NEUP Nuclear Energy University Program
U.S. Department of Energy

Center for Education and Training of the Nuclear Merchant Mariner

PI: Paul A. Wlodkowski, Ph.D., Maine Maritime Academy

Collaborators: American Bureau of Shipping (ABS), MobileNuclear Energy LLC (MNE)

Program: Nuclear Reactor Safety Training and Workforce Development

ABSTRACT:

The global maritime industry is currently undergoing a period of planning focused on reducing the carbon footprint of the worldwide shipping fleet numbering more than 100,000 vessels and associated operations. Innovations focused on "decarbonization" are driven largely by goals set by the International Maritime Organization (IMO) to reach net-zero greenhouse gas (GHG) emissions from international shipping by 2050 and to ensure an uptake of alternative zero or near-zero GHG fuels by 2030 along with indicative checkpoints for 2030 and 2040. Nuclear energy features prominently in this strategy. Maine Maritime Academy (MMA), in collaboration with the American Bureau of Shipping (ABS) – a maritime classification society, and MobileNuclear Energy LLC (MNE), a leading developer of microreactors, plans to establish the nation's first Center for Education and Training of the Nuclear Merchant Mariner (NMM). In doing so, the consortium will provide a direct and strong tie to three of the four Mission Goals of the Office of Nuclear Energy, i.e. keep existing U.S. nuclear reactors operating, deploy new nuclear reactors, and expand international nuclear energy cooperation.

Dr. Paul A. Wlodkowski of MMA is the proposed Principal Investigator (PI). He will lead the consortium in delivering three major deliverables: (1) Completion and offering of a Nuclear Engineering Technology (NET) curriculum (2) Development of an IMO approved Nuclear Power Operator Course, and (3) Demonstration of the feasibility of a floating nuclear power plant (FNPP) prototype. The opportunity that nuclear energy presents the maritime industry is even more important than good economics for maritime companies and decarbonization of an entire industry. The ability to introduce and control U.S.-based nuclear technology options for the maritime industry can expand multiple elements of the U.S. economy. The distinct advantages of advanced reactor technology for maritime applications can (1) revitalize U.S. shipping companies and shipbuilders that have suffered without a competitive differentiator from foreign competitors, (2) create a potential market of thousands of ships and offshore assets for U.S. nuclear reactor designers, builders, and operators, and (3) develop a supply and logistics support chain for fueling these reactors in the U.S. This technology would be transformative for the U.S. economy and clean-energy job growth, while also supporting the clean power and decarbonization initiatives of the government.

None of this, however, can move forward without a maritime workforce that can operate assets with nuclear technology onboard. The workforce needs will be many, including the following:

- Licensed mariners who can operate maritime assets with embedded advanced nuclear technology onboard

- Naval Architects and Marine Engineers who can lead the design and construction of maritime assets with embedded advanced nuclear technology

- Port engineers and supporting technical teams who can manage and execute sustainment and support activities (regulatory, logistics, etc.) of these assets

While there are education and workforce development programs for maritime workers and for nuclear workers, there are no programs in place now covering both domains. The proposed project fills a critical gap that must be addressed for the industry to move forward.

This project is timely because numerous early-stage development projects are underway across the industry, covering mobile floating power assets as well as development of various types of vessel propulsion concepts. Small modular reactors will be operating onshore before the end of 2030, and deployment of maritime applications will soon follow. Now is the time to build the pipeline of jointly qualified maritime and nuclear workers needed to have the highly skilled workforce that will be required.