

CASE STUDY

THE NATIONAL ENVIRONMENTAL POLICY ACT

AND THE DISPOSITION OF

EX-ORISKANY

September, 2012

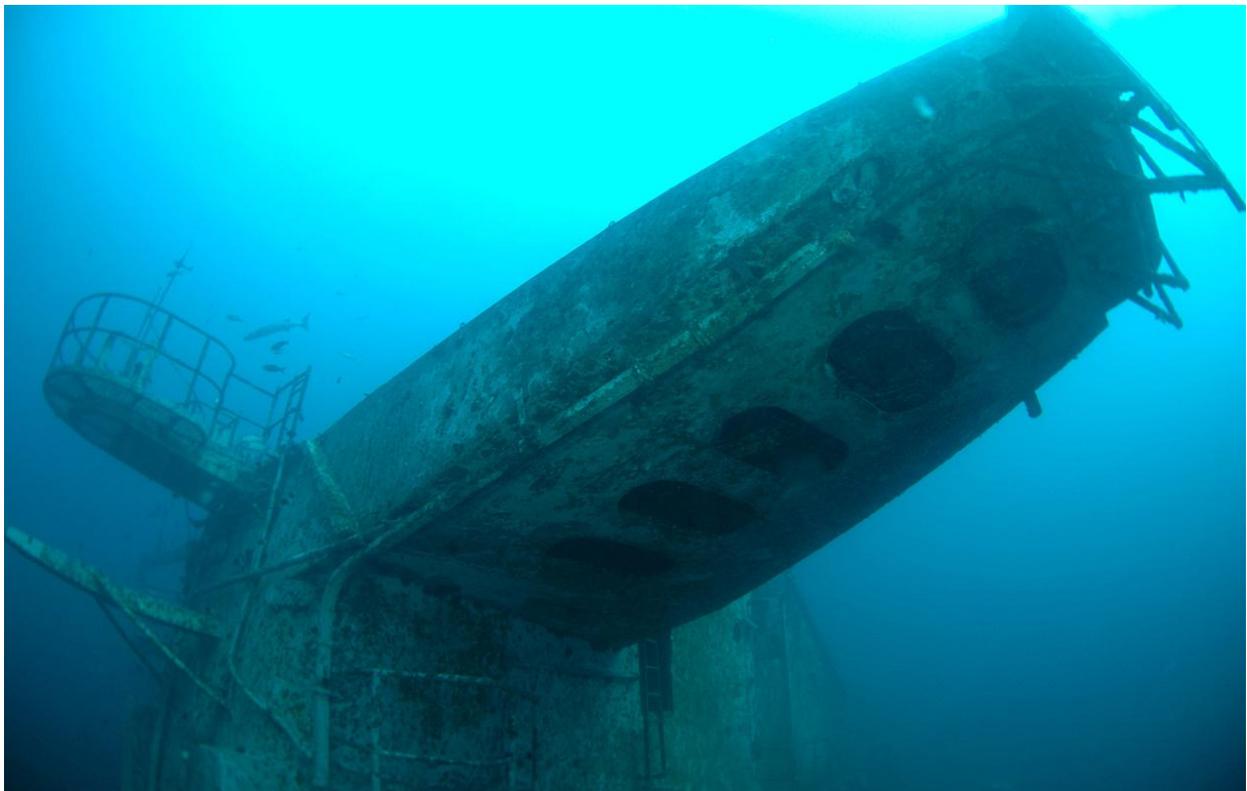
By: Ted R. Mitchell
Environmental Specialist
U.S. Department of Homeland Security

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Case Study: National Environmental Policy Act and the Disposition of the ex-Oriskany



The decommissioned aircraft carrier ex-ORISKANY is sunk off the coast of Pensacola, Florida, on Wednesday, May 17, 2006, to form an artificial reef. (A P photo/U.S. Navy/Jeffrey P. Kraus)



The sunken ex-ORISKANY radar platform is shown. (AP Photo/DrDive.com, Jim Meyers)

Abstract

A decommissioned former Navy aircraft carrier, ex-ORISKANY, was successfully scuttled as an artificial reef in Gulf of Mexico off Pensacola, in Northwestern Florida, on May 17, 2006.

Extensive environmental planning and analysis was completed by the Navy, State of Florida, and Escambia County, and other stakeholders in the years prior. Key environmental planning and documentation included:

- Human Health Risk Assessment
- Ecological Assessment
- Scoping, Coordination, Consultation, and Public Participation
- Permitting
- Mitigation
- States Application for Navy Donation
- Environmental Assessment Document
- (Action) Decision and Donation to the State of Florida
- Modeling the Environmental Fate of Polychlorinated Biphenyls
- Review by an Environmental Protection Agency Scientific Advisory Board (SAB)
- Post Action Monitoring

The ex-Oriskany artificial reef has provided beneficial and thriving hard bottom habitat populated by diverse populations of fish, encrusting organisms, and many other reef species. The artificial reef has been used for recreational scuba diving and fishing, and it provides a lucrative tourist attraction for beach resorts in proximity. However, results of post action environmental monitoring at the reef site found varying and elevated concentrations of PCBs in fish tissues, resulting in a continued monitoring program. In this paper, I propose to review the environmental planning and monitoring activities completed for this action, provide some overarching program observations, and explore the potential for opportunities to enhance the Artificial Reef Program as part of the Navy's overall management programs for decommissioned ships, in alignment with the National Environmental Policy Act.

1.0 PROJECT SUMMARY

1.1 NAVY ACTION AND THE PURPOSE AND NEED

The federal action was to sink and transfer the ex-ORISKANY, a decommissioned aircraft carrier CV-34, to a state for use as an artificial reef. Prior to transfer the Navy prepared ex-ORISKANY in accordance with Environmental Protection Agency (EPA) Guidance: “Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs.” Prior to sinking, a risk based approval was obtained from the EPA to dispose of solid materials remaining aboard the vessel that contained 50 ppm or greater polychlorinated biphenyls (PCBs).

The primary purpose of the action was to reduce the Navy’s inactive fleet inventory, and the need for the action was to reduce the costs for maintaining ships that are pending disposal. Accordingly, ex-ORISKANY was the Navy’s highest disposal priority¹.

1.2 ALTERNATIVES

The Navy obtained and considered state applications seeking to obtain ex-ORISKANY for use as an artificial reef from: 1) Florida; 2) Joint application from South Carolina/Georgia; Texas; and Mississippi. Disposition as an artificial reef was identified as the preferred alternative, and subsequent competitive review of state applications found that the State of Florida had the highest rated application and was chosen for the award². The Navy developed an environmental assessment/overseas environmental assessment (e.g., under Executive Order 12114 requirements) for the proposed sinking location bordering Florida State waters that found that the action did not pose a significant potential for environmental impacts.

The other alternative reviewed in the Navy’s environmental assessment was the no action alternative, which consisted of continued maintenance by the Navy (O&MN) while in storage. The no action alternative was not found to pose significant environmental impacts either;

¹ Department of Defense, Department of the Navy, Naval Sea Systems Command. *Environmental Assessment Overseas Environmental Assessment of the Disposition of EX-ORISKANY (CVA 34), 2004 Executive Summary* (DoD, NAVSEA, EA, 2004)

² DoD, NAVSEA EA/OEA, 2004

however, this alternative did not meet the Navy's need to dispose of ships in its inactive fleet that are no longer fit for service.

Two other alternatives, dismantlement and scrapping, and donation of the vessel for use as a museum were also considered. However, the Navy determined that both of these alternatives were too expensive, and therefore, these two alternatives were not evaluated any further.

1.2.1 Legal Authorities

Prior to completing this action, the Navy obtained statutory authority in Section 1013 of Public Law 108-136, the National Defense Authorization Act for fiscal year 2004, to transfer any vessel stricken from the Naval Vessel Register to any state, commonwealth, or possession of the United States, or any municipal corporation or political subdivision thereof, for use as an artificial reef.

This law requires:

- (1) that the recipient use, site, construct, monitor, and manage the vessel only as an artificial reef in accordance with the requirements of the National Fishing Enhancement Act of 1984 (33 U.S.C. 2101 et seq.), except that the recipient may use the artificial reef to enhance diving opportunities if that use does not have an adverse effect on fishery resources (as that term is defined in section 2(14) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1802(14));*
- (2) the recipient obtain, and bear all responsibility for complying with, applicable federal, state, interstate, and local permits for using, siting, constructing, monitoring, and managing the vessel as an artificial reef; and*
- (3) that the Secretary of the Navy shall ensure that the preparation of a vessel transferred for use as an artificial reef is conducted in accordance with the environmental best management practices developed pursuant to section 3504(b) of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314; 16 U.S.C. 1220 note); and any applicable environmental laws.*

1.2.2 State Artificial Reef Programs

Many of the Atlantic and Gulf states have active artificial reef programs that are based on National Artificial Reef Plan guidance developed by the Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), and requirements in the National Fishing Enhancement Act³. According to a RAND Report on Disposal Options for Ships, 2001, the Atlantic and Gulf Coast state reef programs reported over 846 vessels sunk for use as reefs over the last 25 years and currently there is demand for hundreds more. States with reef building

³ U.S. Department of Commerce, National Oceanic and Atmospheric Administration. National Artificial Reef Plan

programs include: Massachusetts, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas. Steel-hulled vessels, as well as other materials of opportunity are used for artificial reef building⁴.

The U.S. Army Corps of Engineers (COE) issues permits for proposed artificial reef areas in federal waters – and the ex-Oriskany reef site was located in federal waters and outside of state waters. Both the COE and the Florida Department of Environmental Protection (DEP) permit in state waters, and both of these regulatory agencies accept comments from the Florida Fish and Wildlife Commission (FWC) and other interested parties during the artificial reef application review process. Local governments that apply for new reef sites go through a rigorous permit application process typically over a six to nine month review period.

1.2.3 Florida Site Location

Based on review including beneficial use and economic returns, the state of Florida application, from the Florida Fish and Wildlife Commission (FWC) and County of Escambia, won the competition to receive ex-ORISKANY. The FWC Division of Marine Fisheries administers the artificial reef program in the state of Florida. For this action the FWC and Escambia County planned, sited, and provided environmental assessment information to the Navy for the proposed action⁵. The Florida site is located near Escambia County, FL, in federal waters of the Exclusive Economic Zone (EEZ) in the Gulf of Mexico near Northwestern Florida. Prior to selection the state evaluated the site, incorporated inputs from other state environmental site reviews and held public meetings. The site is located in the southeast corner of Escambia East Large Area Artificial Reef Site (LAARS), which is managed by the FWCC and Escambia County Marine Resources Division (ECMRD). LAARS was permitted to receive artificial reef materials by the Army Corps of Engineers (ACOE) in 1994 and renewed in 2001⁶.

⁴ Hess, R., D. Rushworth, M. V. Hynes, and J. E. Peters. *Disposal Options for Ships*. RAND Corporation, 2001.

⁵ FWC, *Progress report on PCB monitoring*, 2011.

⁶ Dodrill, J. and Turpin. 2003. *Letter of application to DOT MARAD*

The site is located in proximity to Pensacola, Florida, 17 nm from shore, 22.5 nm from Pensacola Pass, and 32.7 nm from Destin Pass. Ex-ORISKANY was sunk 212 feet (ft.) deep with about 56 feet of navigational clearance⁷.

Florida's proposed use for the artificial reef was to enhance marine fish habitat, create additional hook-and-line fishing opportunities and to create a diving resource for commercial and private entities. The artificial reef has been successfully utilized for these purposes since it was sunk on May 17, 2006⁸.

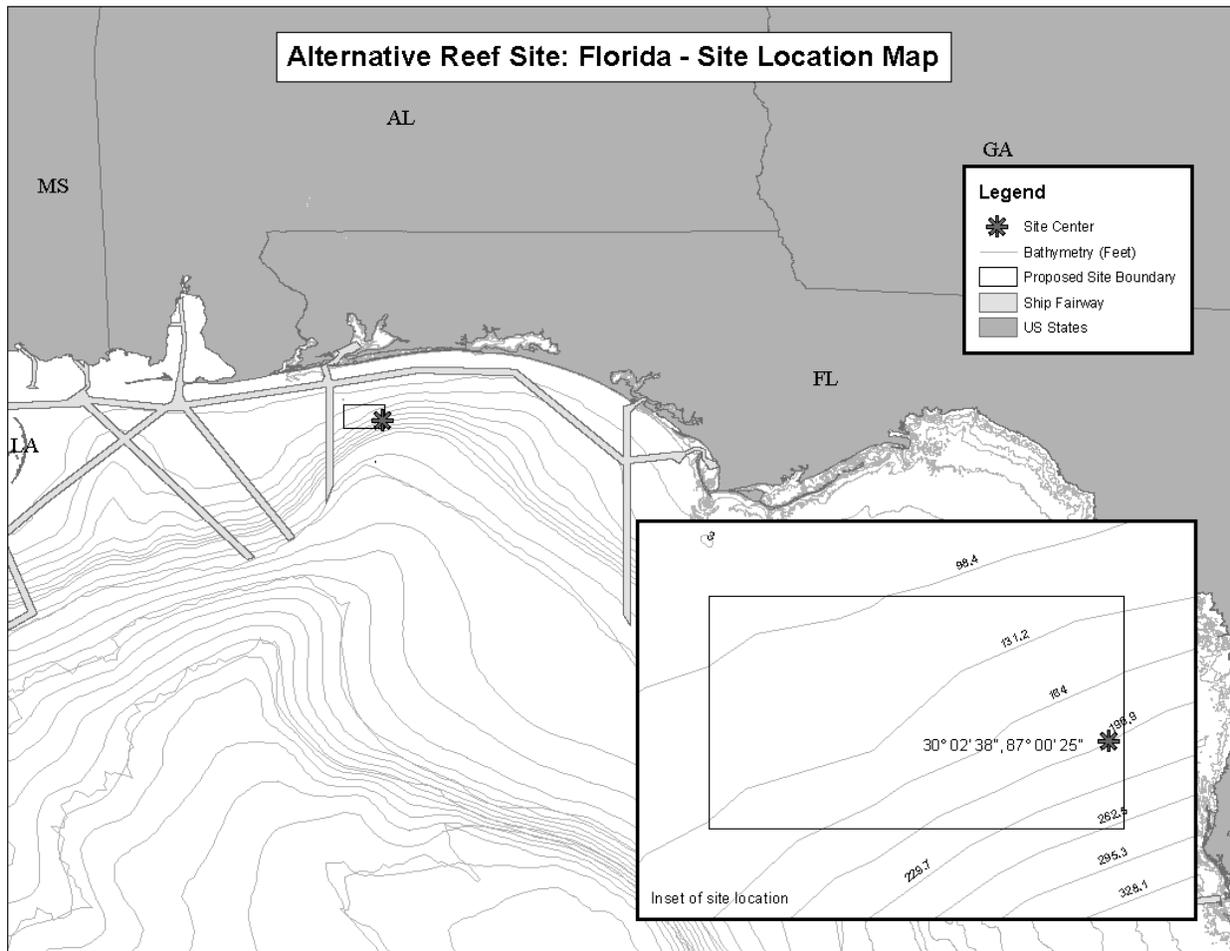


Figure 1: Florida Site location map (US Navy, Naval Sea Systems Command, 2004)

⁷ DoD, NAVSEA EA/OEA, 2004

⁸ FWC, Progress Report on PCB Monitoring, 2011

Prior to completing the action the Navy's environmental assessment included review of impacts to the physical environment including those to: air resources, water resources, substrate resources; biological environment, including benthic organisms, fish, and other pelagic organisms; socioeconomic environment, including navigation, costs, and benefits; and cultural resources, including both historic Navy vessels and submerged resources. The action was predicated on the mitigation - including removal and remediation of ship-borne hazardous materials prior to sinking and transfer to the state⁹.

⁹ DoD, NAVSEA EA/OEA, 2004

2.0 MITIGATION

2.1 APPROACH

The Navy took responsibility for preparation of ex-ORISKANY by removing hazardous materials in advance of sinking the ship. The ex-ORISKANY was towed to Corpus Christi Texas, and remediated under contract in accordance with EPA Guidance developed specifically for this purpose – “EPA’s “National Guidance Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs.” This guidance was developed in response to a request from the U.S. Maritime Administration (MARAD) to EPA to provide national best management practices.

The guidance document was jointly developed by the U.S. Environmental Protection Agency’s (EPA) Oceans and Coastal Protection Division within the Office of Water and the Department of Transportation’s Maritime Administration. The EPA established an interagency workgroup to enable guidance development with active participation from:

- Maritime Administration
- National Oceanic and Atmospheric Administration
- United States Army Corps of Engineers
- United States Fish and Wildlife Service
- United States Coast Guard
- United States Department of the Navy
- United States Environmental Protection Agency¹⁰

2.2 HAZARDOUS MATERIAL REMOVAL

The BMP guidance identified specific hazardous materials of concern and provided narrative remediation goals for each. Mitigation included remediation to guidance narrative goals for the following hazardous materials:

- Asbestos
- Paint
- Polychlorinated biphenyls (PCBs)

¹⁰ EPA guidance, *National Best Practices for Preparing Vessels Intended to Create Artificial Reefs*, 2007

- Bilge and Ballast Water
- Mercury wastes
- Ozone depleting substances
- Radioactive materials
- Miscellaneous materials such as antifreeze, other loose/floatable materials

On ex-Oriskany, loose materials including asbestos-containing materials and flaking paint were removed while materials solidly adhering to substrate were left in place. Liquids were removed from the vessel including all liquid PCBs¹¹. However, non-liquid PCBs were left in place and regulated as PCB bulk product waste and disposal was based on risk-based disposal approval obtained from EPA Region 4 after consultation and review of the Navy's risk assessments with an EPA Scientific Advisory Board.

A comprehensive ships survey and report was written on the weight of shipboard PCB bulk product on ex-Oriskany and resulting PCB load in pounds. Loading in each of the 209 PCB congeners was also assessed in the report. While the identified PCB containing liquids and lubricants identified were all removed from the ship, PCB bulk product remaining upon sinking included primarily ships cables, bulkhead insulation, gaskets, and paint. Visual inspections estimated that 5% of paints were removed, 10% of cables were removed, 73% of bulkhead insulations were removed, and no gasket materials were removed. Accordingly, based on the report analysis, it was estimated that between 722.6 and 1,342 lbs. of PCBs remained in those bulk product applications upon sinking ex-Oriskany¹².

Some unique hazardous materials were identified onboard ex-Oriskany including the wooden flight deck which after sampling during remediation and subsequent laboratory analysis was found to have regulated concentrations of PCBs and was completely removed¹³. After remediation in Corpus Cristi, the vessel was towed to Pensacola, FL, where additional hazardous materials removals and diver safety modifications were accomplished by at the State of Florida.

¹¹ FWC – Progress report on PCB Monitoring, 2011

¹² Pape, Polychlorinated biphenyls (PCB) source term estimates for ex-Oriskany, 2006

¹³ Pape, Polychlorinated biphenyls (PCB) source term estimates for ex-Oriskany, 2006

Sinking of the vessel was predicated on Coast Guard inspection to ensure petroleum products were completely removed and that work was completed in accordance with the best management practices guidance. According to the updated EPA guidance document, ex-Oriskany remediation required approximately three years to complete and cost \$8.23 M with \$3.61M from flight deck removal¹⁴.

As discussed above, extensive sampling and analysis was completed to determine the total shipboard load of PCBs in bulk product prior to sinking as a requirement prior to obtaining the EPA PCB risk based approval. However, it is notable that no quantitative analysis was performed for any of the other shipboard hazardous materials that may have impacts to the human environment such as toxic metals and other organic chemicals.

¹⁴ EPA guidance, *National Best Practices for Preparing Vessels Intended to Create Artificial Reefs*, 2007

3.0 RISK ASSESSMENT, SCIENTIFIC REVIEW AND PUBLIC PARTICIPATION

3.1 SCOPING AND COORDINATION

Along with other State applicants, the State of Florida was supportive and active in obtaining the ex-Oriskany for an artificial reef site for its State. Prior to the Navy's decision, Florida held its own public scoping meetings to assess the best site locations and discuss potential risks. After Florida's site selection and initial selection by the Navy, joint public meetings were held with the Navy to present the Project with opportunities for public and stakeholder inputs.

As part of the process, other agencies and stakeholders were consulted and monitored including but not limited to National Oceanic and Atmospheric Administration, Army Corps of Engineers, Fisheries Commission, Maritime Administration, and Escambia County. Attention was also given to local stakeholders such as commercial fishing and diving shops as well as postings from national interest groups such as Earth Justice and Basel Action Network¹⁵.

3.1.1 Public Comments on NEPA Documentation

The NEPA EA was posted in two local newspapers in proximity to Pensacola, and a 30 day public comment period was provided. The Navy received very few comments, all of which were supportive in nature.

3.2 RISK BASED PCB DISPOSAL APPROVAL

Under the Toxic Substances Control Act (TSCA) and its Federal PCB regulations (40 CFR part 761), the U.S. Navy had to obtain a risk based approval from EPA prior to sinking the vessel with non-liquid PCBs onboard. EPA's Region 4 and Office of Prevention, Pesticides and Toxic Substances (OPPTS) requested that the EPA Science Advisory Board (SAB) conduct a Consultation on the human health and ecological risk assessments prepared and submitted by the U.S. Navy¹⁶.

¹⁵ FWC - Progress report on PCB monitoring, 2011

¹⁶ U.S. Environmental Protection Agency. US EPA Science Advisory Board (SAB) (website)

3.2.1 EPA Scientific Advisory Board Review

The SAB members — collectively referred to as the Polychlorinated Biphenyl-Artificial Reef Risk Assessment Consultative Panel (“Panel”) — met in a public meeting held in Washington, DC in August, 2005, to conduct the consultation. The focus of the SAB consultation included leaching studies of on-board PCB cable materials, fate and transport models known as the Time Dynamic Model (TDM) and the Prospective Risk Assessment Model (PRAM), used to address the characterization of potential risks to human and ecological receptors using the artificial reef. In general, the Panel was complimentary of the work undertaken by the Navy to that point¹⁷.

The Panel identified that:

While the draft risk assessment does not appear to indicate a significant risk, the Panel identified several limitations and has made recommendations to strengthen the current TDM and PRAM models before they are applied in assessing the risk from the deployment of the ex-Oriskany as an artificial reef. With regard to the charge question about the transferability of the TDM and PRAM models to other naval reefing applications, the view of the Panel was the current models are not adequate and they recommend the development of probabilistic models to better characterize the uncertainty inherent in the risk assessment.

Key comments from the individual Panel members also found that:

Overall, this is a complex and challenging subject with some significant unknowns. From a larger perspective, the mass of PCBs on the ex-Oriskany may or may not contribute significantly to the PCB regional budget in the Gulf of Mexico (or perhaps even globally). Absent analysis of how this source relates to total loads, it is difficult to determine relative contributions and impacts. I suspect that 700 to 1200 lbs. of PCBs is not an insignificant amount.

Mechanistic leaching studies really are needed to anchor the source term efforts. However, the surfaces where leaching will occur will be immediately fouled by organic conditioning layers (minutes to hours), bacteria (hours to days), eukaryotes (days to weeks), and (depending on interior currents to support sessile filter feeders), fouling invertebrates such as bryozoans, hydroids, sponges, tunicates, etc. Assessing their relative role at retarding diffusive fluxes or mobilizing PCBs from the solids into the biofouling layers really will help to frame longer term PCB availability into the ship interior and subsequent trophic transfer.

It should be noted that this paper is not intended to provide a technical discussion or opinion on the veracity of the Navy’s risk assessment models and supporting documents. Rather, the selected Panel comments are provided to give insight into major challenges and the considerable undertaking of modeling risk from PCBs for this action.

¹⁷ U.S. Environmental Protection Agency. US EPA Science Advisory Board (SAB) (website)

However, based review of the Panel's comments it is clear that environmental impacts in some of the review parameters remained uncertain because the mechanisms were not fully analyzed or understood – including but not limited to bio uptake, flow, and transport and associated potential for cumulative effects beyond the site. Therefore, the panel did not conclude that it would be advisable to transfer these risk assessments and models for future artificial reef sites on a national basis.

The Navy addressed and responded to the Panel's comments, which were provided together with the Panel's consultation documents to EPA Region 4 to support their decision on the permit application.

3.2.2 EPA Region IV Risk Based PCB Approval

Based on internal reviews and with the Panel inputs and consultation on the materials provided by the Navy, the EPA Region 4 concluded that PCBs from ex-Oriskany would not pose an unreasonable risk of injury to human health and the environment. Documentation of a draft risk based approval document was made available for a 30-day public review. After the review period, the EPA held a public meeting. Public comments received included largely supportive statements, however, nine comments were received that posed questions of the analysis which were addressed and documented by EPA Region 4¹⁸. Again, the review and public participation activities by EPA Region 4 focused on the PCB risk based disposal approval, was site specific (e.g., excluded cumulative impact analysis), and therefore excluded other potential impacts.

¹⁸ FWC – Progress report on PCB monitoring, 2011

4.0 NEPA DOCUMENTATION

4.1 ENVIRONMENTAL ASSESSMENT

Based on the conclusions in its risk assessments, its environmental policy and its other reviews, the Navy identified that the action posed a potential for impacts to human environment, and therefore, an Environmental Assessment and associated Finding of No Significant Impact (FONSI) were drafted to satisfy NEPA documentation requirements¹⁹. Under the Navy's Policy, OPNAVINST 5090.1c:

Chapter 5, 5-5.2 Environmental Assessments (EAs):

*b. Action Normally Requiring EAs. The action proponent prepares an environmental assessment of the action unless it is determined that an EIS shall be prepared or that an action falls within the scope of one or more categorical exclusions. (9) **Exercises conducted at the request of States (e.g., ship sinking for artificial reefs)** or territorial governments wherein they are expecting an environmental impact, degree of highly uncertain effects or unique or unknown risks*

4.1.1 Discussion of Level of Documentation and the Significance Criteria

Based on the conclusions from the risk assessments and its environmental policy, the Navy chose an Environmental Assessment level of documentation for this action. However, based on significance criteria (40 CFR 1508.27) and other considerations discussed below, an EIS vs. an EA may be supported in light of the Navy's policy and the NEPA implementing regulations. Accordingly, based on the discussion below, the review did not analyze and/or fully address the following considerations with regard to level of NEPA documentation:

1. Context: the affected environment in which the impact will occur was analyzed largely from a site specific or local perspective. However, the larger regional and national impacts may require further review. For example, contaminant fate and/or flow between other and/or future reef sites may require further analysis. Notwithstanding, the Navy previously considered a programmatic EPA risk-based approval for SAB review process that included ex-Oriskany with corresponding national context.
2. Level of precedence: regulatory citation – Historically many ships have been sunk/utilized, some as artificial reefs. These ships have been sunk to differing standards

¹⁹ Department of the Navy, Chief of Naval Operations (CNO), OPNAV Instruction 5090.1b is the Navy's policy and Environmental and Natural Resource Manual (Chapter 2, NEPA), 2002

of cleanliness, although no other aircraft carrier has ever been sunk and none under the current best management practice standards for hazardous materials removal. Because it is a very large ship in comparison to other ships sunk in this manner ex-Oriskany likely represents a much larger magnitude of disposal for PCBs and other hazardous materials.

3. Environmental Risk Assessment (degree of highly uncertain effects or unique or unknown risks): While, the Navy made extensive efforts to analyze and model PCBs in its risk assessments, efforts were largely focused on the need to obtain an alternative disposal approval for PCBs and in the context of human health. The assessments were programmatic and not site specific and impacts from other hazardous materials contaminants, (e.g., cadmium, chromium, mercury, etc. antifouling paint compounds, radiation, and other organic compounds) had very limited review with respect to biological and species impacts addressed in this screening level environmental assessment for the program.
4. Limited Data with unproven utility (degree of uncertain effects): PCB Risk Assessments completed were in ocean waters at coastal locations including the Atlantic Ocean in North and South Carolina, and Pacific Ocean in Southern California, areas with significantly varied water quality, bottom substrate, depth, environmental, and biological settings²⁰. While the limited data derived from these locations may be useful for comparison purposes, data utility for site specific and quantitative risk assessment purposes does not appear to have been fully demonstrated or analyzed.
5. Cumulative effects analysis. Numerous vessels are sunk outside US territorial waters annually for the SINKEX program, and in the future the Navy may donate additional ships to states such as Florida for reefing projects. MARAD and States have their own reefing programs, some of which use transferred ex-Navy vessels. The cumulative effects interactions between vessels utilized for reefs and for SINKEX ships may be complex²¹. NEPA requires cumulative effects analysis for current and foreseeable conditions that are not addressed by the existing NEPA documents and risk assessments.
6. Connected Actions (cumulative effects). Navy actions including decisions for ship disposition that are made within the context of integrated ship decommissioning and

²⁰ Navy Human Health Risk Assessment/ Navy Screening Level Ecological Risk Assessment (study locations)

²¹ DoD, NAVSEA EA, 2004

disposal program (e.g., donation for museum, artificial reefing, SINKEX, scrapping, transfers, etc.) and are not themselves discrete actions.

Based on the magnitude of action/precedence, the screening level of environmental risk assessment, risk complexity, combined with the absence of significance analysis cumulative and connected actions of existing and foreseeable conditions, an EIS may be have been a more appropriate level of documentation under NEPA and Navy policy.

In OPNAVINST 5090.1b, Navy policy states:

5-5.3 Environmental Impact Statements (EISs), b. Guidelines and Standards. The action proponent may use several guidelines to judge the significance of the effect of an action on the environment, including :(2) *The Long-Term Impact of the Action. The action proponent should maintain an objective view toward the magnitude of environmental effects of both the immediately contemplated action and future actions, for which the proposed action may serve as a precedent, and which may result in a cumulatively significant impact.*

5.0 SUMMARY OF MONITORING

5.1 MONITORING PLAN

5.1.1 State Management/Monitoring

States monitor artificial reefs in their programs to assure compliance with the reef permit, special management zone requirements (SMZ) and to evaluate performance in accordance with the objectives for the reef²². Compliance monitoring is also utilized for documenting the stability and structural integrity of the artificial reef throughout its life. Based on requirements in the Navy and FWC risk based PCB disposal approval from EPA Region 4, a Tier 1 monitoring plan was developed and implemented, which primarily focused on PCBs concentrations in the tissue of recreational sport fish caught at the Oriskany site. The Plan established EPA and FL thresholds for median PCB concentrations in fish tissue of a species (20 ppb and 50 ppb, respectively) beyond which public health advisories and additional monitoring activities would be required in Tier II monitoring. FWC and Escambia County, Florida developed and implemented the program and the EPA approved it in 2006. FWC and Escambia County have been responsible and fully funded the monitoring plan. The monitoring plan was amended in 2007 in part to include the Navy as a responsible party²³.

5.1.2 Scope of Monitoring

The Tier I sampling included eight fish sample collection events/rounds between 2006 and 2010. Additional sampling has been conducted during 2011 with results to be determined²⁴. Of the total of 254 fish retained for the Oriskany reef, 184 were red snapper the top recreational sport fish. Other species included were caught in much less numbers included vermillion snapper, red porgy, whitebone porgy scamp grouper, gray trigger fish, and red grouper. Tier I sampling did not focus on ecological consequences and did not require sustained multi-year sampling effort or sampling at other site locations. Tier II would require sampling not just recreational sport fish but sampling at the different trophic levels and also include water column, sediments, and invertebrate species and include locations other than the reef site itself²⁵.

²² Gulf States Marine Fisheries Commission. *Coastal Artificial Reef Planning Guide*, 1998.

²³ FWC, *Combined Tier 1 Level Polychlorinated Biphenyl Fish Screening Monitoring Work Plan and Quality Assurance Project Plan*

²⁴ FWC – *Progress report on PCB monitoring*, 2011.

²⁵ FWC – *Progress report on PCB monitoring*, 2011.

Prior to the reefing, University of West Florida conducted baseline monitoring. Fish tissues were sampled along with sediments from the immediate area of the proposed sink site and other reefs in the general vicinity. This sampling found very low PCB concentrations.

5.1.3 Results

The results for the key recreational sport fish species of red snapper found PCB concentrations in excess of EPA and Florida Department of Health (FDOH) Tier I screen values in sampling event round numbers 1-6 with mean value of 54 ppb. In round number 7, results exceeded Tier I EPA values in 2 of the 15 red snapper samples, and declined below EPA thresholds by round number 8.

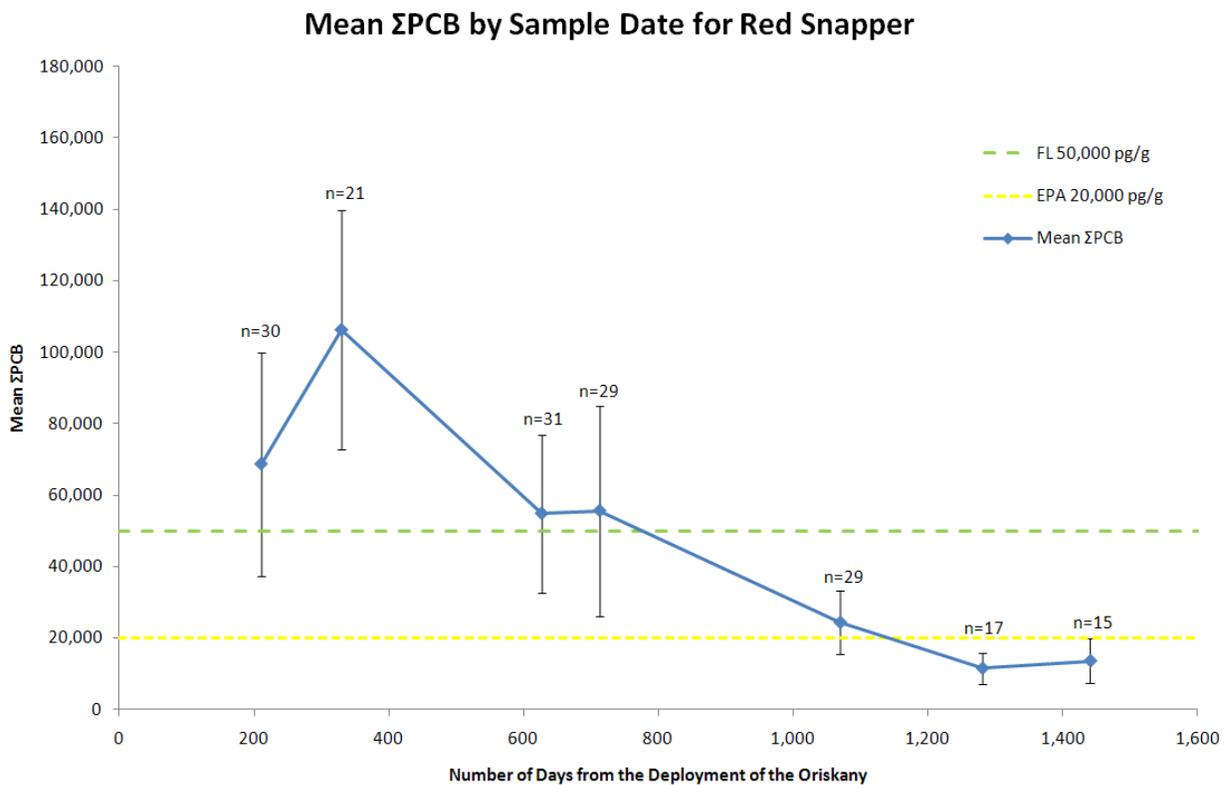


Figure 2. Example Results: Mean PCB by sample date for red snapper from the Oriskany Reef through sample round #7 (FWC, 2011).

For all species the mean total PCB concentration exceeded the FDOH and EPA thresholds for the first two years of monitoring. At 3.5 years after sinking ex-Oriskany mean total PCB concentration for all species was below EPA and FDOH thresholds.

During two rounds, 61 fish tissue samples were taken from a nearby fishing reef made of steel and reinforced concrete bridge materials. All of these samples showed PCB concentrations well below threshold values. A tagging project was performed as part of the ex-Oriskany monitoring that focused on red snapper. One associated observation was that while red snapper tended to stay at the ex-Oriskany location, excessive fishing pressure on red snapper at the reef could limit available time for the fish to be exposed to PCBs.

Comparison of monitoring data with those predicted by the Navy was complicated by the fact that the target fish from the Navy model for the species of grouper and trigger fish were not readily available for sampling at the ex-Oriskany reef. However, two fish species with similar trophic levels were available and with limited sampling data appeared to show continued elevated PCB concentrations including the red and whitebone porgy (4 samples in excess of FDOH and EPA threshold in sampling round number 8). These fish were caught at the bottom of the ex-Oriskany reef and as intertivores, foraged on sandbottom fauna such as crabs and snails²⁶.

While fish tissue PCB concentrations were above thresholds and reported in accordance with the monitoring plan, a health advisory was not provided in part because the reef site is located outside of state waters under their authority.

5.1.4 Future Reef Monitoring Activities

While results of monitoring have not resulted in Tier II level of monitoring, the FWC and Escambia County have provided several options for consideration regarding future monitoring options. Options identified included continuing fish sampling and presenting results to EPA again in 2011 (to be determined). If results continue to decline it was recommended that monitoring rate be reduced to annually from current semiannual basis. Additional activities proposed included cooperation with the University of West Florida to monitor fish movements in

²⁶ FWC – Progress Report on PCB Monitoring

the vicinity. Finally, upon EPA request, costs could be explored for sampling invertebrate organisms such as spiny oysters, scallops, and other benthic sessile organisms to better understand bio uptake mechanisms²⁷.

²⁷ FWC – Progress report on PCB monitoring, 2011.

6.0 CONCLUSIONS

Based upon the foregoing review and discussion, the following observations and associated program opportunities were identified:

1. The Navy invested extensive resources into obtaining necessary authorities, developing partnerships with regulators/other agencies, and completing PCB modeling and risk assessment and analysis for its artificial reefing program, and obtained risk-based PCB disposal approval from EPA Region 4, which ultimately resulted in successful disposition of the ex-Oriskany as an artificial reef. Based on the site-specific nature of the EPA approval, the Navy must apply for each such action separately in the future.
2. As requested by EPA Region 4 for the risk based PCB disposal approval under 40 CFR 761.62 (c), an EPA Scientific Advisory Board (“the Panel”) provided consultation and review of the Navy’s human health and ecological risks assessments, models, and supporting documentation. The Panel’s review and consultation found that the specific project was not anticipated to pose an unreasonable risk to human health and the environment. However, the Panel also noted that the Navy risk assessments and models were not adequate. A probabilistic model with sensitivity analysis as well as further definition of boundary conditions and mechanisms for transport/flow would be needed prior to using these tools for a national reefing program.
3. Remediation narrative goals were established in the EPA BMP guidance, which were codified in the legislation to create artificial reefs. This guidance was implemented for remediation completed on ex-Oriskany, and additional remediation was also completed by Florida beyond the established guidance. However, since creation of the ex-Oriskany artificial reef, no new artificial reefs with vessels have been created subject to these standards. In addition, post deployment monitoring has not been conducted for any impacts from non-PCB hazardous materials left onboard. Moving forward, it is unclear what the role of the EPA guidance will be for future Navy or State artificial reef program actions or whether the BMPs/legislation will be modified in accordance with the results of monitoring.
4. Post-action monitoring was undertaken by FWC and Escambia County in cooperation with EPA Region 4 and focused on the identification of PCB concentrations in recreational sport fish species at the reef site itself. Results of monitoring have shown elevated concentrations when compared to a nearby artificial reef site location with

materials constructed of steel bridge materials and reinforced concrete. Tissue concentrations have been in excess of the EPA and FL levels, peaked approximately two years after the sinking, and have shown mean concentration decreases below thresholds since that time. Opportunities for additional Tier II monitoring were not taken that may have provided additional data on transport and flow. However, FWC has recommended further sampling and monitoring to assure concentrations continue to decline, and if requested by EPA - sampling of benthic organisms such as crabs and snails. Extensive PCB fish tissue data from the monitoring results are now available for research, and in applications for developing new or revised risk assessments and models.

5. Prior to transferring and sinking ex-Oriskany as an artificial reef, opportunities for the public to participate and review NEPA documentation and PCB risk based disposal approval documents were provided in several forums and venues. These included 30-day availabilities and opportunities to review the Navy's EA document (draft availability FONSI advertised in a local newspaper), and PCB risk-based approval documentation. In addition, the EPA's expert Panel met in a public meeting for its review but with no public attendance, and a public meeting was held by EPA Region 4 prior to providing its risk based PCB disposal approval. Opportunities were primarily focused on PCBs, and only resulted in 9 comments on the veracity of the analysis, and these were addressed by the EPA. The result was that public participation was too narrowly focused on the EPA PCB risk-based approval for the specific site rather than an all-hazards impact and programmatic approach under NEPA.
6. In combination, based on the requirements of NEPA implementing regulations and significance criteria, Navy policy, results of the EPA Panel, results of post action monitoring, limited nature of ecological assessment (e.g., its screening level), need for more detailed analysis for non-PCB hazardous materials, need for more detailed analysis of cumulative effects and connected actions from current and foreseeable conditions regarding the Navy's other programs such as SINKEX and ship transfers to MARAD for artificial reefing, the most appropriate level of documentation for this action may be an EIS that provides additional analysis and opportunities for public participation. Accordingly, an EIS may also be an appropriate consideration for NEPA processes and documentation undertaken for a national program and/or for future ships for use as artificial reefs.

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