

(3) Narrative

Background:

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Position Description: Major duties and responsibilities consist of identification and mitigation of ESOH risks, and extensive coordination and documentation to ensure compliance with National Environmental Policy Act (NEPA)/Executive Order (EO) 12114.

Awards and Services: Defense Environmental Security Award for Pollution Prevention in FY 96 and FY 97 and Environmental Protection Agency (EPA) Stratospheric Ozone Protection Award in 1998.

Accomplishments:

The VIRGINIA Class T&E Environmental Program has:

- (1) *established an environment, safety and occupational health (ESOH) effort to identify ESOH risks, document those risks, and mitigate the associated risks through systems engineering for one or more systems acquisition programs, and they have*

In December 2008, the VIRGINIA (SSN 774) Class Submarine Program Office approved the ACAT 1D Milestone III Programmatic Environment, Safety, and Occupational Health Evaluation (PESHE) in accordance with the requirements established in DoDI 5000.2 and SECNAVINST 5000.2D. It characterizes the VIRGINIA Class Submarine Program approach for integrating ESOH considerations into the overall systems engineering process to ensure compliance with applicable ESOH laws and regulations, international treaties and agreements, and Navy policy and procedures.

- (a) The VIRGINIA Class Program successfully met all ESOH requirements necessary for Milestone III approval in 2009. The VIRGINIA Class Submarine Program continues to set the standard for environmental excellence among DoD Weapon Systems Acquisition Programs. Seven submarines of the class, USS VIRGINIA (SSN 774), USS TEXAS (SSN 775), USS HAWAII (SSN 776), USS NORTH CAROLINA (SSN 777), USS NEW HAMPSHIRE (SSN 778), USS NEW MEXICO (SSN 779),

USS MISSOURI (SSN 780), and USS CALIFORNIA (SSN 781) have been delivered, and the VIRGINIA Class Submarine Program Office, PMS450, remains fully committed to ESOH issues and continues to fund necessary ESOH support efforts.

PMS450 has performed a System Safety ESOH Management Self Evaluation to provide a “snapshot” on the health and progress of ongoing ESOH management efforts. Using the System Safety ESOH Management Evaluation Criteria for DoD Acquisition Programs of January 2007, the VIRGINIA Class Program achieved a rating of “Green”.

The program strategy for integrating ESOH considerations into the systems engineering process is that ESOH quality is the responsibility of every program participant, and that integration of ESOH considerations is carried out through the actions of the design-build teams, of which Environmental Compliance Team are members. All program participants are reminded of their involvement in this process through a program of annual environmental awareness training. ESOH compliance considerations began early in the integrated design/construction-planning phase. Northrup Grumman and Electric Boat consecutively developed a comprehensive Region of Influence study to (1) establish a baseline of environmental laws, regulations and requirements; (2) forecast required permits and Toxic Release Inventories; and (3) provide a performance history record of environmental impact data.

The Region of Influence study evaluated existing environmental operating permits, and Toxic Release Inventory reported chemicals and Biennial Hazardous Waste Reports. Completion of the VIRGINIA Class Submarine Region of Influence study produced detailed guides summarizing applicable environmental laws and regulations, in addition to evaluating materials and processes used and waste streams generated during the VIRGINIA Class Submarine construction in Groton, CT, North Kingston (Quonset Point), RI and Newport News, VA.

To date, no significant ESOH compliance issues associated with homeporting, operation or maintenance of the VIRGINIA Class have been identified. Although disposal of the lead ship of the VIRGINIA Class Submarine is over 30 years away, the VIRGINIA Class Submarine Program Office has acknowledged the difficulties and costs involved with disposing of a nuclear powered submarine. Coordination with the planned Disposal Yard, Puget Sound Naval Shipyard, has led to development of the VIRGINIA Class Submarine Recycling Process Manual, which defines actions required to dispose of the VIRGINIA Class Submarine, including the associated demilitarization and environmental impacts. This information was factored into the analyses conducted during the ship’s design phase to minimize overall life cycle costs and impacts to the environment.

- (b) With respect to system safety and health, the VIRGINIA Class Submarine Program has a comprehensive program to effectively integrate system safety and health

considerations, following the requirements of OPNAVINST 5100.24, and the methodologies of MIL-STD-882. PMS450 Standard Operating Procedure #8 assigns system safety responsibilities. An evaluation of the system safety and health program's findings from design through disposal is described and maintained in the "VIRGINIA Class System Safety Hazard Tracking List" database maintained by Electric Boat. DoDI 5000.2 requires the approval of the Secretary of the Navy's Acquisition Executive for acceptance of high-risk hazards. The acceptance authority for serious-risk hazards is Program Executive Officer (Submarines) and for lower risk hazards is in accordance with PMS450 Standard Operating Procedure #8.

The VIRGINIA Class Submarine Discharge/Emissions and the Design/Build Environmental Analyses databases, address environmental and occupational health (EOH) impacts and issues for all ship systems (excluding reactor plant and selected propulsion related systems). These databases are separate from the Hazard Tracking List and are the official EOH databases for VIRGINIA Class submarines. Similarly, the VIRGINIA Class Hazardous Material Map is maintained as the official record of hazardous materials included in VIRGINIA Class submarine components.

During the design and planning phase of the ship's life cycle, the MIL-STD-882 system safety and health analysis process is implemented by system safety engineers who are matrixed into the integrated design teams, thus ensuring that system safety and health issues are considered during all design decision-making. Additional safety and health lessons-learned taken into consideration are collected from the field experiences of existing submarines, the Naval Safety Center, vendor failure data, and the Naval Ordnance Safety and Security Activity.

- (c) The VIRGINIA Class Submarine Program's Hazardous Materials Management and Pollution Prevention Strategy was developed early on to provide specific guidance to key life cycle participants, including the prime contractor, principal suppliers, and contractors providing equipment.

The Design/Build Environmental Analyses database, an integral element of the Environmental Resource Library, describes the VIRGINIA Class systems and components, their material makeup, and the waste streams created by their manufacture, installation, testing, operation, maintenance and disposal. The Design/Build Environmental Analyses database consolidates common information elements (such as environmental and health effects of hazardous material constituents) and allows linking to ship system specific reports, and provides links to other environmental analysis products (e.g., Detailed Impact Analyses for preferred consumables for construction, maintenance and operations). The Design/Build Environmental Analyses also serve to establish a future submarine design baseline for assessing improvements in environmental performance, effects of waste streams on environment and human health, alternative materials and processes considered to reduce adverse effects, rationale for design decisions regarding the employment of alternatives and mitigation measures implemented to control environmental and human health impacts..

The VIRGINIA Class Program is continuing to prevent or minimize potential future waste streams at the source. The most comprehensive Pollution Prevention effort underway is the ongoing review of procedural standards to eliminate regulated substances and to substitute more environmentally preferable materials wherever possible. Through the design process, hazardous materials are being eliminated or reduced at the source, rather than being managed as waste material later in the life cycle. The minimization of hazardous material is seen as a significant contributor to the reduction of total ownership costs. The program developed the “VIRGINIA Class Submarine Hazardous Materials Avoidance List,” to assist designers, planners and logisticians in their efforts to eliminate and reduce hazardous substances from use during design, construction, maintenance, and operations.

The Program Office has worked to develop the VIRGINIA Class Submarine HazMat Map, which is a pollution prevention, hazardous material control and management, and cost saving tool for the VIRGINIA Class. The HazMat Map identifies hazardous and non-hazardous materials contained in parts and components used to construct the ship, and their locations on the ship, and it provides access to the parts' environmental information for all VIRGINIA Class Submarine life cycle activities. A major benefit of the HazMat Map will be its use as a resource during maintenance, overhaul, or disposal where information is needed to identify a component's hazardous constituents. This is significant because of the potential cost savings. Each time the HazMat Map is used for component evaluation in preparation for maintenance or disposal, a cost avoidance results by obviating the need for a material history search as well as potential sampling and laboratory analysis costs. Data for more than 37,000 parts and components have been entered into the HazMat Map to date.

- (d) Explosives Safety is a part of Weapons System Safety, which is integral to the Test and Evaluation Process. Safety tests are proposed in coordination with the Test and Evaluation Master Plan and Master Ship Test Plan. This includes safety testing of any hardware and software that have been identified as safety critical by hazard analysis. The safety risk management process discussed previously provides the necessary information for making proper decisions regarding the safe conduct of the respective test and evaluation effort. Commander, Operational Test and Evaluation Force, as a member of the VIRGINIA Class Submarine Weapons System Safety Process Integration Team, provides safety input to Test and Evaluation requirements. While there are no explosives inherent in the construction materials of the VIRGINIA Class Submarine, Weapon System Explosives Safety Review Board concurrence is obtained prior to loading explosives and testing all weapon systems.

(2) established a partnership with the system's end users to fully address long-lead NEPA/EO 12114 compliance requirements before the system is delivered.

The T&E Environmental Team played an integral role in providing continued comprehensive environmental compliance support for the VIRGINIA Class Submarine

Program, in addition to sponsoring innovative mitigation and research initiatives. These efforts include the following:

- (a) NEPA/EO compliance efforts: The VIRGINIA Class T&E Environmental Team provided continued support for substantial VIRGINIA Class Submarine Follow-On Operational Test and Evaluation (FOT&E)/Follow-On Developmental Test and Evaluation (FDT&E) activities. In 2009, the team prepared an Overseas Environmental Assessment for VIRGINIA Class FOT&E/ FDT&E in Arctic Waters, which is considered a pioneer effort for environmental planning associated with under-ice submarine test activities. The team also prepared an Environmental Assessment for Southeast Coast Pierside Test Activities, which provided a unique Cooperating Agency opportunity between the US Air Force, 45th Space Wing at Patrick Air Force Base and the U.S. Department of the Navy. This effort also involved regulatory coordination and consultation with a variety of federal and state agencies, including the National Marine Fisheries Service (NMFS), the US Fish and Wildlife Service (USFWS), the State of Florida, and the State of Georgia.

In addition, in order to accomplish goals associated with NEPA and EO 12114 compliance, TEAM SUB successfully teamed with Fleet range sustainment coordinators to provide compliance for Developmental and Operational Test events under TAP I environmental documentation and analysis for at-sea ranges and operating areas. Coordination of the VIRGINIA Class test events on these ranges requires communication with environmental representatives from the range prior to the onset of test events, analysis of potential impacts, coordination with the VIRGINIA Class Test team, and drafting of the appropriate documentation. This was accomplished for a variety of test events, including torpedo and minefield test events in the Hawaii Range Complex.

- (b) Mitigation implementation: The T&E Environmental Team provided marine mammal observer (MMO) support for VIRGINIA Class Submarine Lock-out Trunk/Dry Deck Shelter Technical and Operational Evaluation in Key West, FL and for VIRGINIA Warfare Material Certification Program (VWMCP) Trials pierside testing in Port Canaveral, FL. In addition, team members devised and implemented a MMO Cost Reduction plan in support of pierside test events. The goal of this plan was to minimize costs associated with executing marine mammal observation requirements for pierside test activities in Port Canaveral, FL while meeting environmental compliance requirements. Improvements were identified by using resources to cross-train members of the test team to support mitigation requirements, therefore reducing the need for added personnel needed to fulfill marine mammal and protected species mitigation requirements. This effort involves significant cost-cutting measures while ensuring appropriate levels of operational and environmental support are maintained.

The T&E Environmental Team also supported the VIRGINIA Class Submarine Program through coordination with Fleet Operational Forces Commands for test activities occurring on Fleet ranges and Operating Areas that fell under the auspices of Fleet environmental coverage. Through partnership with representatives of US

Fleet Forces (USFF), and Commander, Pacific Fleet, the T&E Environmental Team successfully leveraged existing Fleet environmental documentation for VIRGINIA Class T&E requirements. Under the Letters of Authorization (LOA) issued by the National Marine Fisheries Service (NMFS) to the Fleets, there exist detailed requirements for mitigation measures, monitoring, and reporting. The T&E Environmental Team coordinated fulfillment of the at-sea marine mammal mitigation requirements and preparation and submittal of after action reports to the Chief of Naval Operations in accordance with the requirements of OPNAVINST 5090.1C.

- (c) Applied research: Biologists from the T&E Environmental Team prepared a full proposal and received ONR-sponsored funding to execute the first year of research to study behavioral reactions of fish to underwater acoustic signals at the VIRGINIA Class pierside test basin in Port Canaveral, FL. This study utilizes acoustic telemetry to investigate the behavioral effects of mid- and low- frequency sonar on wild fish species in a natural environment. This information will provide valuable data on fish behavior, movement, and survival following exposure to high-intensity sonar. This research will likely be conducted in conjunction with VIRGINIA Class Submarine Weapons Systems Accuracy Trials (WSAT) pierside testing in the future. This study will be, virtually, the first that has studied behavior of wild fish in response to sonar or virtually any kind of human-generated intense sound. Thus, the results of the work will have potential implication in providing an understanding of behavioral responses to intense sounds in general, and provide a methodology that could be applied to other fish species and other sound sources. USFF has also provided funding to investigate the behavioral response of fish to pile-driving occurring in Port Canaveral in Fall 2011, and this effort is currently in progress. Research partners in these efforts include biologists from Kennedy Space Center and the University of Maryland.