PMA-290 Nomination for the FY 2011
CNO Environmental Awards:
(Team) Environmental Excellence in Weapon System Acquisition

NAVAIR PMA-290 – Team Narrative

I. PROGRAM MANAGEMENT

Weapon System Acquisition Program

Program Manager Air (PMA)-290 reports to the Program Executive Officer, Air Anti-Submarine Warfare, Assault and Special Missions Programs. PMA-290 is responsible for modifying, maintaining, and upgrading legacy aircraft weapon systems for P-3 variants (P-3C, P-3 Special Projects Aircraft, and the EP-3E), in addition to developing the next generation of replacement aircraft, P-8A Poseidon. The P-8A Poseidon (Figure 1), will replace the aging P-3C, is a commercial 737-800 derivative military article, incorporating design changes to support the maritime patrol mission. The P-8A Poseidon is approaching Full-Rate Production Decision Review (FRP DR) in Fiscal Year 2013. Ground and flight testing will occur at several United States (U.S.) Navy (USN) facilities and ranges as PMA-290 continues with capability upgrades to this aircraft.

Figure 1: P-8A Poseidon

Figure 2: Assembly of the P-8A Poseidon – Boeing Thompson Site in Seattle, WA

Boeing Integrated Defense Systems is manufacturing the P-8A Poseidon (Figure 2) in conjunction with Boeing Commercial Airplanes at the following Boeing facilities: Renton, Everett, Auburn, Frederickson, and Seattle, Washington; Portland, Oregon; Huntington Beach and Anaheim, California; and Mesa, Arizona. All Boeing sites associated with the P-8A Poseidon Program are International Organization for Standardization 14001 certified.

PMA-290 is committed to integrating an effective Environment, Safety, and Occupational Health (ESOH) program into the development, manufacture, use, maintenance, and disposal of its aircraft systems. The partnership between PMA-290 and Boeing has resulted in measurable improvements towards energy efficiency as PMA-290 and Boeing are both committed to protecting the environment. The P-8A Poseidon engine, CFM56-7BE, will be more energy efficient and lower in maintenance costs compared to the previous engine, CFM56-5C. Pursuant to the President's goal expressed in Executive Order (EO) 13514 – "It is therefore the policy of the United States that Federal agencies shall increase energy efficiency…" the CFM56-7BE engine will provide a 2 percent (%) improvement in fuel consumption, which equates to a 2% reduction in carbon emissions per year. The enhanced CFM56-7BE will provide up to 4% lower maintenance costs, depending on the thrust rating.

A significant number of sustainable design strategies have been integrated throughout PMA-290 programs. The President's goal, as expressed in EO 13423, requires agency's goods and services to use "sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products…" In 2009, Boeing began using a thin, tough plastic material called Royalite to protect interior floor panels from damage during P-8A Poseidon aircraft assembly (Figure 3). Boeing arranged for the floor panels to come with the Royalite already in place, and when Boeing mechanics finished working inside the

aircraft, they removed the Royalite. Initially, the bulk of the Royalite that was removed from the aircraft went into a landfill. In 2009 this added roughly seventy-two tons per year to the solid waste stream for the Boeing production facilities where P-8A Poseidon is assembled (Figure 4). The facilities worked collaboratively to come up with a better solution.

In 2010, Boeing began pilot work with the original supplier to determine the feasibility of recycling the Royalite. Boeing personnel found a local nonprofit company to clean the plastic and cut it into smaller pieces. Boeing then arranged for the recovered plastic to be shipped back to the original supplier, melted down, and blended into new protective flooring, resulting in very minimal amounts of solid waste generated each month from Royalite which started in April 2011. As a result; the protective flooring that Boeing receives consists of 40% Boeing recycled content.

Figure 3: Removing a Piece of Royalite from the Floor (Photo Taken in Everett, WA on the 777 line)

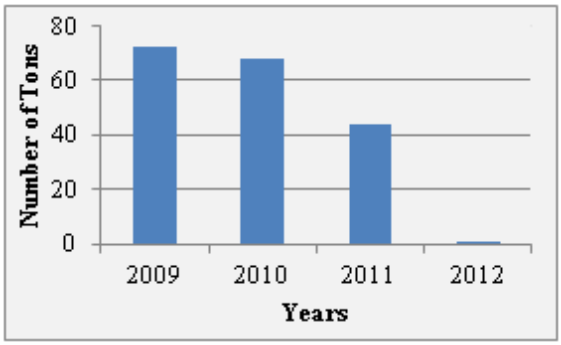

Figure 4: Number of Tons of Royalite Sent to the Landfill

II. TECHNICAL MERIT

Incorporating ESOH Integration into Systems Engineering and the Weapon System Acquisition Program's Decision-making Process

The PMA-290 ESOH Team maintains a robust ESOH program to ensure compliance with Department of Defense (DoD) Directive 5000.01; DoD Instruction (DoDI) 5000.02; Military Standard (MIL-STD)-882D; and other applicable policies, EOs, and memorandums. The PMA-290 team assures a successful integration of an effective life-cycle ESOH program into the systems engineering process. The PMA-290 ESOH Team strives to resolve any ESOH issues pertaining to the manufacturing, Test and Evaluation (T&E), maintenance, operations, training, and eventual disposal of the P-8A Poseidon at the end of the aircraft's life-cycle. The PMA-290 ESOH Team operates as an integral part of the PMA-290 Programs; reporting to the PMA-290 Systems Engineering Integration Team (SEIT) Lead (Figure 5). As part of the SEIT, the PMA-290 ESOH Team works closely with stakeholders in the Air Vehicle, Mission Systems, Product Support, T&E, Product Support, and Human Systems Integration

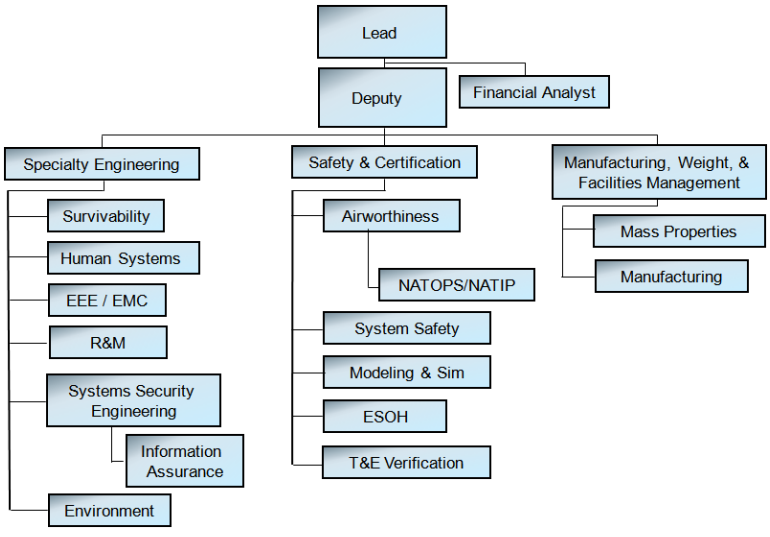

Figure 5: SEIT Organizational Chart

teams. SEIT member Team Leads meet weekly to discuss P-8A status and issues. The PMA-290 ESOH Team attends quarterly System Safety Working Group (SSWG) meetings where the PMA-290 ESOH Team Lead is a voting member.

The SEIT is responsible for integrating people and processes with products which are managed by other Integrated Product Teams (IPT), i.e., Aircraft Systems, Mission Systems. In parallel, working with Program Operations Team, the SEIT ensures these integration efforts satisfy war fighter needs while balancing program acquisition and life-cycle requirements. Key Responsibilities of P-8A SEIT IPT documented in the SEIT Charter include: ensuring compliance with applicable International, Federal, State, and local ESOH law, regulations, and treaties and managing a combined Hazardous Materials (HAZMAT) Management Program and Pollution Prevention (P2) Program.

The PMA-290 ESOH Team has fostered Design for the Environment and Safety (DFES) as a key element of its management approach. The DFES concept integrates ESOH considerations such as green design, material substitution, recycling, ergonomics, and other positive attributes into the acquisition process. Other key elements of the ESOH program include an issue tracking database based on MIL-STD-882D criteria, bi-weekly technical interchange meetings dealing with near-term issues, and quarterly reviews of long-term issues. Prime contractor performance is monitored via annual Contract Data Requirements List reports from Boeing summarizing progress to date. The PMA-290 ESOH Team routinely confers with other organizations within Naval Air Systems Command (NAVAIR) for opinions and guidance, including AIR 1.6-Environmental and AIR 11.0-Legal Counsel.

III. ORIENTATION TO MISSION SUSTAINABILITY

Hazardous Materials Management and Pollution Prevention

Boeing had received two HAZMAT Corrective Action Reports (CARs) for activities at the Patuxent River Naval Air Station (NAS) Hanger. Proactive measures from the PMA-290 ESOH Team (comprised of Boeing ESOH personnel) resulted in closing the CARs within eight months and subsequently receiving an excellent assessment from the last audit performed by the Government Flight Representatives. A new path forward for the Hangar included standardized maintenance training for Boeing personnel annually over the life-cycle of the Program, random facility assessments, increased Hangar oversight to encompass multiple shifts, and a single repository for required trainings. The maintenance training ensures consistency among maintenance crews and incorporates the following HAZMAT disciplines: (1) hazard communication and personal protective equipment awareness, (2) Lead and Cadmium hazard awareness training, and (3) oil spill prevention control and countermeasures.

PROACTIVE MEASURES TO REDUCE FUTURE HAZMAT ISSUES

- Established standardized ESOH Training for system contractor maintenance personnel.
- Conducted working group assessments at system contractor facilities.
- Increased Hanger personnel from 1 to 3.
- Incorporated HAZMAT storage locker with additional lockers and shelving.

HAZMAT specific to the P-8A Poseidon design can be readily identified during the design and manufacturing process. However, identification for the basic commercial 737 design has unique, proprietary challenges for a Commercial Off-The-Shelf, military, derivative. There is no extant list of HAZMAT associated with the basic commercial 737 aircraft and the sheer number of legacy drawings (several thousand) makes a retroactive design review cost prohibitive. To address this issue, the PMA-290 ESOH Team worked closely with their Boeing counterparts to find an alternate means of HAZMAT identification for the P-8A Poseidon system utilizing existing data sources in an economical fashion. The PMA-290 ESOH Team's solution was to create a P-8A Poseidon "Chemical Map" (Table 1). The P-8A Poseidon Chemical Mapping enables HAZMAT

identification, quantity, chemical constituents, and locations on the P-8A Poseidon. The PMA-290 ESOH Team tapped into Boeing's automated Material Safety Data Sheet System, linked data elements with design data, and facilitated HAZMAT identification. The Chemical Map will be applicable to other USN platforms and sub-systems for which Boeing is the prime contractor.

Table 1: Chemical Mapping Sample HAZMAT P-8A Poseidon Database Data

Item Number	Maintenance Zone	Item Location	Product ID	Qty Per Unit	Remarks	CAS Number	MSDS Number
1	311	Hydraulics	04117432-BX	0.01	Irritant	7440439	V23720
2	311	Hydraulics	04117432-BX	0.01	Irritant	7440471	V6810
15	311	Hydraulics	04117432-BX	10	Irritant	7440020	V6640A1
16	311	Hydraulics	04117432-BX	7	Irritant	7440439	V10008-1
17	311	Hydraulics	04117432-BX	80	Irritant	7439921	V19269

In addition to the Chemical Mapping, PMA-290 has also contractually required the system contractor to develop a HAZMAT database for supporting HAZMAT identification. The database will include the identified HAZMAT, the location and estimated quantities of HAZMAT incorporated into the P-8A Poseidon system, and the HAZMAT used in manufacturing the P-8A Poseidon. The database will provide the ability to discern between those materials used in manufacturing and the materials delivered on the aircraft. Furthermore, the database will include the restricted materials among the materials incorporated into the P-8A Poseidon system, and any explosives, energetics, and ozone-depleting substances among the materials incorporated into the P-8A Poseidon system. The HAZMAT database complies with DoDI 5000.02 requirement to document HAZMAT and it helps to facilitate demilitarization and disposal planning.

PMA-290, Boeing, and the suppliers remain cognizant of HAZMAT Management/P2 responsibilities. As a commercial derivative, the P-8A Poseidon employs Halon 1211 in the hand-held fire extinguishers and will monitor the commercial solutions. Currently, Bromotrifluoropropene (BTP) is undergoing testing by Boeing as a potential substitute for Halon 1211 in commercial applications. Quarterly Technical Interchange Meetings hosted by Boeing, for Halon solutions, provide a forum for NAVAIR tracking and insight into testing stages. PMA-290 will continue to monitor BTP developments to determine the additional military qualification needed for implementation into the P-8A Poseidon.

IV. INTERNAL EXECUTION AND DOCUMENTATION

The Programmatic Environment, Safety, and Occupational Health Evaluation (PESHE) serves as PMA-290's strategy for integrating ESOH considerations into all aspects of the P-8A Poseidon Program. Pursuant to DoDI 5000.02, PMA-290 updated the PESHE for the P-8A Poseidon Program with signed approval obtained in February 2010. After reviewing the PESHE, the Office of the Under Secretary of Defense Installations and Environment, commented: "Overall, this is one of the better written PESHE documents reviewed by this office in recent history." The PESHE reflects PMA-290's continuing ESOH initiatives and risk management strategy. Four key ESOH disciplines comprise the P-8A Poseidon PESHE process (Figure 6) (1) ESOH Compliance, (2) National Environmental

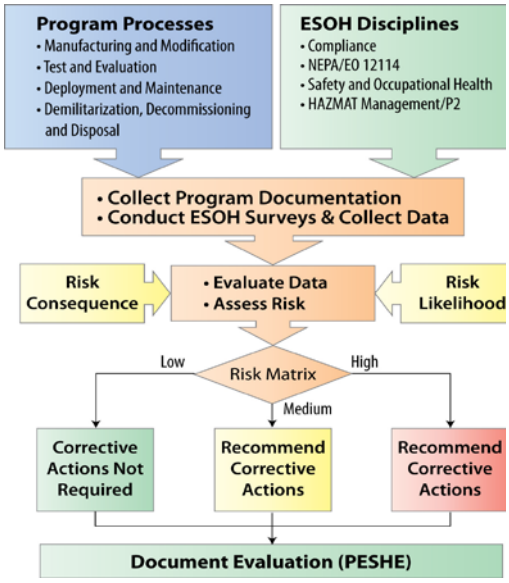

Figure 6: P-8A Poseidon PESHE Process

Policy Act (NEPA)/EO 12114, (3) Safety and Occupational Health, and (4) HAZMAT Management/P2. These disciplines of the P-8A Poseidon PESHE were applied to the production, test, operation, maintenance, and eventually the disposal of the aircraft. The intent of the PESHE process is to assess and reflect progress in executing ESOH requirements, and to identify any ESOH risks.

In previous years, P-8A Poseidon system contracts and performance specifications requirements were not flowed down properly from the system contractor to suppliers. As a result, the PMA-290 ESOH Team created the Environmental Process Action Team (EPAT) requirement in the latest Statement of Work. To ensure that ESOH requirements are flowed down to the suppliers, the EPAT will meet quarterly, with a representative from each supplier, the contractor, and the PMA-290 ESOH Team. As P-8A Poseidon Program approaches FRP DR, the system contracts for Low Rate Initial Production I and II specially incorporate ESOH requisites and encompasses compliance with National Aerospace Standard 411, EOs (e.g., 12114, 12898, 13045, 13423), Federal Acts, International Treaties, and eliminating or mitigating ESOH hazards pursuant to MIL-STD-882D. The proactive ESOH management practices of creating the EPAT will ensure Federal directives are in contract specifications and are flowed down from the system contractor to their suppliers. The system contractor and all suppliers are required to identify the type and quantity of HAZMAT delivered with and for maintenance of the system, including if there are any Class I and II Ozone Depleting Substances, hexavalent chromium and emerging contaminants, as part of the system contractors HAZMAT Management Program Reports.

EPAT MANAGEMENT STRATEGY

- Streamline and facilitate communication between the PMA-290 ESOH Team, system contractor, and suppliers.
- Develop and validate ESOH requirements and criteria.
- Prioritize ESOH requisites, assign designated leads, and develop a plan of action.

V. EXTERNAL COORDINATION OF RISK MANAGEMENT

External Coordination

In support of the USN's Tactical Training Theater Assessment and Planning Program (TAP), the PMA-290 ESOH Team works closely with various stakeholders to ensure that all PMA-290 testing requirements for 2014 - 2020 are appropriately embedded in TAP Phase II NEPA/EO 12114 documents and Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) consultation packages. This effort was initiated with an extensive data call from production, T&E, foreign military sales and PMA-264 to identify all weapons systems and testing activities, including new in-water sound systems and new weapons capabilities that will be required to support the maritime patrol mission. Data was collected for over 20 different systems, 10 USN Range Complexes/Operating Areas within and outside of the U.S. during a seven year timeframe, and combined with data from other PMAs into one single dataset maintained by the PMA290 ESOH Team. The PMA-290 ESOH Team has taken the lead in providing quality assurance and control of this data. Due to the dynamic schedule associated with the TAP Program, often times the PMA-290 ESOH Team is required to review and coordinate with other NAVAIR competencies within just a few days to ensure that Program testing requirements are being met, potential Program changes are identified, and that all data is appropriately represented into each TAP document.

STAKEHOLDERS

- NAVAIR IPT structures (production, T&E, foreign military sales, Defense Contract Management Agency).
- Competencies within NAVAIR (Patuxent River Range Sustainability Office, PMA-264, PMA-299, and PMA-290 Program Leads).
- Fleet Forces Command Atlantic and Pacific.
- Chief of Naval Operations N45.
- Naval Facilities Engineering Command.
- Naval Undersea Warfare Center.

Ensuring that NAVAIR testing requirements are adequately and accurately captured in these documents streamlines the NEPA/EO 12114 and MMPA/ESA compliance process and eliminates the need for duplicative and additional documentation in the future. This will ultimately result in both time and cost savings to the Program (estimated $2.75 million and 3 years for completion of an Environmental Impact Statement (EIS)/Overseas EIS and MMPA/ESA consultations). Additionally, this ensures that the program continues to balance protecting the marine environment from the potential effects of underwater sound while also meeting NAVAIR mission requirements.

In addition to the TAP effort, PMA-290 is taking other steps to eliminate redundancy in NEPA/EO 12114 requirements for the Program. As a result of P-8A Poseidon NEPA/EO 12114 scoping for Integrated Testing (IT)-5, the PMA-290 ESOH Team initiated a gap analysis to assess test locations with respect to weapons/sonobuoy systems and flight test requirements. The gap analysis will ultimately ensure that all test requirements for PMA-290 platforms have been addressed and will identify existing environmental documentation for specific geographic test locations being proposed under IT-5, in addition to identify any potential planning deficiencies. The results of the IT-5 gap analysis are expected to result in both time and cost savings to the Program by eliminating the need to prepare an Environmental Assessment (EA)/Overseas EA (estimated $150,000 and 18 months for completion). Preparation and completion of the IT-5 gap analysis also ensures that military readiness and test schedules are met without delay.

Figure 7: P-8A Poseidon Launching the First MK54 Torpedo

The P-8A Poseidon aircraft successfully launched the first MK54 torpedo during a test event in the Atlantic Test Range at NAS Patuxent River on 13 October 2011 (Figure 7). The Mission Computing and Display System aboard the P-8A Poseidon allowed the test aircraft (T-3) to launch a single torpedo at 500 feet above water. PMA-290 conducted initial torpedo release tests to verify safe separation of the MK54 weapon from the P-8A Poseidon with future testing to include delivery accuracy, weapon integration, and end-to-end test. This recent event was accomplished primarily due to efficient internal and external coordination (through ESOH, test engineers, Boeing, and Range Sustainability Office [RSO]), combined with proactive NEPA/EO 12114 planning to support aggressive military readiness and test schedules.

The PMA-290 ESOH Team also routinely coordinates with test engineers, planners, and the RSO to ensure that appropriate mitigation measures and standard operating procedures are taken into consideration and implemented during testing activities to ensure compliance with the MMPA and ESA. The PMA-290 ESOH Team also participates in reviewing and commenting on existing USN training programs and tools, such as the Marine Species Awareness Training and the Protective Assessment Measures Protocol, to ensure that aircrews are trained to detect protected marine animals that could be in the vicinity of a testing event and to ensure that appropriate mitigations are applied during specific testing events. The PMA-290 ESOH Team also ensures aircrews are cognizant of mitigations measures by providing updates to the operational community during SSWG meetings.