Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*

COST ($ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	8.012	0.769	0.811	0.801	-	0.801	0.817	0.833	0.851	0.870	Continuing	Continuing
1830: *RADIAC Development*	8.012	0.769	0.811	0.801	-	0.801	0.817	0.833	0.851	0.870	Continuing	Continuing

A. Mission Description and Budget Item Justification

Mission Description: The Radiation Detection, Indication and Computation (RADIAC) Program is responsible for providing radiation monitoring instruments that detect and measure ionizing radiation. These instruments are used on all Navy, Coast Guard and Military Sealift Command vessels, and at every Navy shore installation, in order to ensure the safety of personnel, continuity of operations in radiological contingencies, and protection of the environment.

Justification: Title 10 of the Code of Federal Regulations, Part 20 (10 CFR 20) requires RADIAC instruments be used to ensure the safety of personnel who work with or who are exposed to radioactive materials in their jobs. Additionally, the Navy's mission requires personnel and ships to have the ability to operate in radiological environments and the ability to identify and interdict radiological Weapons of Mass Destruction (WMD). Navy programs that require RADIAC instruments for Occupational Safety & Health (OSH) under the provisions of 10 CFR 20 include Naval Nuclear Propulsion, Nuclear Weapons, Medical, and Radiological Affairs Support. Non-OSH programs include Radiological Defense, Consequence Management, Training, Technical (RADIAC calibration, shielding evaluation, research) and Radiological Search (maritime interdiction and radiological search missions to locate or intercept WMD).

This budget item develops, tests and evaluates new, highly reliable, more easily calibrated, easy to care and maintain, light weight and modern RADIAC instruments in order to improve the effectiveness of radiation safety, to make instruments simpler to use, and to reduce life cycle costs. The ultimate goal is to replace old, bulky, costly to maintain and repair, unreliable and obsolete instrumentation with multifunction equipment that can be automatically calibrated at greatly reduced cost.

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	0.772	0.811	0.818	-	0.818
Current President's Budget	0.769	0.811	0.801	-	0.801
Total Adjustments	-0.003	0.000	-0.017	-	-0.017
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.003	0.000			
• Rate/Misc Adjustments	0.000	0.000	-0.017	-	-0.017

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Navy	Date: March 2024
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603542N *I Radiological Control*

Change Summary Explanation

FY2023 decreases of $0.003 million due to SBIR.

FY2025 decreases of $0.017 million for rate/Misc adjustment.

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy										Date: March 2024		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603542N / *Radiological Control*				Project (Number/Name) 1830 / *RADIAC Development*			
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
1830: *RADIAC Development*	8.012	0.769	0.811	0.801	-	0.801	0.817	0.833	0.851	0.870	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission: The Radiation Detection, Indication and Computation (RADIAC) Program is responsible for providing radiation monitoring instruments that detect and measure radiation in accordance with the provisions of Title 10 of the Code of Federal Regulations (10 CFR 20). These instruments are used on all vessels afloat and at every shore installation in order to ensure the safety of personnel and the environment. RADIACs are also required after an act of terrorism or war that involves nuclear material in order to enable continuation of warfighting ability.

Justification: Many RADIAC instruments and dosimetry systems are decades old and approaching the end of their useful lives. In some cases the equipment and replacement parts are no longer manufactured, making the equipment logistically unsupportable. In other cases increasing failure rates due to age make replacements an economic efficiency
improvement. In all cases a technology refresh will make both economic sense in terms of lowering the total ownership costs, and will also provide increased operational capabilities.

Naval Nuclear Propulsion Program (NNPP): Instruments are developed to support the safe operation and maintenance of nuclear powered vessels and at nuclear maintenance facilities.

Non-NNPP: Instruments are developed to support other than NNPP end users, such as Explosive Ordnance Disposal, Nuclear Weapons, Medical, Industrial Radiography, Radiological Defense and Training.

Visit, Board, Search & Seizure (VBSS): The Navy has been tasked to intercept and board vessels at sea to search for nuclear or radiological materials that could be used for terrorist attacks. These instruments would have different characteristics than those used for NNPP and non-NNPP purposes and prototypes must be developed and/or tested and evaluated.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**
Title: Primary Dosimetry	0.245	0.215	0.168	0.000	0.168
Articles:	-	-	-	-	-
Description: The need for primary dosimetry is inherent due to the Navy's operation of nuclear reactors and their emission of ionizing radiation. Title 10 CFR 20.1502 states "Each licensee shall monitor exposures to radiation and radioactive material at levels sufficient to demonstrate compliance with the occupational dose limits." A primary dosimeter must pass accreditation proficiency testing, allowing the reading obtained					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
to become a part of an individual's permanent health record. This permanent record is used to protect the individual radiation worker's health, and also the Navy from future liability. The Navy's current primary device is the DT-702/PD, a passive Thermo Luminescence Dosimeter (TLD). Existing TLDs and newer technologies, such as Optically Stimulated Luminescence (OSL), must be continually researched to determine on-going performance parameters, cost to field and cost to maintain, since the current system is approaching the end of its useful life and must be replaced by 2030. A passive device does not provide a display of the dose being received, which can be important in certain circumstances. The dosimeter instead must be sent to a facility with a special reader to recover the dose, which is then entered in the individual's medical records. An active device displays the dose digitally in real time, providing immediate feedback in high risk scenarios. Newer passive-active systems can do both. ***FY 2024 Plans:*** Mirion Technologies, Inc. CRADA testing will be finalized and a final report will be submitted to NAVSEA 09RD and the contractor. NSWCCD will extend the CRADA for Mirion Technologies, Inc. for an additional three years to test the RASP, BUMED and NNPP applications of the software and hardware. This includes but is not limited to the following: dosimeter connectivity, dosimetry reports, and the dosimeter's ruggedness for use by NNPP, BUMED, and RASP. NSWCCD will continue the CRADA testing the of TFS and Landauer, Inc. dosimetry systems. ***FY 2025 Base Plans:*** NSWCCD will finalize the extended CRADA Testing of the Landauer and TFS Systems and provide a final report to NAVSEA 09RD and the contractors. NSWCCD will continue the extended CRADA testing of the Mirion Technologies, Inc System. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Less testing to be completed in FY25 compared to FY24.					
Title: Secondary Dosimetry	0.212	0.085	0.000	0.000	0.000
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Description: Secondary dosimetry includes the monitoring of doses to the hands, feet and eyes. In some medical and industrial applications, there is a high risk of such local high exposures due to the handling of sources, working close to a high radiation field, or using/cleaning high-energy beta emitters. Because of this, the need to accurately measure extremity dose is of significant importance to the Navy. The legacy system currently used for hands and feet dose measurements is RadStar. This is an active system (see the Primary Dosimetry Overall Description task for a discussion of passive and active dosimeters), but it is no longer supported by the vendor and must be replaced. To that end the ED3 system was procured in FY18 and has been tested and a report rendered on its suitability as a replacement. This is another active system, but shortfalls noted were that it currently measures only exposure to the hands, and it is too fragile for industrial-type use. Another active system being considered is the iMUX, which has the advantage of being wireless (the other two require wires that extend from the extremities to a pager-sized device clipped to the belt or worn on the wrist), and is capable of measuring dose at both the hands and feet. Measurement of dose at the eyes is currently extrapolated from the Navy's passive primary dosimeter, the DT-702/PD. Because eyes are subject to development of cataracts with prolonged or high dose exposure to radiation, a more precise and real time measuring device is being sought in the systems being evaluated. A secondary dosimeter provides an accurate, real-time readout of the radiation exposure in operational environments and is utilized in conjunction with a primary dosimeter. Employment of extremity monitoring can be utilized during operations requiring hands-on maintenance in a radiation field, research facilities and medical procedures. A replacement EPD that can function as both a secondary and extremity dosimeter will be used by NNPP, RASO, BUMED and SSP during everyday operations and will be replacing the current ThermoFisher Scientific (TFS) MK-2 and RADSTAR systems. ***FY 2024 Plans:*** NSWCCD will submit a final report to NAVSEA 09RD. ***FY 2025 Base Plans:*** No planned actions as the project will be moved to the procurement phase of the replacement EPDs. ***FY 2025 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Project will move from RDTE to OPN in FY25.					
Title: Laboratory Test Equipment	0.080	0.020	0.105	0.000	0.105
Articles:	-	-	-	-	-
Description: Laboratory Test Equipment are used in laboratories to test and evaluate radiation detectors and dosimetry devices. The primary end users will be NSWCCD and NDC. The beta irradiators will be used throughout the development and procurement of the Navy's new primary dosimetry system to evaluate system performance. Handheld radiation detection equipment from the Radiological Detection System (RDS) can also be evaluated using the beta irradiators. The upgraded Ortec equipment will be used to analyze the new accident dosimeter after exposure to a criticality event. ***FY 2024 Plans:*** A neutron shielding study will be performed to determine if the NSWCCD range room will be able to hold a neutron irradiator. ***FY 2025 Base Plans:*** Conduct market research on neutron irradiators. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase due to labor needed to conduct market research.					
Title: Radiological Detection System Training Device	0.055	0.212	0.212	0.000	0.212
Articles:	-	-	-	-	-
Description: The Radiological Detection System (RDS) is a survey meter with ancillary probes that is being procured by all the Services and some North Atlantic Treaty Organization (NATO) allies to replace the legacy equipment in all the respective procuring activities, and to allow joint interoperability. The Training Device will be an instrument designed to simulate the detection and measurement of alpha, beta, gamma, neutron and low energy X-rays for trainees on the RDS equipment without having to use actual radioactive sources. This makes the training safer and more cost effective to manage by avoiding the significant legal and safety issues involved when using radioactive sources.					

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
FY 2024 Plans: NSWCCD will begin prototype testing. ***FY 2025 Base Plans:*** NSWCCD will complete prototype testing and provide a report with a recommendation to NAVSEA 09RD for procurement. ***FY 2025 OCO Plans:*** N/A					
Title: Battery Powered Air Particle Sampler ***Articles:*** ***Description:*** The HD1151() are battery powered portable air samplers that have been fielded for over 15 years. The weight of the device at 38 pounds, has been a long-standing complaint by the end user community. These systems will be used by the NNPP for radioiodine sampling. ***FY 2024 Plans:*** NSWCCD will procure systems and conduct testing. ***FY 2025 Base Plans:*** NSWCCD will continue testing air sampling systems. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase due to more required testing.	0.054 -	0.164 -	0.167 -	0.000 -	0.167 -
Title: Surface Contamination Monitor ***Articles:*** ***Description:*** A Surface Contamination Monitor (SCM) will allow the end user to quickly survey large areas for alpha-beta contamination. These types of surveys are required by federal, state and Navy regulations prior to releasing an area for unlimited use. SCM technology configurations include proportional detectors or scintillation type detectors. In addition, the SCM automated mapping and report generating features will accelerate these types of radiological surveys. These devices would be used at shipyard facilities by the Naval Nuclear Propulsion Program.	0.123 -	0.115 -	0.149 -	0.000 -	0.149 -

Exhibit R-2A, RDT&E Project Justification: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
FY 2024 Plans: NSWCCD will continue participating in the CRADA status calls with PNSY and will observe the operational portion of the SCM testing. The SCM prototype testing is expected to be completed. NSWCCD will begin testing the Ludlum SCM. ***FY 2025 Base Plans:*** NSWCCD will continue testing Ludlum SCM. ***FY 2025 OCO Plans:*** N/A ***FY 2024 to FY 2025 Increase/Decrease Statement:*** Increase due to required testing being conducted in FY25.					
Accomplishments/Planned Programs Subtotals	0.769	0.811	0.801	0.000	0.801

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• OPN 2920: *RADIAC*	7.647	16.475	38.688	-	38.688	34.325	39.798	41.953	32.790	Continuing	Continuing

Remarks

D. Acquisition Strategy

Development efforts are focused on evaluation, modification (as required to meet operational requirements) and adaptation of commercial-off-the-shelf (COTS) technology in order to minimize total ownership costs. To the maximum extent possible new contracts are targeted for fixed price efforts to control development cost.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy			Date: March 2024
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603542N / *Radiological Control*	Project (Number/Name) 1830 / *RADIAC Development*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	Various	NSWCCD : West Bethesda, MD	8.012	0.769	Nov 2022	0.811	Nov 2023	0.801	Nov 2024	-		0.801	Continuing	Continuing	Continuing
		Subtotal	8.012	0.769		0.811		0.801		-		0.801	Continuing	Continuing	N/A

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	8.012	0.769		0.811		0.801		-		0.801	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Navy		Date: March 2024
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Primary Dosimetry				
Test & Evaluation: TFS & Landauer Extension CRADA Testing & Report	1	2023	4	2025
Test & Evaluation: Mirion Extension CRADA Testing & Report	1	2024	4	2026
Test & Evaluation: Neutron Correction Factor and Neutron Area Monitor Study	1	2026	4	2027
Secondary Dosimetry				
Test & Evaluation: COTS Electronic Dosimeters Testing & Report	1	2023	3	2024
Laboratory Test Equipment				
Test & Evaluation: Neutron Shield Analysis	4	2023	4	2024
Test & Evaluation: Contract Events: Procure Neutron Irradiator	3	2024	4	2025
Test & Evaluation: Contract Events: Low Background Analysis	1	2026	3	2026
Radiological Detection System Training Devicce				
Test & Evaluation: Test & Report	3	2023	4	2029
Surface Contamination Monitor				
Test & Evaluation: Portsmouth Naval Shipyard CRADA Testing	1	2023	4	2024
Test & Evaluation: Ludlum CRADA Testing & Report	4	2024	4	2026
Battery Powered Air Particle Sampler: Contract Events: Electronics Upgrade	1	2023	4	2024
Battery Powered Air Particle Sampler: Test & Evaluation: Test & Report	4	2024	4	2026
AN/PDR-70 Upgrade				
Contract Events: Electronics Upgrade	2	2026	2	2026
Test & Evaluation: Test & Report	1	2027	4	2029