contaminated sediment and could potentially have high levels of contaminants. If the COPEC's at the site likely accumulate more in fish than in insects please explain in the writeup and provide references. Otherwise evaluate insectivorous birds as a measurement endpoint. Why would fish eating birds be more important than insect eating birds?

Division of Water Quality
- Aquatic Toxicology Unit

January 6, 2003 2003

MEMORANDUM

To: Stuart Parker
Superfund Section, DWM

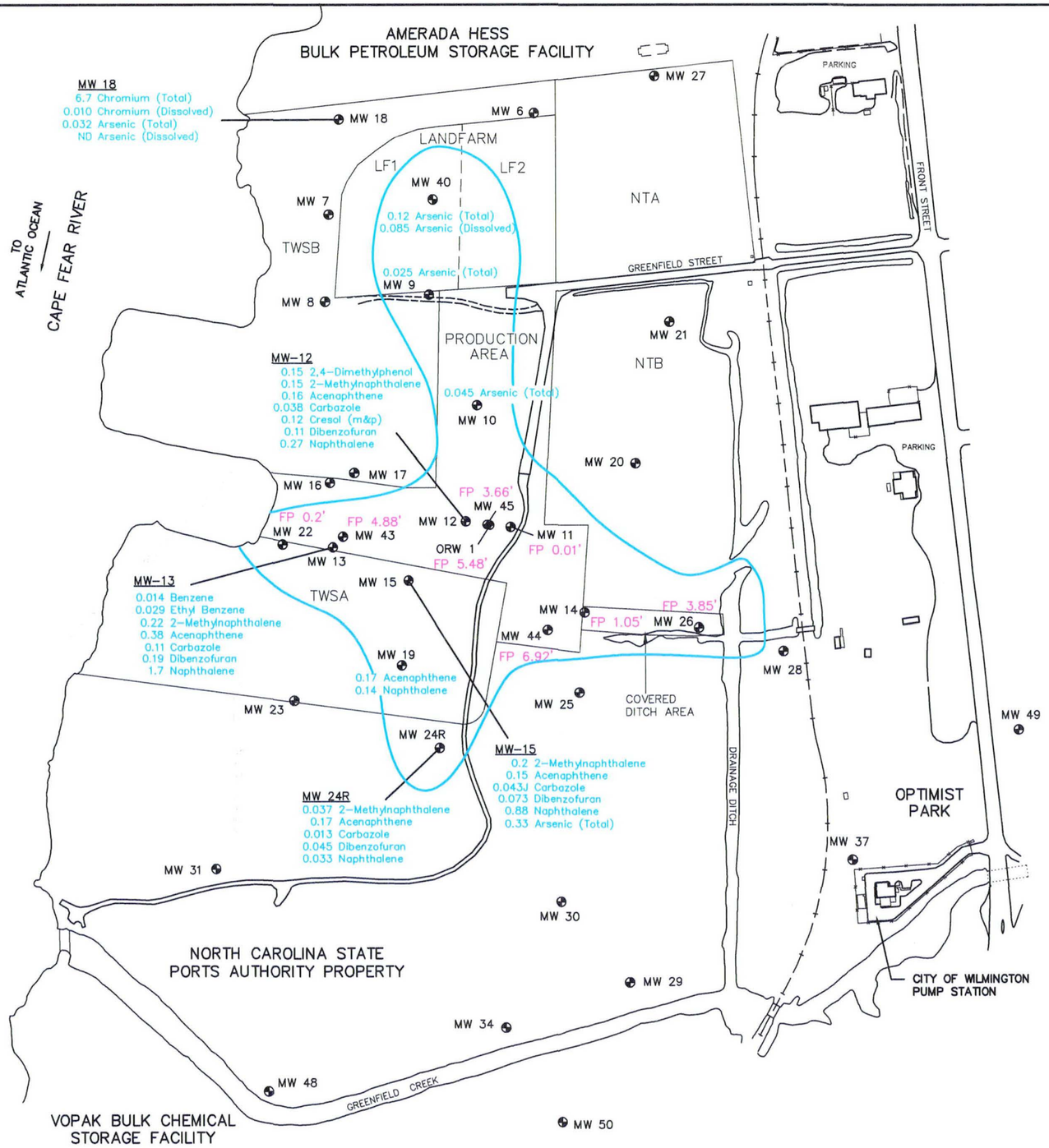
Through: Matt Matthews MM
Supervisor, Aquatic Toxicology Unit, DWQ

From: Sandy Mort SLM
Environmental Biologist, Aquatic Toxicology Unit, DWQ

Subject: Review of response to comments, Southern Wood Piedmont (Wilmington) sediment toxicity report

ATU has reviewed the response to comments for the Southern Wood Piedmont remedial investigation sediment toxicity report. ATU recommends that the final report include descriptions of deviations from USEPA sediment toxicity procedures as specified in the most recent manual. (It is also recommended that for future work, deviations from USEPA protocols be specified and reviewed prior to initiation of the testing to insure compliance with standardized methods and suitability of any modifications to maintain sample and test integrity.) Brief explanation of the basis for the deviations should also be included. Any modifications that may impact test sensitivity or precision should be discussed in detail. Specific recommendations include:

1. Include a description of sample collection and storage methods (depth of collection, equipment, number of sub-samples per composite, compositing procedures, temperature of storage).
2. Discuss the reduced number of replicates employed in the test relative to the number recommended by USEPA, and the potential impact on test sensitivity.
3. It was not clear if water renewals or slow introduction techniques were employed for this data set. If water renewal/introduction were used, describe the technique employed. If not used, provide a brief discussion to support this decision along with any other associated modifications or manipulations to maintain system viability. Discuss the use of aeration.
4. Specify the water type (preparation) used for overlying water in the test. Is this the same water used for reference toxicity tests?
5. Specify the method used to determine the growth dry weight endpoint (temperatures, drying time, data averaging).
6. Provide a reference toxicant cusum chart with re-calculation of control limits with each successive data point, as described by USEPA. Also, include the cusum chart for the previous reference toxicant (last 20 data points, control limits re-calculated with each data point) due to the recent change in toxicants and small number of data points with the current toxicant. Indicate any certifications the laboratory maintains for toxicity testing.



NOTE: ONLY CONSTITUENTS THAT EXCEED PRELIMINARY REMEDIATION GOALS ARE SHOWN ON MAP. ALL DETECTED CONSTITUENTS ARE SHOWN ON TABLE.

Preliminary Remediation Goals

GROUP	CONSTITUENT	MDL	PQL	PRG
METALS	Arsenic (Total)	0.0050	0.010	0.010
	Chromium (Total)	0.0011	0.010	0.050
	Copper (Total)	0.0027	0.020	1.0
VOLATILES	Acetone	0.0023	0.05	0.70
	Benzene	0.000096	0.005	0.001
	Dichloromethane (Methylene Chloride)	0.00061	0.0050	0.005
	Ethyl Benzene	0.00011	0.0050	0.029
	Toluene	0.000065	0.0050	1.0
	Total Xylenes	0.000050	0.010	0.53
SEMI-VOLATILES	2,4-Dimethylphenol	0.0011	0.010	0.140
	2-Chlorophenol	0.0079	0.010	0.0001
	2-Methylnaphthalene	0.0021	0.010	0.014
	Acenaphthene	0.001	0.010	0.080
	Anthracene	0.00050	0.010	2.10
	Benzo(a)Anthracene	0.00080	0.010	0.0000479
	Benzo(a)Pyrene	0.00059	0.010	0.00000479
	Benzo(b)Fluoranthene	0.002	0.010	0.0000479
	Benzo(g,h,i)Perylene	0.00062	0.010	0.210
	Benzo(k)Fluoranthene	0.0012	0.010	0.000479
	Bis(2-ethylhexyl)Phthalate	0.0024	0.010	0.003
	Carbazole	0.00059	0.010	0.0034**
	Chrysene	0.00078	0.010	0.00479
	Cresol(o)(2-Methylphenol)	0.0059	0.010	0.18**
	Cresol(m&p)(3&4 Methylphenol)	0.001	0.010	0.0035
	Dibenzo(a,h)Anthracene	0.00064	0.010	0.0000047
	Dibenzofuran	0.001	0.010	0.028
	Di-n-butyl Phthalate	0.001	0.010	0.70
	Fluoranthene	0.00061	0.010	0.280
	Fluorene	0.001	0.010	0.280
	Indeno(1,2,3-cd)Pyrene	0.00085	0.010	0.0000479
	Naphthalene	0.001	0.010	0.021
	Pentachlorophenol	0.002	0.050	0.0003
	Phenanthrene	0.001	0.010	0.21
	Phenol	0.001	0.010	0.30
	Pyrene	0.001	0.010	0.210
	Tetrachlorophenols	0.0013	0.010	0.210

NOTES:

1. All results are in mg/L by USEPA Methods.
2. Method Detection Limit (MDL).
3. Practical Quantitation Limit (PQL).
4. Preliminary Remediation Goal (PRG). The 15A NCAC 2L standard. If the PQL is greater than 2L standard then the PQL becomes the standard. If no 2L standard exists then the interim standard becomes the USEPA Region IX tap water PRG. If the Region IX tap water PRG is less then MDL, then the MDL becomes the interim standard.
5. IHSP. Inactive Hazardous Sites Program Guidelines for Assessment and Cleanup January 2003.
6. **The USEPA Region IX PRG tapwater concentrations (adjusted for non-carcinogenicity).
7. J. Estimated value. Occurs when the analytical results is between the MDL and PQL.

LEGEND

- MONITORING WELLS (36)
- 0.15 CONCENTRATION (mg/l)
- PRG DELINEATION LINE
- DISSOLVED FILTERED SAMPLED
- FP FREE PRODUCT (FT)

FREE PRODUCT MEASURED IN 2001

GROUNDWATER SAMPLES COLLECTED FEBRUARY 2001 AND MAY 2003

GRAPHIC SCALE

0 150 300

1 inch = 300 ft.

Schnabel Engineering

SHALLOW AQUIFER PRELIMINARY REMEDIATION GOALS DELINEATION MAP

SOUTHERN WOOD PIEDMONT WILMINGTON, NC FACILITY

PROJECT NO. 979007.A0-36

FIGURE 12

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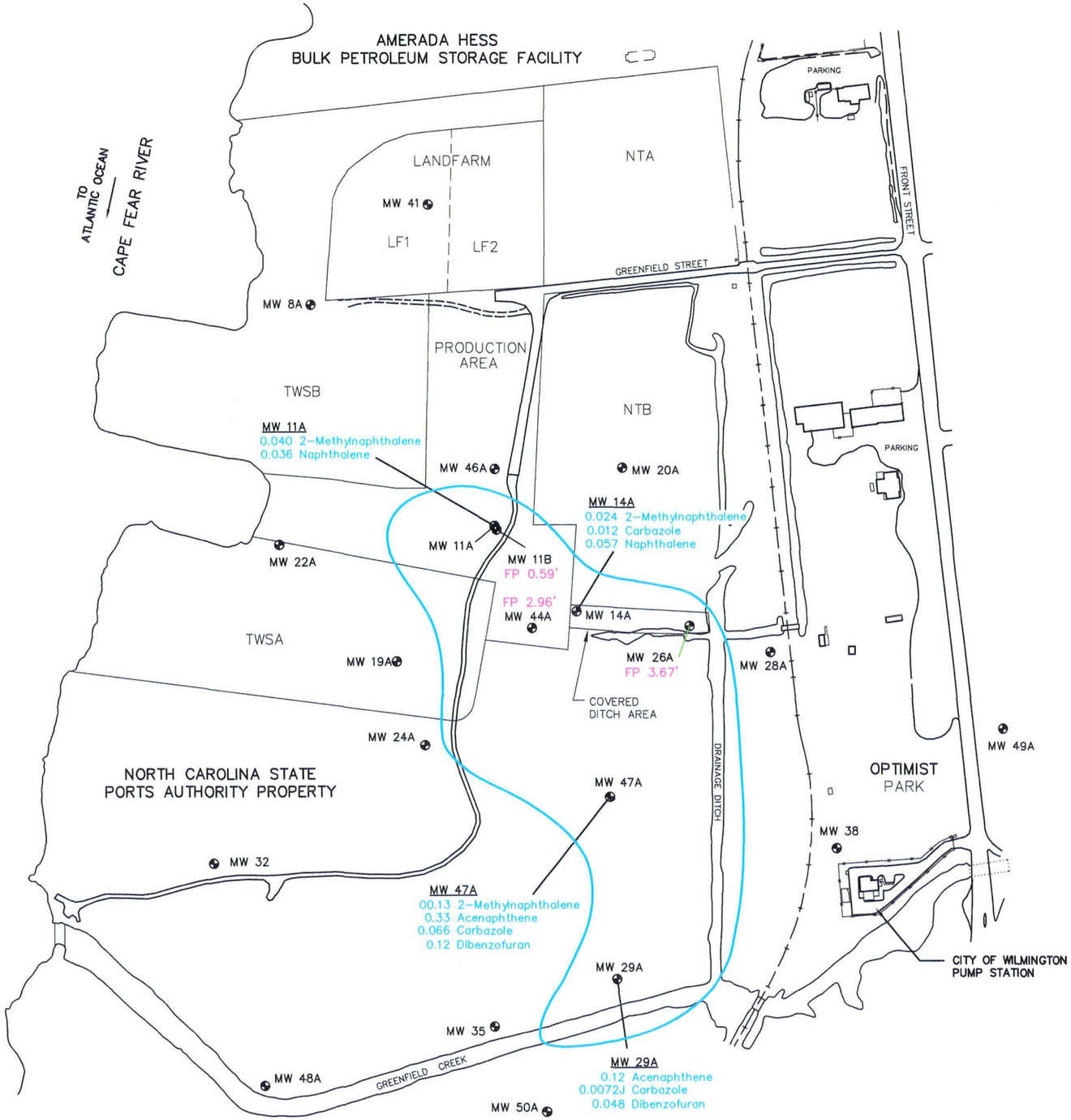

NOTE: ONLY CONSTITUENTS THAT EXCEED PRELIMINARY REMEDIATION GOALS ARE SHOWN ON MAP. ALL DETECTED CONSTITUENTS ARE SHOWN ON TABLE.

Preliminary Remediation Goals

GROUP	CONSTITUENT	MDL	PQL	PRG
METALS	Arsenic (Total)	0.0050	0.010	0.010
	Chromium (Total)	0.0011	0.010	0.050
VOLATILES	Acetone	0.0023	0.05	0.70
	Benzene	0.000096	0.005	0.001
	Chloroform (Trichloromethane)			0.00019
	Dichloromethane (Methylene Chloride)	0.00061	0.0050	0.005
	Ethyl Benzene	0.00011	0.0050	0.029
	Toluene	0.000065	0.0050	1.0
	Total Xylenes	0.000050	0.010	0.53
SEMI-VOLATILES	2-Methylnaphthalene	0.0021	0.010	0.014
	Acenaphthene	0.001	0.010	0.080
	Anthracene	0.00050	0.010	2.10
	Benzo(a)Anthracene	0.00080	0.010	0.0000479
	Benzo(a)Pyrene	0.00059	0.010	0.00000479
	Benzo(g,h,i)Perylene	0.00062	0.010	0.210
	Benzo(k)Fluoranthene	0.0012	0.010	0.000479
	Bis(2-ethylhexyl)Phthalate	0.0024	0.010	0.003
	Carbazole	0.00059	0.010	0.0034**
	Chrysene	0.00078	0.010	0.00479
	Dibenzo(a,h)Anthracene	0.00064	0.010	0.0000047
	Dibenzofuran	0.001	0.010	0.028
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	Naphthalene	0.001	0.010	0.021
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	Pyrene	0.001	0.010	0.210

NOTES:
1. All results are in mg/L by USEPA Methods.
2. *Method Detection Limit (MDL).*
3. Practical Quantitation Limit (PQL).
4. Preliminary Remediation Goal (PRG). The 15A NCAC 2L standard. If the PQL is greater than 2L standard then the PQL becomes the standard. If no 2L standard exists then the interim standard becomes the USEPA Region IX tap water PRG. If the Region IX tap water PRG is less then MDL, then the MDL becomes the interim standard.
5. IHSP. Inactive Hazardous Sites Program Guidelines for Assessment and Cleanup January 2003.
6. **The USEPA Region IX PRG tapwater concentrations (adjusted for non-carcinogenicity).
7. J. Estimated value. Occurs when the analytical results is between the MDL and PQL.

LEGEND

- MONITORING WELLS (21)
- 0.13 CONCENTRATION (mg/l)
- PRG DELINEATION LINE
- FP FREE PRODUCT (FT)

FREE PRODUCT MEASURED IN 2001

GROUNDWATER SAMPLES COLLECTED FEBRUARY 2001 AND MAY 2003

GRAPHIC SCALE
0 150 300
1 inch = 300 ft.

Schnabel
Schnabel Engineering

INTERMEDIATE AQUIFER PRELIMINARY REMEDIATION GOALS DELINEATION MAP

SOUTHERN WOOD PIEDMONT WILMINGTON, NC FACILITY

PROJECT NO. 979007.A0-36
FIGURE 13

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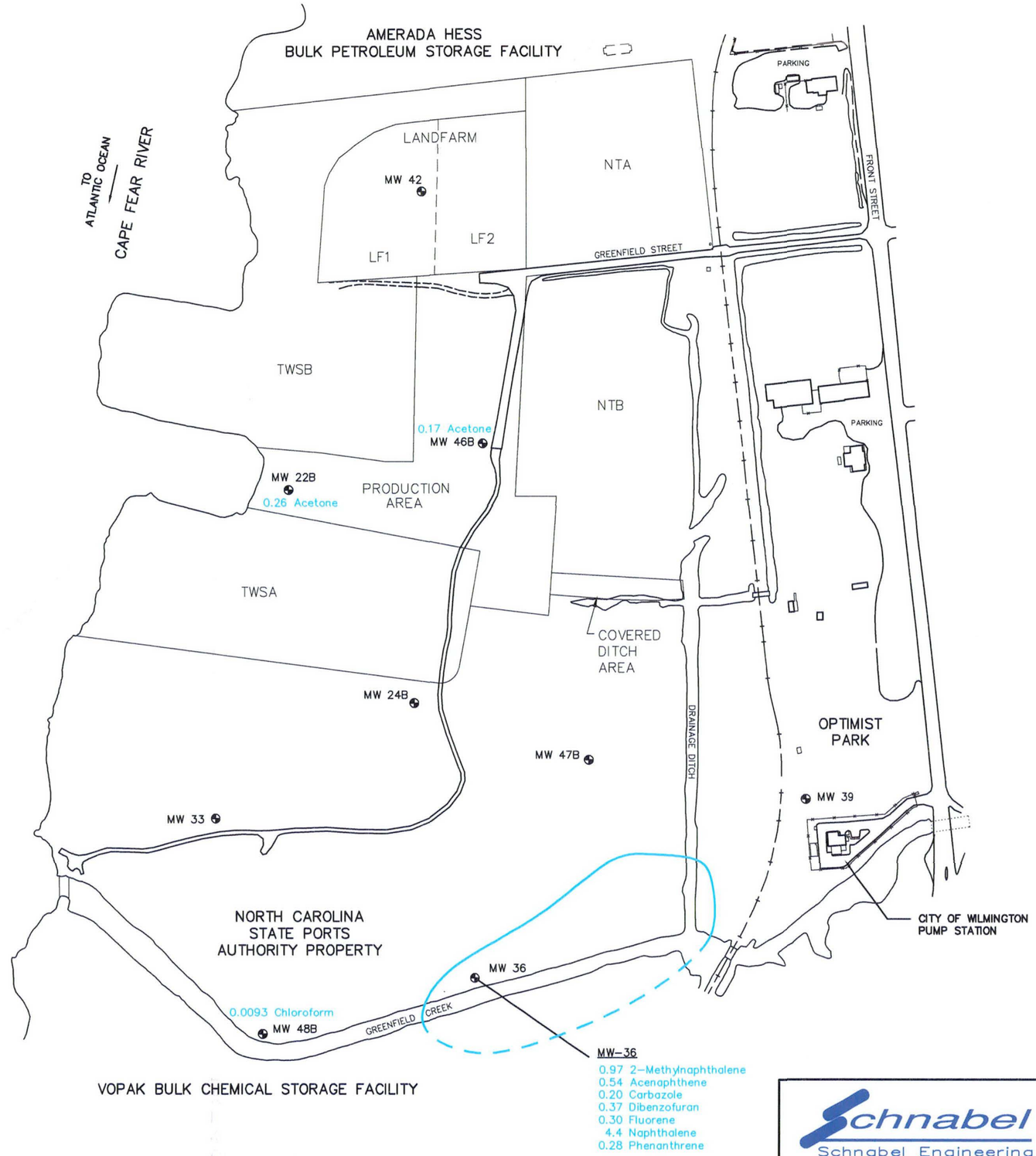

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Preliminary Remediation Goals

GROUP	CONSTITUENT	MDL	PQL	PRG
METALS	Chromium (Total)	0.0011	0.010	0.050
	Copper (Total)	0.0027	0.020	1.0
VOLATILES	Acetone	0.0023	0.05	0.70
	Bromodichloromethane			0.0006
	Chloroform			0.00019
	Dichloromethane (Methylene Chloride)	0.00061	0.0050	0.005
	Ethyl Benzene	0.00011	0.0050	0.029
	Total Xylenes	0.000050	0.010	0.53
SEMI-VOLATILES	2-Methylnaphthalene	0.0021	0.010	0.014
	Acenaphthene	0.001	0.010	0.080
	Anthracene	0.00050	0.010	2.10
	Benzo(a)Anthracene	0.00080	0.010	0.0000479
	Benzo(a)Pyrene	0.00059	0.010	0.00000479
	Benzo(b)Fluoranthene	0.002	0.010	0.0000479
	Carbazole	0.00059	0.010	0.0034**
	Chrysene	0.00078	0.010	0.00479
	Dibenzofuran	0.001	0.010	0.028
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	Fluoranthene	0.00061	0.010	0.280
	Fluorene	0.001	0.010	0.280
	Naphthalene	0.001	0.010	0.021
	Phenanthrene	0.001	0.010	0.21
	Pyrene	0.001	0.010	0.210

NOTES:
1. All results are in mg/L by USEPA Methods.
2. Method Detection Limit (MDL).
3. Practical Quantitation Limit (PQL).
4. Preliminary Remediation Goal (PRG). The 15A NCAC 2L standard. If the PQL is greater than 2L standard then the PQL becomes the standard. If no 2L standard exists then the interim standard becomes the USEPA Region IX tap water PRG. If the Region IX tap water PRG is less then MDL, then the MDL becomes the interim standard.
5. IHSP. Inactive Hazardous Sites Program Guidelines for Assessment and Cleanup January 2003.
6. **The USEPA Region IX PRG tapwater concentrations (adjusted for non-carcinogenicity).
7. J. Estimated value. Occurs when the analytical results is between the MDL and PQL.
8. Acetone and Chloroform are not considered wood-treating site related chemicals.

LEGEND

- MONITORING WELLS (9)
- 0.20 CONCENTRATION (mg/l)
- PRG DELINEATION LINE

GROUNDWATER SAMPLES COLLECTED FEBRUARY 2001 AND MAY 2003

Schnabel
Schnabel Engineering

DEEP AQUIFER PRELIMINARY REMEDIATION GOALS DELINEATION MAP

SOUTHERN WOOD PIEDMONT
WILMINGTON, NC FACILITY

PROJECT NO. 979007.A0-36
FIGURE 14

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7/16/03 G:\Drawing\SWP\Wil\2003Drawings\2003Report\DeepAqRemedGoals7-03.dwg

ATTACHMENT 5

Table 1. Summary of Site-Specific Sediment Cleanup Levels (mg/kg) [ppm]

	Adolescent Trespasser			
	Carcinogenic			Noncarcinogenic
	1×10^{-6}	1×10^{-5}	1×10^{-4}	
Chemical				
Arsenic	**41**	414	4,143	2,486
Chromium	NA	NA	NA	**13,985**
Benz(a)Anthracene	**74**	738	7,385	NA
Benzo(a)Pyrene	**7**	74	738	NA
Benzo(b)Fluoranthene	**74**	738	7,385	NA
Benzo(k) Fluoranthene	**739**	7,394	73,944	NA
Chrysene	**7,394**	73,944	739,440	NA
Dibenzo(a,h)Anthracene	**7**	74	738	NA
Indeno(1,2,3-cd)Pyrene	**74**	738	7,385	NA
TCDD TEQ	**0.0004**	0.004	0.041	0.008

NA = Not Applicable

Bolded values indicate lowest sediment cleanup target

ATTACHMENT 6

Table 2. Summary of Site-Specific Surface Soil Cleanup Levels (mg/kg) [ppm]

	Facility Worker			
	Carcinogenic			Noncarcinogenic
	1×10^{-6}	1×10^{-5}	1×10^{-4}	
Chemical				
Arsenic	**4**	35	351	526
Chromium	**NA**	NA	NA	1,406
Benz(a)Anthracene	**5**	47	474	NA
Benzo(a)Pyrene	**0.5**	5	47	NA
Benzo(b)Fluoranthene	**5**	47	474	NA
Benzo(k) Fluoranthene	**48**	475	4,753	NA
Carbazole	**173**	1,729	17,295	NA
Chrysene	**475**	4,753	47,535	NA
Dibenzo(a,h)Anthracene	**0.5**	5	47	NA
Indeno(1,2,3-cd)Pyrene	**5**	47	474	NA
Naphthalene	NA	NA	NA	**23,065**
TCDD TEQ	**0.00003**	0.0003	0.0033	0.002

NA = Not Applicable

Bolded values indicate lowest soil cleanup target

ATTACHMENT 7

Table 3. Summary of Site-Specific Subsurface Soil Cleanup Levels (mg/kg) [ppm]

	Utility Worker				Construction Worker			
	Carcinogenic			Noncarcinogenic	Carcinogenic			Noncarcinogenic
	1×10^{-6}	1×10^{-5}	1×10^{-4}		1×10^{-6}	1×10^{-5}	1×10^{-4}	
Chemical								
Arsenic	146	1,462	14,616	22,341	**61**	609	6,090	372
Chromium	2,546	25,460	254,604	122,109	**1,061**	10,608	106,085	2,035
Benz(a)Anthracene	263	2,634	26,339	NA	**110**	1,097	10,974	NA
Benzo(a)Pyrene	26	263	2,634	NA	**11**	110	1,097	NA
Benzo(b)Fluoranthene	263	2,634	26,339	NA	**110**	1,097	10,974	NA
Benzo(k) Fluoranthene	2,637	26,374	263,744	NA	**1,099**	10,989	109,894	NA
Carbazole	9,605	96,046	960,462	NA	**4,002**	40,019	400,192	NA
Chrysene	26,374	263,744	2,637,445	NA	**10,989**	109,894	1,098,935	NA
Dibenzo(a,h)Anthracene	26	263	2,634	NA	**11**	110	1,097	NA
Indeno(1,2,3-cd)Pyrene	263	2,634	26,339	NA	**110**	1,097	10,974	NA
Naphthalene	NA	NA	NA	742,680	NA	NA	NA	**12,378**
TCDD TEQ	0.0015	0.015	0.15	0.0729	**0.0006**	0.006	0.06	0.0012

NA = Not Applicable

Bolded values indicate lowest subsurface soil cleanup target

Table 4a. Exposure Factors for the Hypothetical Onsite Trespasser Scenario (TCDD TEQ) - Fish Consumption

Parameter	Value: Adolescent (age 8-18)	Symbol	Source
Common Parameters			
Fish consumption rate (g/day)	6	FCR	EPA, 1997
Exposure frequency (days/yr)	5	EF	site-specific
Exposure duration (yrs)	10	ED	site-specific
Body weight (kg)	47	BW	EPA, 1997
Conversion factor (kg/g)	1E-03	CF	calculated
Averaging time - noncarcinogenic (days)	3,650	ATnc	EPA, 1989
Averaging time - carcinogenic (days)	27,375	ATc	EPA, 1997

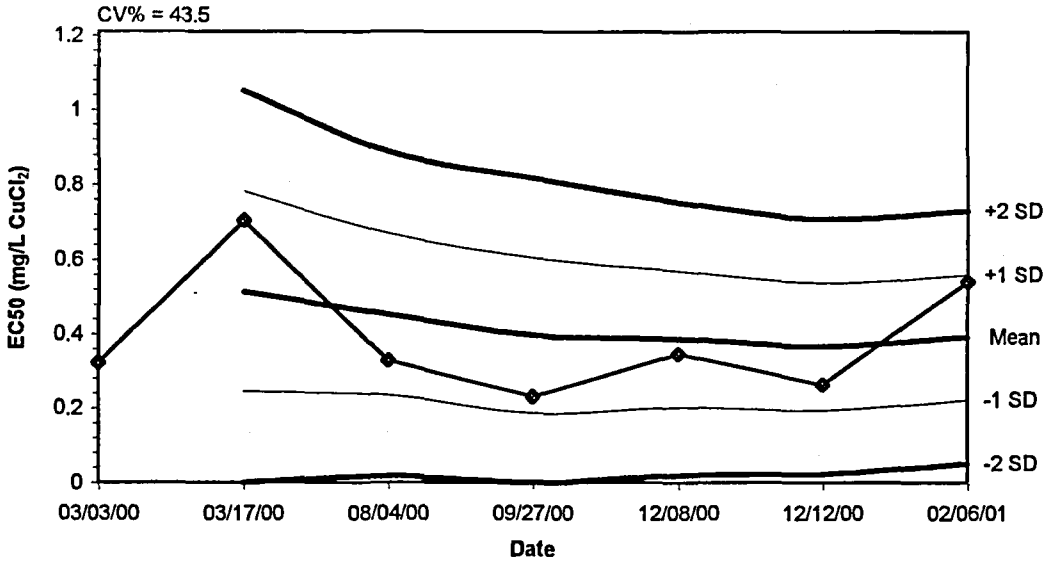
Table 4b. Health-Based TCDD TEQ Fish Tissue Levels for the Onsite Trespasser Scenario

Fish $RBC_{noncancer}$ = (Target Hazard Index * RfD)/(FCR * EF * ED * 1/BW * CF * 1/ATnc)
Fish RBC_{cancer} = Target Risk Level/((CSF)*(FCR * EF * ED * 1/BW * CF * 1/ATc))

NONCARCINOGENIC			
Reference Dose (RfD) (mg/kg-day)[a]	1E-09		
Target Hazard Index	1		
Health-Based Fish Tissue Level (mg/kg [ppm])	**6.E-04**		
CARCINOGENIC	1×10^{-6}	1×10^{-5}	1×10^{-4}
Cancer Slope Factor (CSF) $(mg/kg\text{-}day)^{-1}$ [b]	150000	150000	150000
Target Risk Level	1E-06	1E-05	1E-04
Health-Based Fish Tissue Level (ppm)	**3.E-05**	**3.E-04**	**3.E-03**

Notes:
a - The RfD is based on a minimum risk level (MRL) of 1 pg/kg-day as cited in ATSDR (1997).
b - The CSF is from EPA's Health Effects Summary Tables (HEAST) (EPA, 1995)

TABLE 5 Reference Toxicant Control Chart - *Chironomus tentans*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
03/03/00	0.3240					
03/17/00	0.7039	0.5140	0.2453	0.0000	0.7826	1.0512
08/04/00	0.3290	0.4523	0.2344	0.0165	0.6702	0.8881
09/27/00	0.2291	0.3965	0.1865	0.0000	0.6065	0.8166
12/08/00	0.3450	0.3862	0.2029	0.0195	0.5696	0.7529
12/12/00	0.2624	0.3656	0.1940	0.0224	0.5372	0.7088
02/06/01	0.5406	0.3906	0.2205	0.0505	0.5606	0.7307

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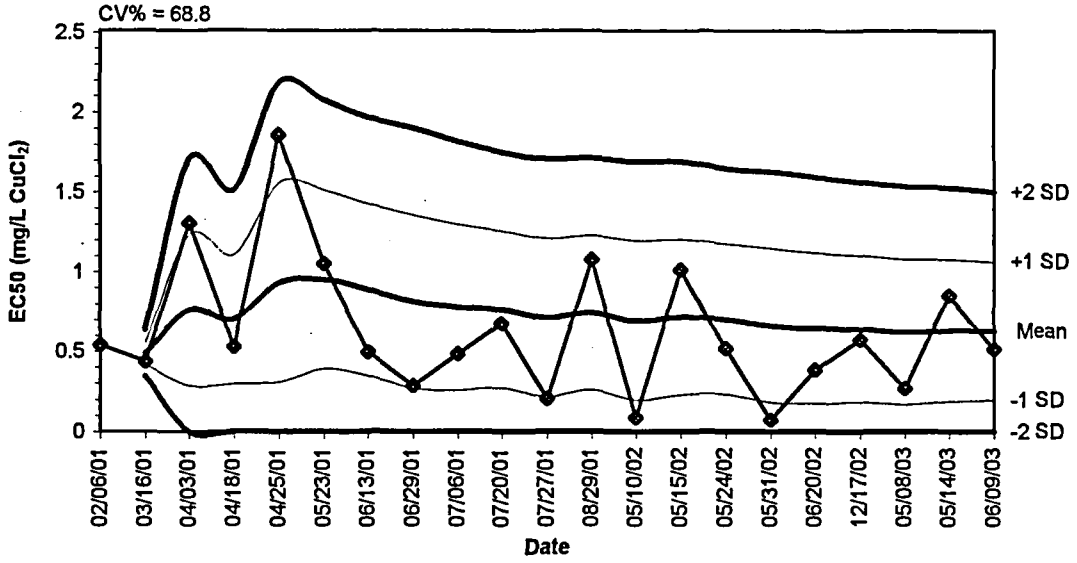
Reference Toxicant Control Chart - *Chironomus tentans*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/06/01	0.5406					
03/16/01	0.4387	0.4897	0.4176	0.3456	0.5617	0.6338
04/03/01	1.3058	0.7617	0.2878	0.0000	1.2357	1.7096
04/18/01	0.5286	0.7034	0.2993	0.0000	1.1076	1.5117
04/25/01	1.8595	0.9347	0.3103	0.0000	1.5590	2.1833
05/23/01	1.0523	0.9543	0.3938	0.0000	1.5147	2.0752
06/13/01	0.4961	0.8888	0.3487	0.0000	1.4290	1.9691
06/29/01	0.2863	0.8135	0.2699	0.0000	1.3571	1.9006
07/06/01	0.4850	0.7770	0.2569	0.0000	1.2971	1.8172
07/20/01	0.6776	0.7671	0.2757	0.0000	1.2584	1.7498
07/27/01	0.2061	0.7161	0.2202	0.0000	1.2120	1.7079
08/29/01	1.0777	0.7462	0.2620	0.0000	1.2304	1.7146
05/10/02	0.0856	0.6954	0.1969	0.0000	1.1939	1.6924
05/15/02	1.0140	0.7181	0.2317	0.0000	1.2046	1.6910
05/24/02	0.5191	0.7049	0.2333	0.0000	1.1764	1.6480
05/31/02	0.0703	0.6652	0.1828	0.0000	1.1476	1.6300
06/20/02	0.3863	0.6488	0.1769	0.0000	1.1208	1.5927
12/17/02	0.5769	0.6448	0.1866	0.0000	1.1030	1.5612
05/08/03	0.2716	0.6252	0.1717	0.0000	1.0786	1.5320
05/14/03	0.8530	0.6366	0.1923	0.0000	1.0808	1.5251
06/09/03	0.5153	0.6308	0.1970	0.0000	1.0646	1.4984

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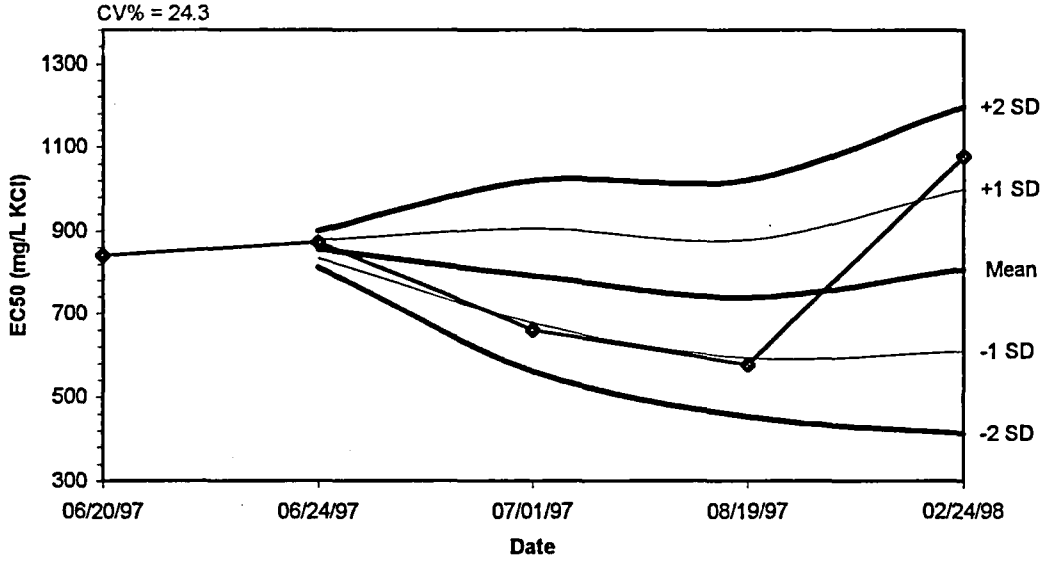
TABLE 6 Reference Toxicant Control Chart - *Hyalella azteca*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/20/97	840.8964					
06/24/97	871.9662	856.4313	834.4617	812.4920	878.4009	900.3705
07/01/97	659.4267	790.7631	675.9665	561.1699	905.5597	1020.3563
08/19/97	577.2563	737.3864	595.3238	453.2611	879.4491	1021.5117
02/24/98	1077.0060	805.3103	609.8503	414.3902	1000.7704	1196.2305

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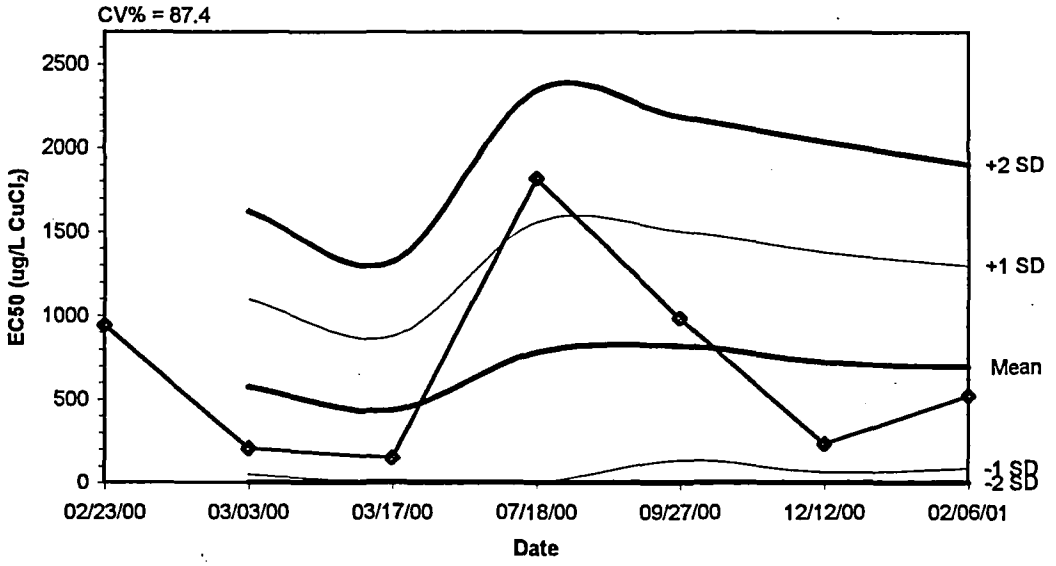
Reference Toxicant Control Chart - *Hyalella azteca*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/23/00	942.8953					
03/03/00	203.5576	573.2264	50.4357	0.0000	1096.0171	1618.8078
03/17/00	146.8149	431.0893	0.0000	0.0000	875.2333	1319.3774
07/18/00	1817.5541	777.7055	0.0000	0.0000	1560.0612	2342.4170
09/27/00	982.3056	818.6255	134.9350	0.0000	1502.3160	2186.0064
12/12/00	230.2174	720.5575	63.5566	0.0000	1377.5584	2034.5592
02/06/01	519.8706	691.8879	87.3534	0.0000	1296.4225	1900.9571

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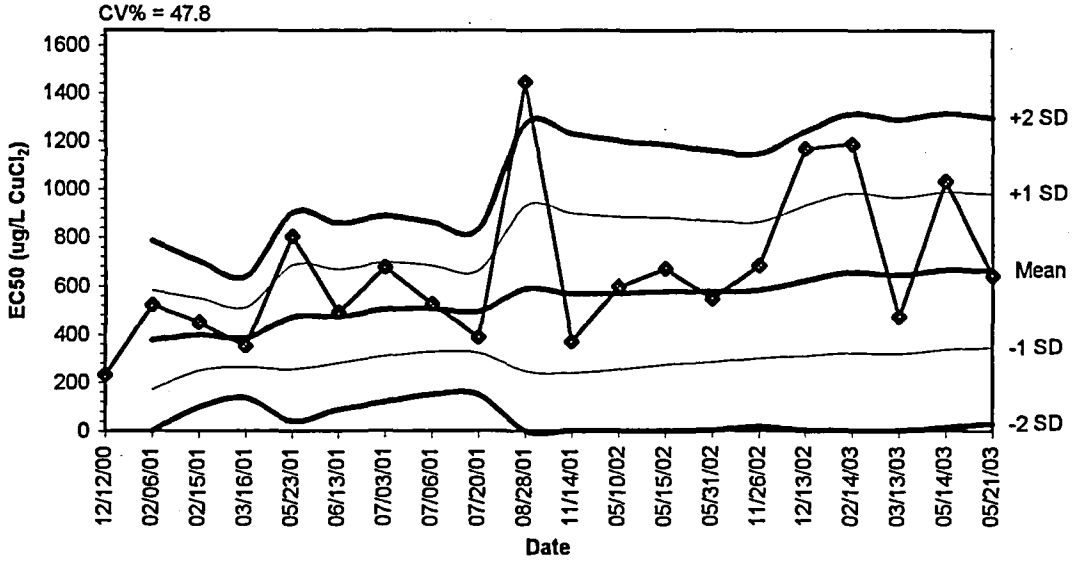
Reference Toxicant Control Chart - *Hyalella azteca*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
12/12/00	230.2174					
02/06/01	519.8706	375.0440	170.2283	0.0000	579.8598	784.6755
02/15/01	447.9034	399.3305	248.5185	97.7066	550.1424	700.9543
03/16/01	350.8374	387.2072	261.7053	136.2035	512.7091	638.2110
05/23/01	803.5751	470.4808	254.8759	39.2709	686.0857	901.6907
06/13/01	491.3767	473.9634	280.9319	87.9004	666.9950	860.0265
07/03/01	676.3369	502.8739	310.7758	118.6777	694.9720	887.0702
07/06/01	526.2626	505.7975	327.7571	149.7167	683.8379	861.8784
07/20/01	389.7241	492.9005	321.9236	150.9467	663.8774	834.8543
08/28/01	1444.6654	588.0770	246.6526	0.0000	929.5014	1270.9258
11/14/01	371.1761	568.3587	237.9189	0.0000	898.7985	1229.2383
05/10/02	597.1113	570.7548	255.5834	0.0000	885.9261	1201.0974
05/15/02	670.4742	578.4255	275.4071	0.0000	881.4438	1184.4622
05/31/02	545.9552	576.1062	284.8462	0.0000	867.3661	1158.6261
11/26/02	683.6768	583.2775	301.2415	19.2055	865.3136	1147.3496
12/13/02	1165.7377	619.6813	310.7394	1.7975	928.6232	1237.5651
02/14/03	1185.0593	652.9388	323.8752	0.0000	982.0024	1311.0661
03/13/03	473.1248	642.9492	320.9095	0.0000	964.9889	1287.0286
05/14/03	1029.1087	663.2733	338.0099	12.7465	988.5368	1313.8002
05/21/03	639.6626	662.0928	345.4606	28.8284	978.7250	1295.3572

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ATTACHMENT 11

State of California—Health and Human Services Agency

Department of Health Services

California
Department of
Health Services

DIANA M. BONTÁ, R.N., Dr. P.H.
Director

GRAY DAVIS
Governor

August 29, 2003

Certificate No 1802

MARILYN SCHWARTZ
AMEC EARTH & ENVIRONMENTAL, INC
5510 MOREHOUSE DRIVE, SUITE 300
SAN DIEGO, CA 92121

Dear MARILYN SCHWARTZ:

Enclosed is an amended copy of your accreditation papers.

If you have any questions, please contact our office at (510) 540-2800.

Sincerely,

George C. Kulasingam

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

Enclosure

Environmental Laboratory Accreditation Program
1625 Shattuck Avenue, Room 101, Berkeley, CA, 94709-1611
510/ 540–2800, fax 510/849-5106
Internet Address: www.dhs.ca.gov/ELAP

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

AMEC EARTH & ENVIRONMENTAL, INC
SAN DIEGO BIOASSAY LABORATORY
5550 MOREHOUSE DRIVE, SUITE B
SAN DIEGO, CA 92121

Lab Phone (858) 458-9044

Certificate No: 1802 **Renew Date: 09/30/2004**

Field of Testing: 113 - Whole Effluent Toxicity of Wastewater

113.010	001	Fathead Minnow (P. promelas)	EPA 600/4-90/027F, Static
113.010	001	Fathead Minnow (P. promelas)	EPA 600/4-90/027F, Static Renewal
113.010	005	Daphnid (C. dubia)	EPA 600/4-90/027F, Static
113.010	005	Daphnid (C. dubia)	EPA 600/4-90/027F, Static Renewal
113.010	006	Daphnia spp.	EPA 600/4-90/027F, Static
113.010	006	Daphnia spp.	EPA 600/4-90/027F, Static Renewal
113.010	008	Topsmelt (A. affinis)	EPA 600/4-90/027F, Static
113.010	008	Topsmelt (A. affinis)	EPA 600/4-90/027F, Static Renewal
113.010	009	Silverside (Menidia spp.)	EPA 600/4-90/027F, Static
113.010	009	Silverside (Menidia spp.)	EPA 600/4-90/027F, Static Renewal
113.010	012	Mysid (M. bahia)	EPA 600/4-90/027F, Static
113.010	012	Mysid (M. bahia)	EPA 600/4-90/027F, Static Renewal
113.020	001	Fathead Minnow (P. promelas)	EPA 600/4-85/013, Static
113.020	001	Fathead Minnow (P. promelas)	EPA 600/4-85/013, Static Renewal
113.020	005	Daphnid (C. dubia)	EPA 600/4-85/013, Static
113.020	005	Daphnid (C. dubia)	EPA 600/4-85/013, Static Renewal
113.020	006	Daphnia spp.	EPA 600/4-85/013, Static
113.020	006	Daphnia spp.	EPA 600/4-85/013, Static Renewal
113.020	009	Silverside (Menidia spp.)	EPA 600/4-85/013, Static
113.020	009	Silverside (Menidia spp.)	EPA 600/4-85/013, Static Renewal
113.028	008	Topsmelt (A. affinis)	EPA-821-R-02-012, Static
113.028	008	Topsmelt (A. affinis)	EPA-821-R-02-012, Static Renewal
113.030	014	Pacific oyster (C. gigas)	ASTM E724-94
113.030	019	Blue mussel (Mytilus spp.)	ASTM E724-94
113.040	001	Fathead Minnow (P. promelas)	EPA 1000
113.050	005	Daphnid (C. dubia)	EPA 1002
113.060	020	Green algae (S. capricornutum)	EPA 1003
113.080	009	Silverside (Menidia spp.)	EPA 1006
113.090	012	Mysid (M. bahia)	EPA 1007
113.120	008	Topsmelt (A. affinis)	EPA 600/R-95/136
113.120	014	Pacific oyster (C. gigas)	EPA 600/R-95/136
113.120	015	Sand dollar (D. excentricus)	EPA 600/R-95/136
113.120	017	Purple sea urchin (S. purpuratus)	EPA 600/R-95/136, Fertilization Test
113.120	017	Purple sea urchin (S. purpuratus)	EPA 600/R-95/136, Embryo-Larval Dev
113.120	019	Mussels (Mytilus spp.)	EPA 600/R-95/136
113.120	022	Giant kelp (M. pyrifera)	EPA 600/R-95/136
113.120	023	Red abalone (H. rufescens)	EPA 600/R-95/136
113.150	015	Sand dollar (D. excentricus)	Dinnel et. al (1987)
113.150	017	Purple sea urchin (S. purpuratus)	Dinnel et. al (1987)

Field of Testing: 119 - Toxicity Bioassay of Hazardous Waste

119.010	001	Fathead Minnow (P. promelas)	Polisini & Miller (CDFG 1988)

As of 08/29/2003, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

ATTACHMENT 12

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Post Office Box 488 • Manchester, Washington 98353-0488 • (360) 895-6144

January 8, 2003

Ms. Marilyn Schwartz
AMEC Earth/Envl San Diego Bioassay Laboratory
5510 Morehouse Drive, Suite 300
San Diego, CA 92121

Dear Ms. ~~Schwartz:~~ Marilyn

Thank you for the timely submission of your application for renewal in the Environmental Laboratory Accreditation Program. Enclosed is a Certificate acknowledging accreditation of your lab for a one-year period beginning January 1, 2003. Also enclosed is your current Scope of Accreditation. Your present Certificate expired on December 31, 2002 and it should be recycled.

A number of changes were made to your Scope, deleting some tests, and adding others per your request. Note that we did not accredit for *Daphnia pulex* by ASTM 1706 as you requested (in your application in a general sense, and more specifically in your e-mail today) because *D. pulex* is not included in the method. Please review your Scope to make sure we have met your needs.

As noted on the Scope, some of the parameters are granted interim accreditation pending an on-site assessment. As soon as we know Margaret Datin's schedule when she returns to the United States at the end of this month, we will schedule a visit on a mutually agreeable date. We will contact you soon to set up that visit.

Finally, continued participation in the Ecology Lab Accreditation Program requires the lab to:

- Submit a renewal application and fees annually
- Report significant changes in personnel, equipment, or the lab's quality assurance manual as they occur

If you have any questions concerning the accreditation of your lab, please contact me at (360) 895-6149, fax (360) 895-6180, or by e-mail at pbra461@ecy.wa.gov.

Sincerely,

Perry

Perry Brake, Chemist
Lab Accreditation Section Manager

The State of Washington
Department of Ecology

This is to certify that

AMEC Earth/Envl San Diego Bioassay Laboratory
San Diego, CA

has complied with provisions set forth in Chapter 173-50 WAC and is hereby recognized by the Department of Ecology as an ACCREDITED LABORATORY for the analytical parameters listed on the accompanying Scope of Accreditation. This certificate is effective January 1, 2003, and shall expire December 31, 2003.

Witnessed under my hand on January 8, 2003.

Perry F. Brake, Chemist
Lab Accreditation Section Manager

Lab Accreditation Number
C025

Scope of Accreditation

AMEC Earth/Envl San Diego Bioassay Laboratory

San Diego, CA

is accredited by the State of Washington Department of Ecology to perform analyses for the parameters listed below using the analytical methods indicated. This Scope of Accreditation may apply to any of the following matrix types: non-potable water, drinking water, solid and chemical materials, and air and emissions. Accreditation for all parameters is final unless indicated otherwise in a note. Accreditation is for the latest version of a method unless otherwise specified in a note. EPA refers to the U.S. Environmental Protection Agency. SM refers to American Public Health Association's publication, Standard Methods for the Examination of Water and Wastewater, 18th, 19th or 20th Edition, unless otherwise noted. ASTM stands for the American Society for Testing and Materials. PSEP stands for Puget Sound Estuary Program. Other references are detailed in the notes section.

Matrix Type/Parameter Name	Reference	Method Number	Notes
Non-potable Water			
Ampelisca abdita	ASTM	E 1367	1
Ampelisca abdita	PSEP	1995	2
Atherinops affinis (West Coast)	EPA	600-R-95/136	3,4
Bioaccumulation, Benthic organisms	ASTM	E 1688	5
Ceriodaphnia dubia	EPA	600/4-91/002	4,6
Ceriodaphnia dubia	EPA	600/4-90/027F	4,7
Ceriodaphnia dubia	ASTM	E 1706	8,13
Chironomus tentans	ASTM	E 1706	8
Crassostrea gigas	PSEP	1995	2
Crassostrea gigas	ASTM	E 1022	9
Crassostrea gigas (West Coast)	EPA	600/R-95/136	3,4
Daphnia magna	EPA	600/4-90/027F	4,7
Daphnia magna	ASTM	E 1706	8,13
Daphnia pulex	EPA	600/4-90/027F	4,7
Dendraster excentricus	ASTM	E 1563	10
Dendraster excentricus	PSEP	1995	2
Dendraster excentricus (West Coast)	EPA	600/R-95/136	3,4
Eohaustorius estuarius	ASTM	E 1367	1

Matrix Type/Parameter Name	Reference	Method Number	Notes
Eohaustorius estuarius	PSEP	1995	2
Grandidierella japonica	PSEP	1995	2
Grandidierella japonica	ASTM	E 1367	1
Hyalella azteca	ASTM	E 1706	8
Leptocheirus plumulosus	ASTM	E 1367	1
Leptocheirus plumulosus	ASTM	E 1688	5
Macrocystis pyrifera (WC)	EPA	600/R-95/136	3,4
Menidia beryllina	EPA	600/4-91/003	4,11
Menidia spp.	EPA	600/4-90/027F	4,7
Mysidopsis bahia	EPA	600/4-91/003	4,11
Mysidopsis bahia	EPA	600/4-90/027F	4,7
Mytilus spp.	PSEP	1995	2
Mytilus galloprovincialis	ASTM	E 1022	9
Mytilus spp. (West Coast)	EPA	600/R-95/136	3,4
Neanthes arenaceodentata	PSEP	1995	2
O. mykiss	EPA	600/4-90/027F	4,7
Pimephales promelas, Chronic	EPA	600/4-91/002	4,6
Pimephales promelas	EPA	600/4-90/027F	4,7
Rhepoxynius abronius	ASTM	E 1367	1
Rhepoxynius abronius	PSEP	1995	2
Selenastrum capricornutum	EPA	600/4-91/002	4,6
Strongylocentrotus purpuratus	ASTM	E 1563	10
Strongylocentrotus purpuratus (WC)	EPA	600/R-95/136	3,4
Strongylocentrotus spp.	PSEP	1995	2

Matrix Type/Parameter Name	Reference	Method Number	Notes

Accredited Parameter Note Detail

(1) ASTM, "Standard Guide for Conducting 10-day Static Sediment Toxicity Tests with Marine and Estuarine Amphipods." E 1367-99. (2) Puget Sound Estuary Program; "Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments" July 1995. (3) USEPA "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms" EPA 600/R-95/136 (Third edition) August 1995. (4) Meets requirements of "Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria" Washington Department of Ecology, Publication Number WQ-R-95-80, Revised March 1997. (5) ASTM "Standard Guide for Determination of the Bioaccumulation of Sediment Associated Contaminants by Benthic Invertebrates" E 1688-00a. (6) USEPA "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms." EPA 600/4-91/002 (Third ed.) July 1994. (7) USEPA. "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms." EPA 600/4-90/027F (Fourth ed.) August 1993. (8) ASTM "Test Method for Measuring the Toxicity of Sediment-associated Contaminants with Freshwater Invertebrates" E 1706-00. (9) ASTM "Standard Guide for Conducting Bioconcentration Tests with Fishes and Saltwater Bivalve Mollusks" E 1022-94. (10) ASTM "Standard Guide for Conducting Static Acute Toxicity Tests with Echinoid Embryos" E 1563-98. (11) ASTM "Standard Guide for Conducting Laboratory Soil Toxicity or Bioaccumulation Tests with the Lumbricid Earthworm Eisenia fetida" E 1676-97. (12) USEPA "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms" EPA/600/4-91/003 (Second edition) July 1994. (13) Interim pending an on-site assessment of the laboratory capability (WAC 173-50-100).

1/8/03

Authentication Signature

Perry Brake -- Section Manager, Washington State Department of Ecology -- Lab Accreditation Section