Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
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*

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	6.021	0.679	0.775	0.761	-	0.761	-	-	-	-	-	-
1830: *RADIAC Development*	6.021	0.679	0.775	0.761	-	0.761	-	-	-	-	-	-

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, etc.) 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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	0.689	0.778	0.788	-	0.788
Current President's Budget	0.679	0.775	0.761	-	0.761
Total Adjustments	-0.010	-0.003	-0.027	-	-0.027
• Congressional General Reductions	-	-0.003			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.010	0.000			
• Rate/Misc Adjustments	0.000	0.000	-0.027	-	-0.027

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
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 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
1830: *RADIAC Development*	6.021	0.679	0.775	0.761	-	0.761	-	-	-	-	-	-
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 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**
Title: Primary Dosimetry	0.171	0.210	0.160	0.000	0.160
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 2022 Navy		Date: May 2021
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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 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 2021 Plans:*** NSWCCD continued the CRADA testing of the passive-active dosimeters provided by TFS, Landauer, Inc. and Mirion Technologies, Inc. ***FY 2022 Base Plans:*** TFS and Landauer, Inc. CRADA testing will be finalized in FY 2022 and the final report will be provided to NAVSEA 04ND. The CRADA testing for the Mirion Technologies, Inc. dosimetry system will be continued. NSWCCD will extend the CRADAs for TFS and Landauer, Inc. for an additional two years to test the Radiological Affairs Support Program (RASP), Bureau of Medicine (BUMED), and Naval Nuclear Propulsion Program (NNPP) applications of the software and hardware. This includes but is not limited to: dosimeter connectivity, dosimetry reports, and the dosimeters' ruggedness for use by the NNPP. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** More extensive testing was conducted in FY 2021 than in FY 2022.					
Title: Secondary Dosimetry	0.100	0.282	0.157	0.000	0.157
Articles:	-	-	3	-	3
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					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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. ***FY 2021 Plans:*** NSWCCD completed testing of Mirion's extremity dosimeter system (iMUX) and reported the results to NAVSEA 04ND. The extremity dosimeter upgrades initially planned were cancelled due to a lack of development and response from the vendor. Concurrently, the Navy Nuclear Laboratory (NNL) issued a letter requesting electronic dosimeter testing in support of the eventual replacement of the existing extremity infrastructure. To support the testing, NSWCCD solicited for loaner test articles and received electronic dosimeter COTS samples from two manufacturers. The test samples were tested at NSWCCD in accordance to the test plan generated by the Radiation Detection Technology Branch (RDTB) for radiological performance as both a secondary dosimeter (whole body) and an extremity dosimeter (hands). ***FY 2022 Base Plans:*** NSWCCD will complete testing and generate a report for the electronic dosimeter test samples tested at NSWCCD.					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
NSWCCD will procure the two electronic dosimeters provided at no cost in FY21 in order to conduct radiological and environmental destructive testing. Articles from additional vendors will be solicited and subjected to the same tests, which will begin in fourth quarter of the fiscal year. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Labor and cost of test articles in FY22 will not be as high had the original plan of upgrading the legacy extremity system still been viable.					
Title: Visit, Board, Search & Seizure	0.080	0.080	0.080	0.000	0.080
Articles:	3	-	-	-	-
Description: The Visit, Board, Search & Seizure (VBSS) mission of the Navy is the requirement to board ships and be able to detect and identify potential radiological or nuclear Weapons of Mass Destruction (WMD). Such a sensitive mission requires leading edge technology and capabilities to ensure success. The AN/PDX-1 RADIAC Set was fielded in response to a Joint Urgent Operational Needs Statement to meet this requirement. It contains three instruments that serve different purposes: (1) a Handheld Radiation Monitor (HRM)that searches for radiological materials; (2) a Radioisotope Identifier (RID) that identifies the type of radiological material located; and (3) a Personal Radiation Detector (PRD) that displays the radiological dose the VBSS team members may be receiving so that they can be aware if they are being exposed to dangerous levels of radioactivity during the mission. Current technology dictates that the sensitivity of the detectors is directly proportional to the size of the detector element; i.e., the larger the detector, the more sensitive and capable it is. However, in VBSS there must be a tradeoff between size/weight and capability, since it is difficult and hazardous for boarding parties to carry a backpack-sized detector, along with their weapons and other gear, up a rope ladder to board a vessel on the high seas. This will be a continuing effort to find smaller, lighter instruments with enhanced sensitivity, reach-back capability, and other enhancements to provide the Navy the best and most cost effective equipment possible for this mission. ***FY 2021 Plans:*** NSWCCD started the testing of the three units acquired in FY20. ***FY 2022 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
NSWCCD will complete the testing of the PRDs and HRMs acquired in FY 2020. The test results of the PRD and HRM will be reported to NAVSEA 04ND. ***FY 2022 OCO Plans:*** N/A					
Title: Radiological Detection System	0.150	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: The Radiological Detection System (RDS) is a survey meter and its associated probes (alpha, beta, gamma, and neutron) used in a wide variety of applications, and the necessary ancillary equipment such as cases, cables and technical manuals. This type of survey meter system is the single most prevalent RADIAC instrument in the Navy inventory, utilized for every Navy end use but predominantly in the Naval Nuclear Propulsion Program (NNPP) and Radiological Defense (RD) end uses. The Joint Product Leader in Radiological Nuclear Defense(JPdl-RND) is currently developing the RDS for use by all the Services. This joint effort will lower the procurement cost for all and just as significantly, for the first time enable joint interoperability in the Radiological Defense arena. The Navy's current version of this instrument is the IM-260/PD Multi-Function RADIAC (MFR), which is 30 years old and nearing the end of its useful life. Army and Marine Corps use the AN/PDR-75 system and the Air Force the ADM-300, which are both also decades old and obsolete. The NNPP end use is unique amongst the Services, since only the Navy operates nuclear reactors, and while the RDS solution should prove to be sufficient for all the Services for most of their respective applications, Navy must test and evaluate the proposed RDS to ensure the performance and specifications of a Joint solution will be sufficient to meet the requirements of the NNPP application. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** N/A ***FY 2022 OCO Plans:*** N/A					
Title: Laboratory Test Equipment	0.178	0.203	0.069	0.000	0.069
Articles:	2	2	1	-	1

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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 2021 Plans:*** Based on the evaluation of the ORTEC system, NSWCCD procured the repair/upgrade for it. NSWCCD acceptance tested the upgraded ORTEC system. NSWCCD developed protocols and standard operating procedures for the beta irradiator. NSWCCD procured the replacement of the RDT&E/stand-alone computers used to control the GC-60 and X-80 irradiators. These computers are currently running on computers with limited memory and storage space. In addition, the operating system on these computers was upgraded from Windows XP to Windows 10. ***FY 2022 Base Plans:*** Due to radioactive decay, the activity of the cobalt source in the GC-60 irradiator will be too low for multiple RADIAC testing. A new 64 Ci Co-60 source will be acquired and installed in the GC-60. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The cost of the Co-60 source is considerably less than the procurement of two computers with Windows OS, and the labor used for evaluation of the ORTEC system in FY 2021.					
Title: AN/PDR-70 Electronics Upgrade	0.000	0.000	0.054	0.000	0.054
Articles:	-	-	-	-	-
Description: The AN/PDR-70 provides accurate dose rate measurements during neutron radiation surveys. The AN/PDR-70 is over 25 years old and as identified by the 2020 life cycle audit (LCA), has multiple obsolescence issues. Based on the LCA, a replacement for the AN/PDR-70 needs to be identified within the next six years. A possible solution is replacing the electronics package on the detector. This has been done with other legacy RADIACs and is an effective method of extending the life of the device for an additional 15-20 years. In addition to the electronics upgrade, NSWCCD will also research and test the effects of modifying the amount of					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
moderator material used on the instrument. This will have a positive impact on the weight of the device, which has been a long-standing complaint by the end user community. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** N/A ***FY 2022 OCO Plans:*** NSWCCD will discuss the path forward with engineers at the In Service Engineering Agent and formulate a strategy for upgrading the electronics in order to improve the instrument's performance and extend its useful life. In addition, less moderator material may be utilized in order to decrease the average weight of the meter without significantly impacting detection performance. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** New subproject beginning in FY 2022.					
Title: Radiological Detection System Training Device ***Articles:*** ***Description:*** The Radiological Detection System (RDS) is a survey meter with ancillary probes that is being procured by all the Services and some 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. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** NSWCCD will initiate discussions with the RDS manufacturer and multiple training equipment manufacturers to determine the possible collaborations needed to develop the system. NSWCCD will award a contract for prototypes to be evaluated. ***FY 2022 OCO Plans:***	0.000 -	0.000 -	0.148 3	0.000 -	0.148 3

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** New subproject beginning in FY 2022.					
Title: Surface Contamination Monitor	0.000	0.000	0.093	0.000	0.093
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. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** As the lead activity for this effort, Portsmouth Naval Shipyard (PNSY) will have an established CRADA in FY 2021. NSWCCD will participate with PNSY and review the CRADA Test Plan drafted by shipyard personnel. The CRADA prototype testing will commence in FY 2022 at the NSWCCD Radiation Range. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** New subproject beginning in FY 2022.					
Accomplishments/Planned Programs Subtotals	0.679	0.775	0.761	0.000	0.761

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN 2920: *RADIAC*	6.450	10.335	9.074	-	9.074	-	-	-	-	-	-

Remarks

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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 2022 Navy		Date: May 2021
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation Labor	WR	NSWCCD : West Bethesda, MD	5.002	0.587	Nov 2019	0.690	Nov 2020	0.493	Nov 2021	-		0.493	-	-	-
Secondary Dosimetry	C/FFP	NSWCCD : West Bethesda, MD	0.688	0.000		0.000		0.059	Mar 2022	-		0.059	-	-	-
VBSS	C/FFP	NSWCCD : West Bethesda, MD	0.166	0.025	Aug 2020	0.000		0.000		-		0.000	-	-	-
Laboratory Test Equipment	C/FFP	NSWCCD : West Bethesda, MD	0.165	0.067	Sep 2020	0.085	Aug 2021	0.104	Mar 2022	-		0.104	-	-	-
RDS Training Device	C/FFP	NSWCCD : West Bethesda, MD	0.000	0.000		0.000		0.105	Feb 2022	-		0.105	-	-	-
		Subtotal	6.021	0.679		0.775		0.761		-		0.761	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	6.021	0.679		0.775		0.761		-		0.761	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
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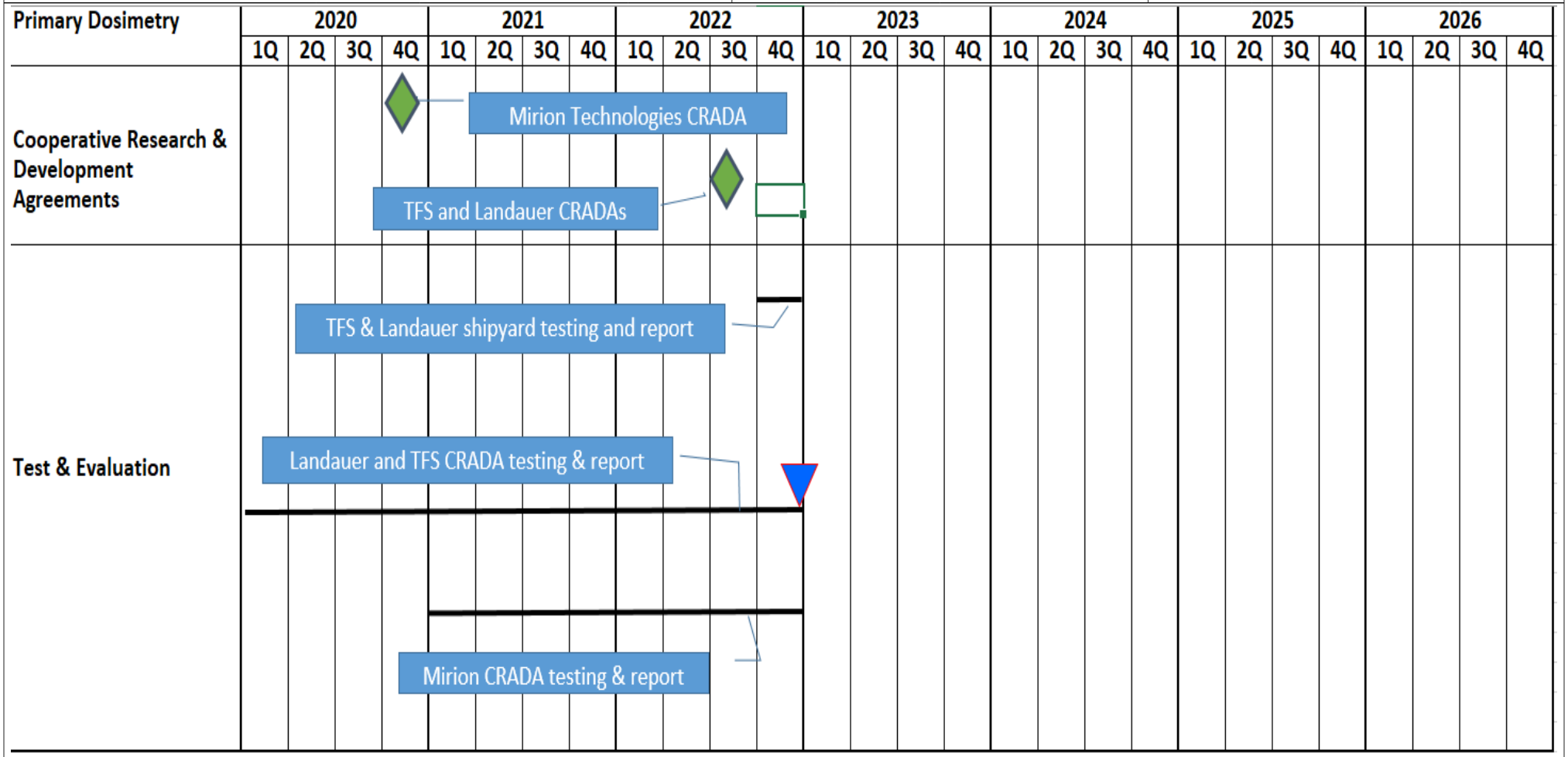

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Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

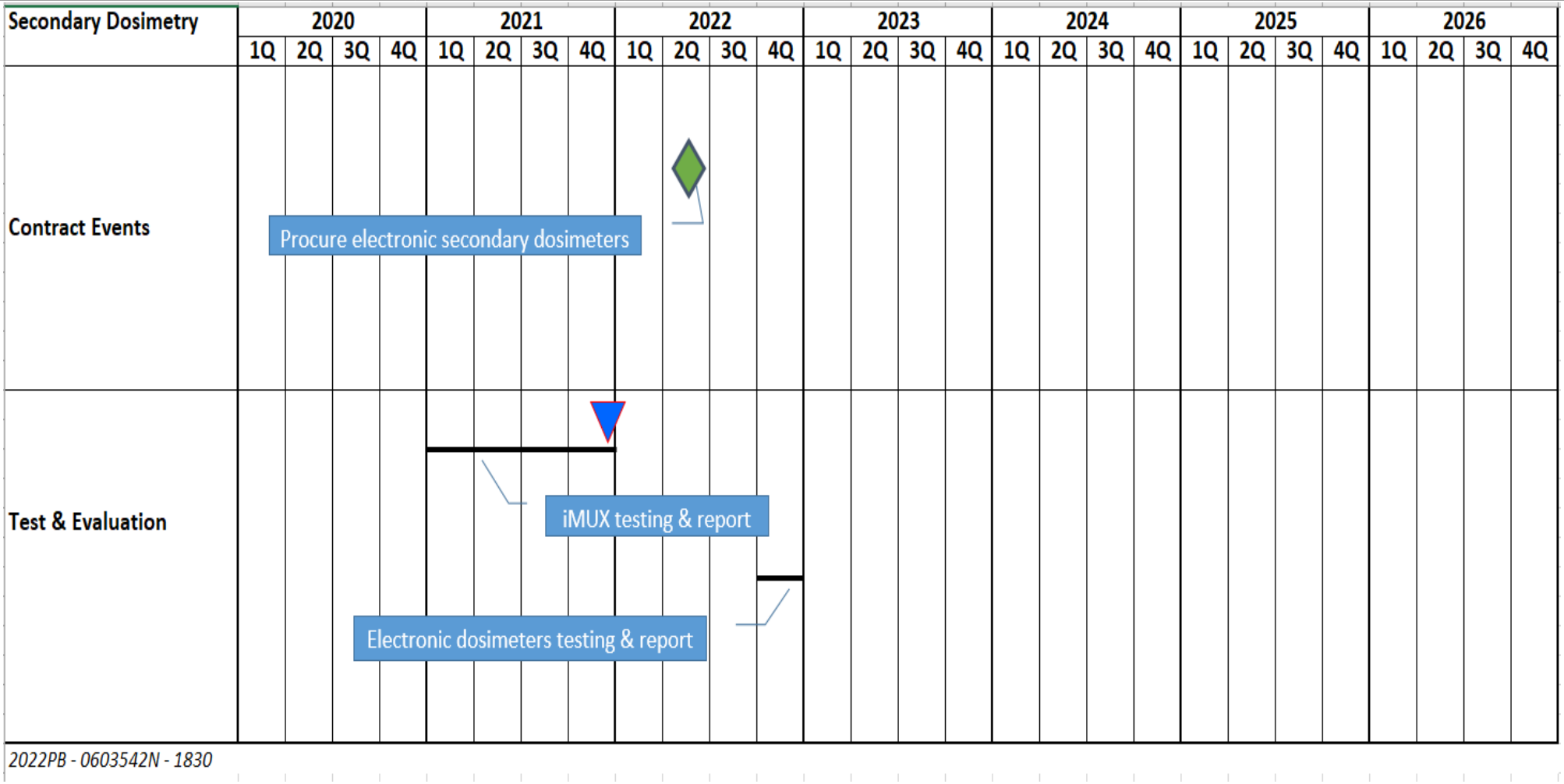

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

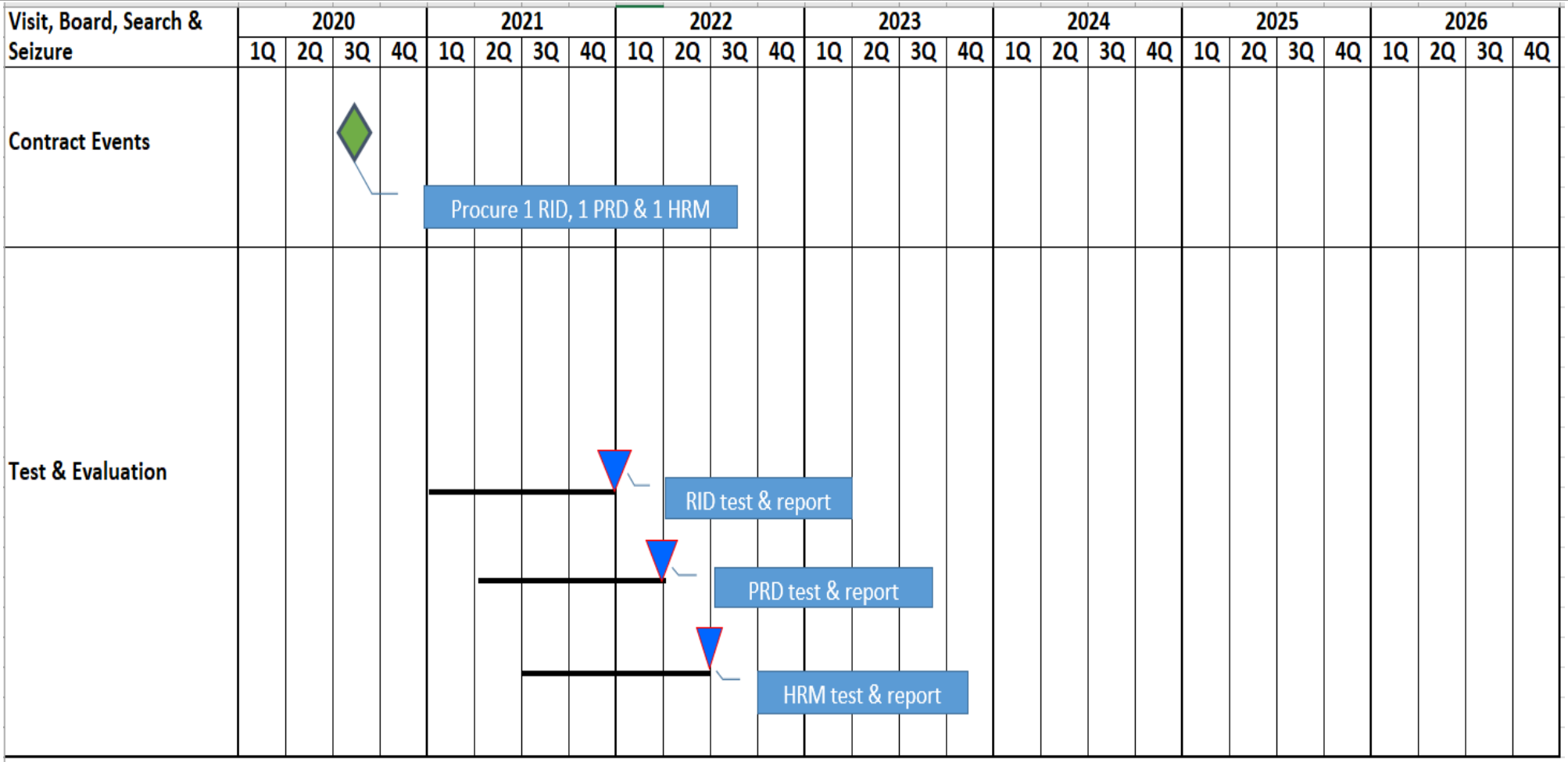

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

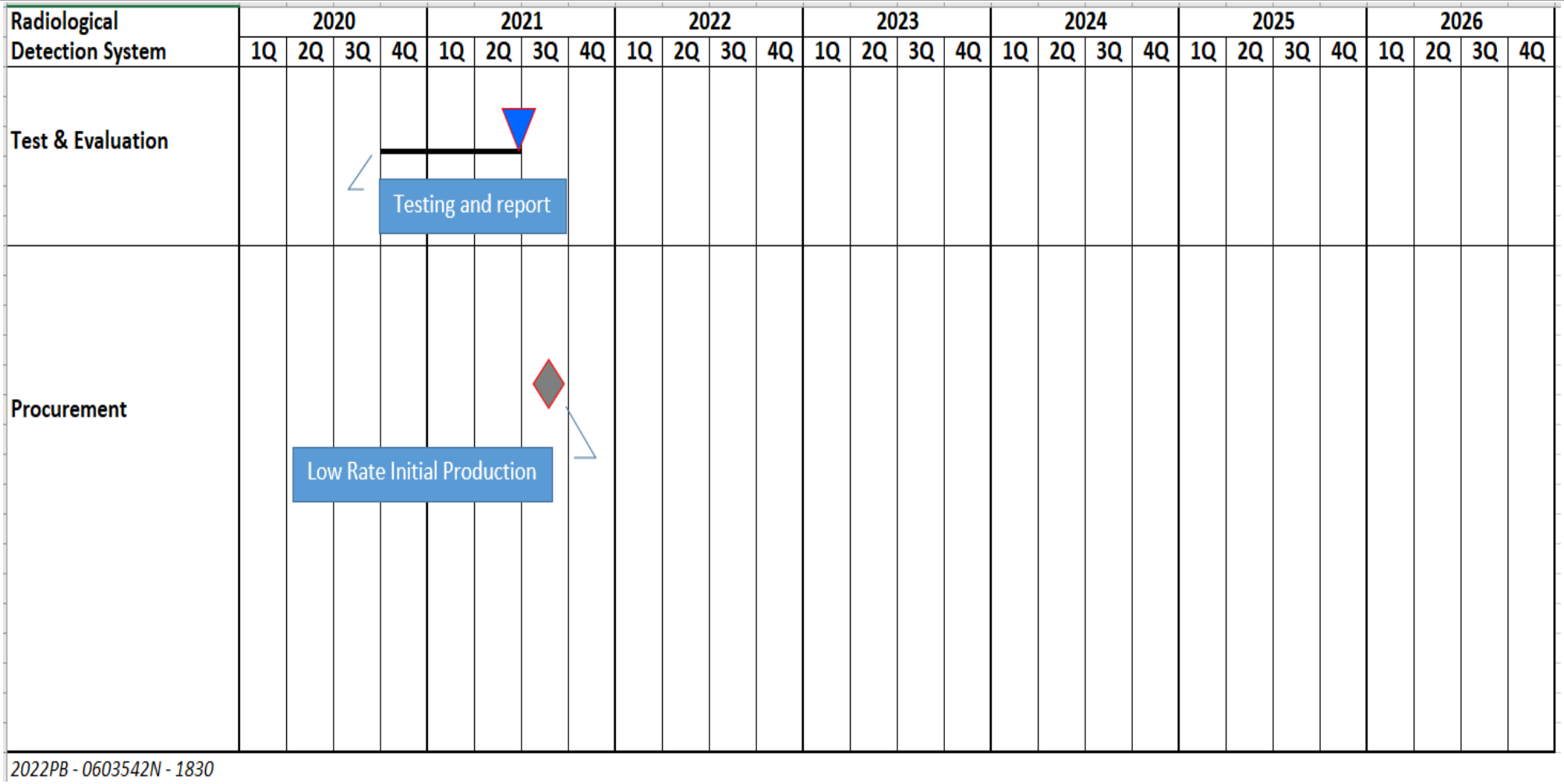

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

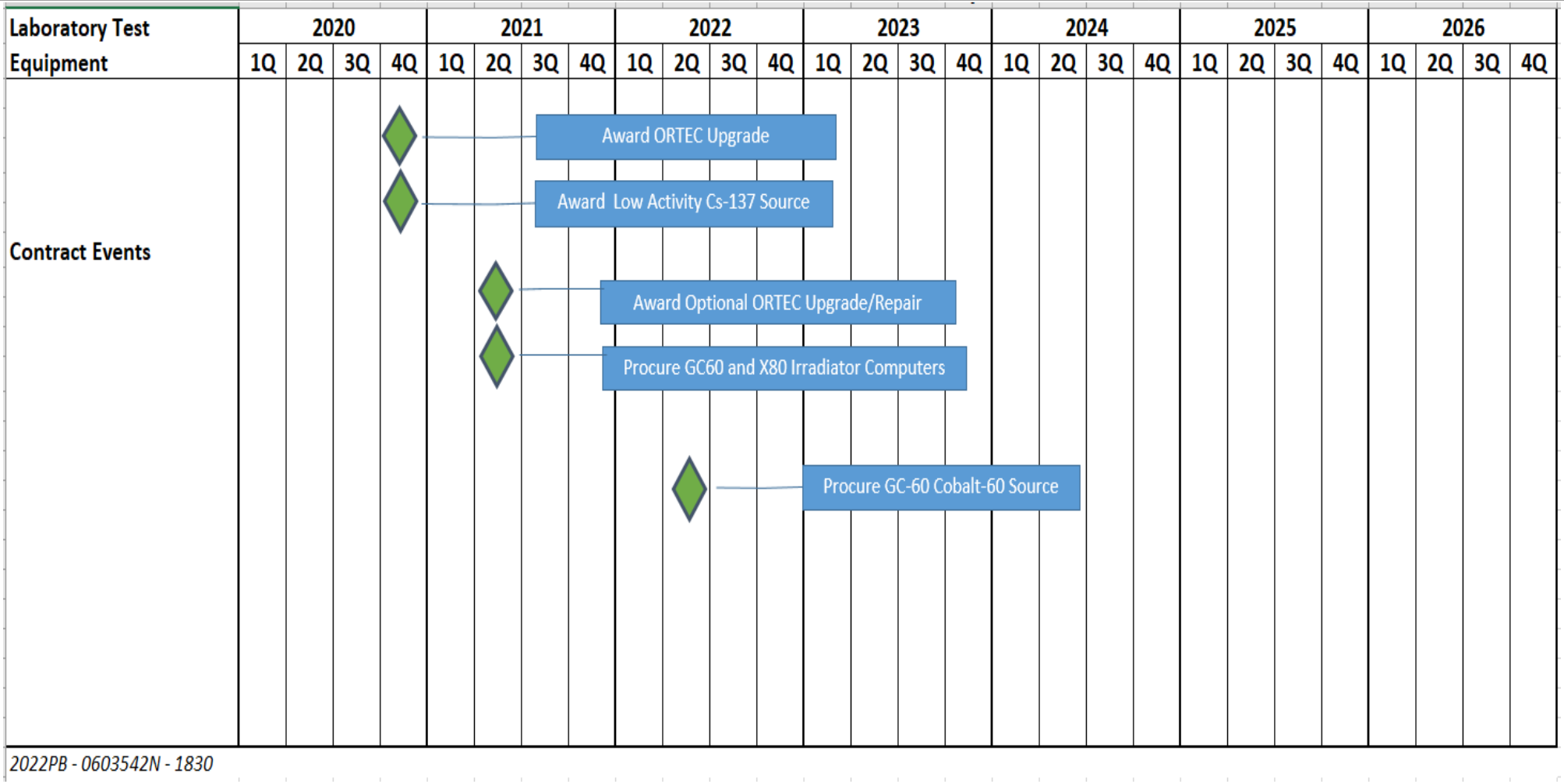

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603542N / *Radiological Control*	Project (Number/Name) 1830 / *RADIAC Development*	

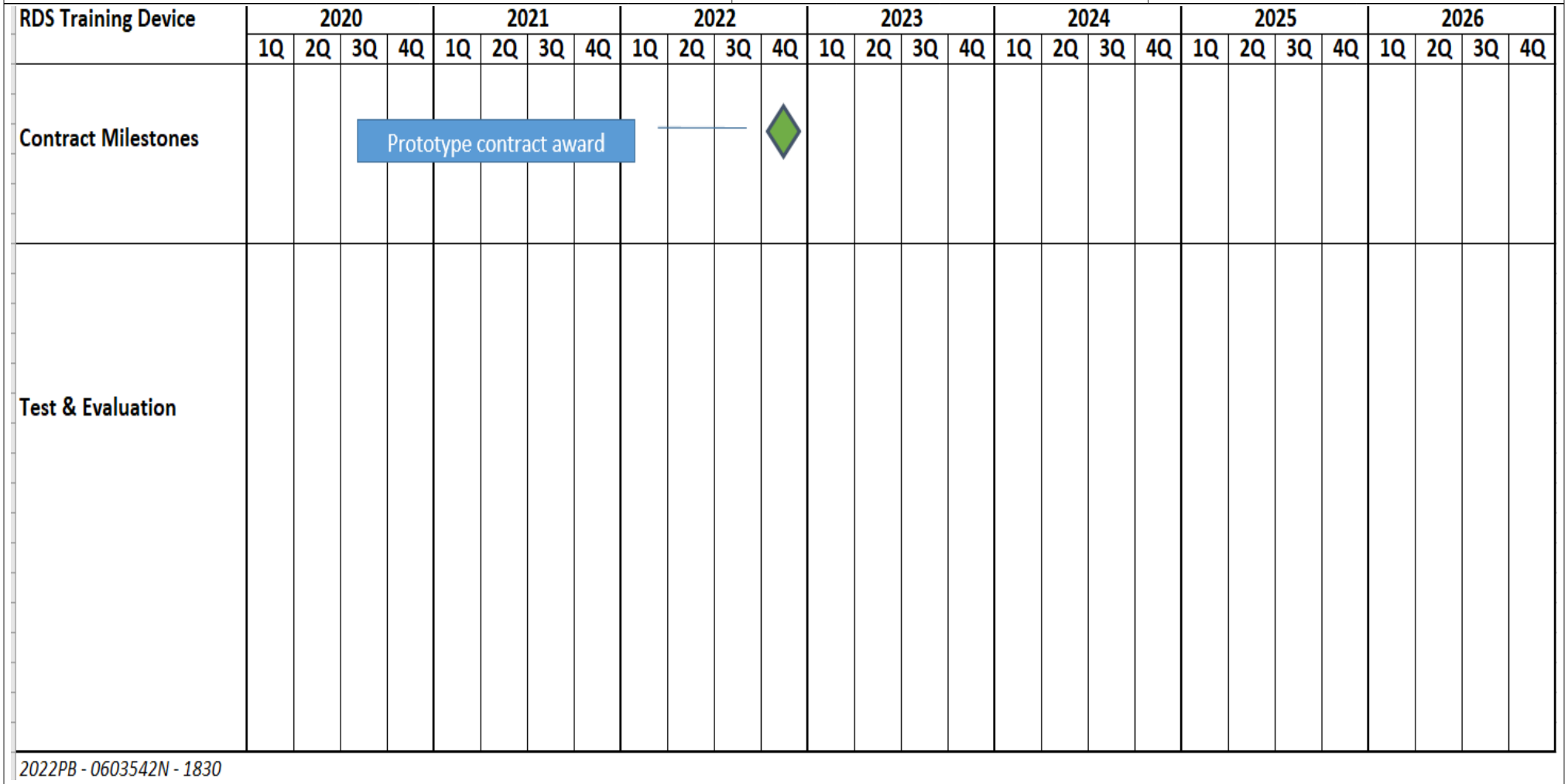

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
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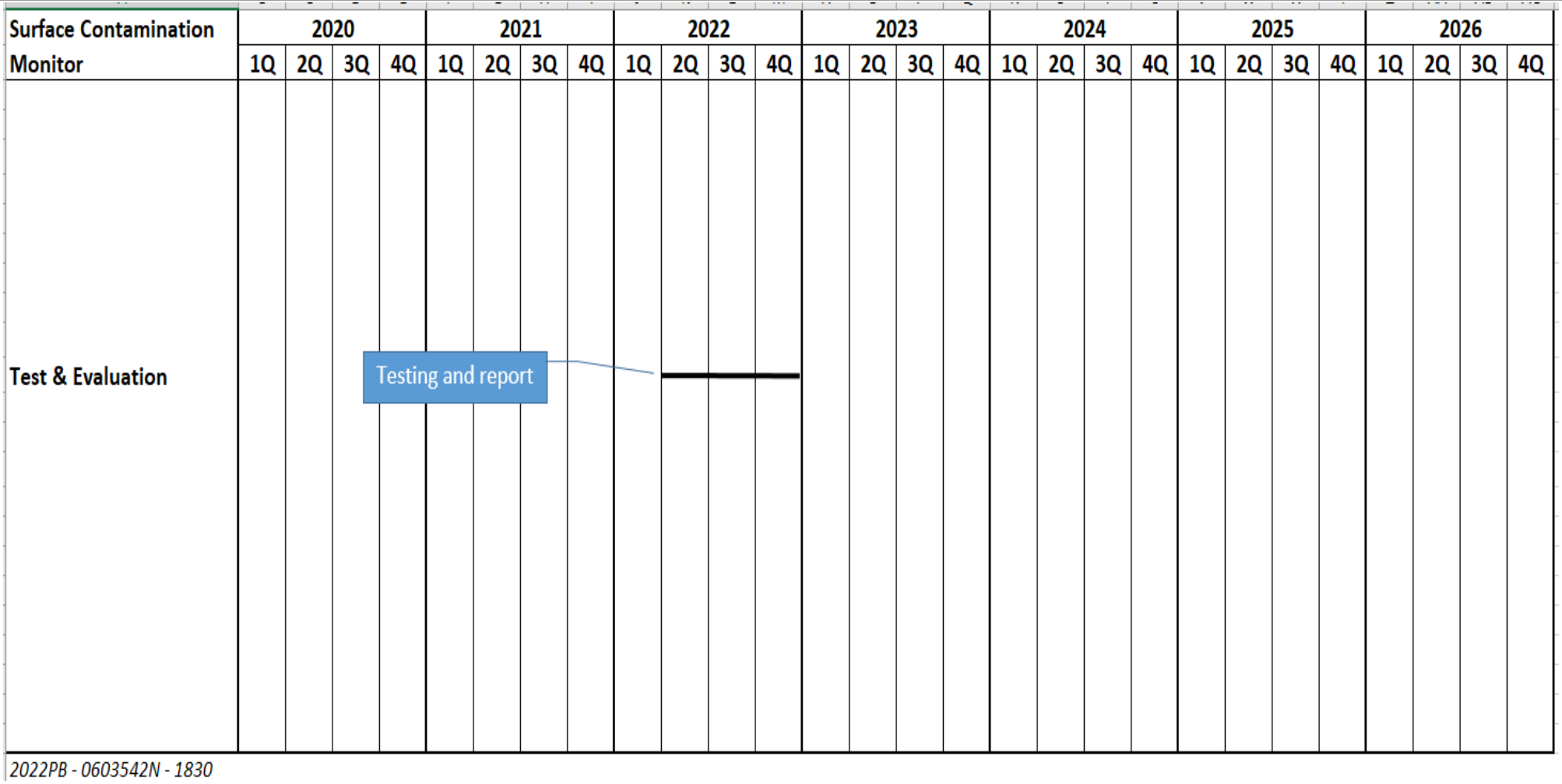

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
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Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Primary Dosimetry				
Test & Evaluation: Landauer Verifii Dosimeter System Test & Report	1	2020	2	2021
Test & Evaluation: Neutron BeO Dosimeter Proficiency Test & Report at PNNL	3	2020	4	2020
Test & Evaluation: Supplemental Test & Report of Neutron BeO Dosimeter	1	2021	4	2021
Test & Evaluation: Landauer CRADA Test & Report	1	2020	4	2022
Test & Evaluation: Thermo CRADA Test & Report	1	2020	4	2022
Test & Evaluation: Mirion CRADA Test & Report	1	2021	4	2022
Cooperative Research and Development Agreements: Establish CRADA With Mirion	4	2020	4	2020
Secondary Dosimetry				
Test & Evaluation: Test & Report on ED3 Extremity Dosimeter System	3	2020	4	2021
Test & Evaluation: Test & Report on Electronic Dosimeters for Extermity Applications	4	2022	4	2022
Contract Events: Procure Electronic Dosimeters for Extremity Applications	2	2022	2	2022
Radiological Detection System				
Test & Evaluation: Test to Meet Navy Specifications for Nuclear Propulsion Program	4	2020	2	2021
Procurement: LRIP Procurement	3	2021	3	2021
Visit, Board, Search & Seizure				
Test & Evaluation: Test & Report on RID Batch 2	1	2021	4	2021
Test & Evaluation: Test & Report on PRD Batch 2	2	2021	1	2022
Test & Evaluation: Test & Report on HRM Batch 2	3	2021	2	2022
Contract Events: Procure RID, PRD & HRM Articles Batch 2	3	2020	3	2020
Laboratory Test Equipment				
Test & Evaluation: Acceptance Testing of MAC	1	2020	2	2020
Contract Events: Procure ORTEC Upgrade	3	2020	3	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603542N / *Radiological Control*	**Project (Number/Name)** 1830 / *RADIAC Development*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Contract Events: Procure Cs-137 Source	4	2020	4	2020
Procurement: Procurement of MAC	3	2021	3	2021
Radiological Detection System Training Devicce				
Contract Events: Prototype Contract Award	4	2022	4	2022
Surface Contamination Monitor				
Test & Evaluation: Test & Report on the Prototype	2	2022	4	2022