MINUTES FROM THE EPA SCIENCE ADVISORY BOARD
Polychlorinated Biphenyl - Artificial Reef Risk Assessment (PCB-ARRA)
Consultative Panel
Face-to-Face Meeting
August 1-2,2005

PURPOSE: The Polychlorinated Biphenyl - Artificial Reef Risk Assessment (PCB-ARRA
Consultative Panel of the EPA Science Advisory Board (SAB) met on August 1-2, 2005 to provide non-consensus, oral advice on the human health and ecological risk assessments prepared and submitted by the U. S. Navy. The focus of the SAB consultation included the leaching studies, the PRAM, and characterization of potential risks. *Attachment A* is the Federal Register notice announcing the teleconference (70 FR 8, January 12,2005). A meeting agenda is included as *Attachment B.*

LOCATION: SAB Conference Center, Woodies Building, 3rd floor, 1025 F St., NW, Washington, DC

DATE AND TIME: August 1-2,2005, 8:30 - 5:00 pm Eastern Time.

PARTICIPANTS: The following individuals participated in this meeting: PCB-ARRA Consultative Panel Members - Dr. Joan Rose (CHAIR), Dr. Gregory Biddinger, Dr. James Bus, Dr. David Dzombak, Dr. Taylor Eighmy, Dr. Dale Hattis, Dr. Randy Maddalena, Dr. Michael Newman, Dr. Gary **S.** Sayler, Dr. Laura Steinberg, Dr. Thomas Theis, Dr. Timothy Thompson, and Dr. Lauren Zeise. The Consultative Panel roster is included as *Attachment* C and a set of biographical sketches is included in *Attachment D*. SAB Staff - Dr. Vanessa Vu, SAB Staff Office Director, Dr. Tony Maciorowski, Associate Director for Science and Dr. Sue Shallal, Designated Federal Officer (DFO); Other Participants – A sign-in sheet indicates that approximately 50 others were also present, including EPA Staff, Navy Scientists and members of the public *(Attachment E).* missing

MEETING SUMMARY: The meeting followed the agenda *Attachment B)*. Each of the *5* documents examined by the PCB-ARRA Panel was described by the Navy Scientists and a discussion by panel members followed (1-Investigation of Polychlorinated Biphenyl Release-Rates from Selected Shipboard Solid Material Under Laboratory-Simulated Shallow Ocean (Artificial Reef) Environments, June 2005 (Draft Final); 2- Time Dynamic Model (TDM) Documentation, May 2005 (Draft Final); 3-Prospective Risk Assessment Model (PRAM) Documentation Version 1.4, May 2005 (Draft Final); 4- Ex-ORISKANY Artificial Reef Project Human Health Risk Assessment, June 2005 (Draft FinaI); 5- Ex-ORISKANY Artificial Reef Project Ecological Risk Assessment, June 2005, (Draft Final)). The discussion of the charge questions were lead by panel members as indicated in *Attachment F*. A summary of the panel's comments and a compilation of individual panel comments are appended to these minutes *(Appendix A and B, respectively).* A summary of the meeting follows.

equation. The quadric equation is used to solve for the distance i for any ZOI selected (Fig **13).** Moving from ZOI 1 to ZOI 2, the concentration does not double. ZOI is based on foraging and habitat requirements (i.e. ZOI of 2 (14.7 m) for reef-associated species (near-field foraging) and ZOI of 5 (48.9 m) for less reef-associated species). The pycnocline is 5 feet above the top of the ship and open areas are considered exterior

The Ex-VERMILLION may not be suitable for comparison site due to several unknowns including, PCB load estimates, types of materials, and PCB concentrations.
PRAM (1.4) has undergone some recommended changes, such as, a Pycnocline, to concentrate PCBs in lower water column, more trophic levels for representative fish, based on dietary and habitation preferences and upper-bound fish exposure estimated by using ZOI of 2, to account for high reef-fidelity fish.

Robert K. Johnston, Ph.D., SPA WARSYSCEN - SD

Dr. Johnston presented the PRAM evaluation methodology *(Attachment L)*. He stated that the model evaluation criteria showed that the outputs from PRAM are plausible and reasonably good estimates (conservative) of exposure (i.e., **BAFs** followed expected behavior, Biomagnification Factors agreed with literature values, Food Web Magnification Factors agreed with literature values)

He also mentioned that the PRAM only evaluates potential toxicological effects from PCB exposure. The benchmarks and evaluation criteria are based on the ecorisk assessment performed for the ex-VERMILLION.

He concluded that it was unlikely that PCBs released from sinking the ex-ORISKANY to create an underwater reef will harm the environment.

PCB-ARRA panel members expressed some concern regarding the inputs to PRAM. They are based on the leaching experiments which may not be representative of actually leaching concentrations. Panel members suggested that a monitoring study be initiated after sinking the Ex-Oriskany.

Higher concentration experiments should be conducted or assume that PCB levels are at lubricant concentrations.

There are different ways to deal with the heterogeneity of samples. Dr. Newman offered a reference (Richard Gilbert et al) – he reiterated that one sample is not satisfactory. He continued stating that more samples may be done in a specific way-

-Leaching data can be gathered from monolithic leaching, wash off domain and **a** depletion domain.

Dr. Dzombak wondered about the representativeness of the sample used in the Ieaching study. He also stated that contamination from the liquid PCBs due to spills is probably a

cause of variability. The clean up during the remediation process removed contaminated parts and retested them.

He asked if there was any vendor information. Navy scientists replied there was no information on the percentage of content on the inventory. There was also the issue of retrofitting that may have occurred over time and the addition of upgrades.

In addition the linear length of cable is not available, only the weight of the cable is known. There is 1242 lbs to 700 lbs of PCB left on board. The removal of cable is very expensive.

Dr. Dzombak also stated that rate variability is an issue– the zero detects are not real and the use of a single sample is not adequate. He added that there are 209 leaching behaviors occurring at the same time and more experiments are needed so as not to rely on a single point. The use of a "cage" introduces other issues i.e. corrosion. PRAM should be tested by doing more monitoring after sinking. The mobilization of PCB by degradation by biofilms and other fouling organisms is a concern. Biodegradation fate information would be helpful for public confidence.

In the discussion of the TDM, Dr. Steinberg stated that the documentation is not well developed.
How the water flow occurs is unclear p 6-7 and the equations are needed.
Irreversibility issue should be further discussed and she offered other references to be included, i.e., Schwinn et al and Ball et al.

The speed of current and the geometry of the vessel should be included to more accurately predict PCB release.

A sensitivity analysis should be done. The development of acute and subacute estimate is the reason for this model- it may be underestimating the actual release by using crude assumptions.

Since there is particle settling, DOC, suspended solids, etc., this is a transient model- why use equilibrium?

Dr. Dzombak and others agreed that hydrodynamics are not well modeled in the TDM and PRAM.

Feeding habits of the fish in the area need to be better elucidated, as well as, where fish feed downstream or upstream from the movement of PCBs.

If other ships are sunk within 6000 mi, can this model handle these issues?

More of the uncertainty needs to be included in the PRAM and some validation procedures should be established. Data from ex-vermillion can be used and the methodology described by

Dr. Hattis added that the release rate from cable insulation is driving the risk numbers.

Dr. Maddalena concluded that how the ship is prepared before sinking will determine the extent of leaching.

Zeise reiterated her concern that a breast milk exposure is an important pathway. He also noted that the fish consumption values used in HHRA are similar to the general population values.

Dr. Bus noted that the diver scenario qualitative assessment is reasonable. When there is an absence of dermal absorption values, then use dose / surface area and use quantitative assessment to frame the uncertainty.

Panel members added that congeners can be assessed at other artificial reef sites; however it is hard to discern ship associated PCBs from those of other sources. Degradation of surface by bacteria on the interior should also be assessed.

Modeling of the amount of loading to the environment should also be considered- i.e., calculate the amount binding to sediments, released to air, etc

Dr. Zeise added that the caveats in the IRIS documents should be included and an MOE approach may be useful.

When Tim Thompson asked if a probabilistic risk assessment approach should be extended to the HHRA, Dr. Hattis, Maddalena and Zeise agreed that the exposure component of the HHRA can be done using a PRA approach.

Dr. *Robert K. Johnston. SPAWARSYSCEN - SD*

The Ecological risk assessment was presented next by Dr. Johnston *(Attachment P).* He stated that only toxicologic effects were considered. He presented the conceptual model food chain.

The effects from bioaccumulation were examined using TSV (tissue screening value) and NOED-LOED (no effect dose- low effect dose).

PRAM was not intended to evaluate Ecological Risk

There were some concerns regarding the ERA expressed by panel members. They noted that tissue concentration is not an endpoint- it is a measure of exposure. They suggested that the concentration should be related to a toxic effect. Dr. Newman and others noted that the use of HQ **<1** in increments is not necessary and was uninformative.

Panel members also indicated that the food chain was incomplete and bacteria need to be included. There should also be an attempt to include a discussion of the benefits of

APPENDICES

Appendix A	Summary of Panel Comments
Appendix B	Individual Panel Comments

ATTACHMENTS

Attachment A	Federal Register notice (70 FR 8, January 12,2005)
Attachment B	Meeting Agenda
Attachment C	Panel Roster
Attachment D	Panel Biographical sketches
Attachment E	Sign-in sheets – available upon request
Attachment F	Charge Assignments
Attachment G	Powerpoint presentation by Wendy Cleland-Hamnett
Attachment H	Powerpoint presentation (overview) by Bill Wild
Attachment I	Powerpoint presentation (LRS) by Robert George
Attachment J	Powerpoint presentation (TDM) by Ken Richter
Attachment K	Powerpoint presentation (PRAM) by Cheryl Warren
Attachment L	Powerpoint presentation (PRAM) by Robert K. Johnston
Attachment M	Powerpoint presentation (HHRA) by Jim Garrison
Attachment N	Powerpoint presentation (ERA) by Robert K. Johnston