

Department of Homeland Security

Countering Weapons of Mass Destruction

Budget Overview



Fiscal Year 2019
Congressional Justification

Table of Contents

Countering Weapons of Mass Destruction1

Appropriation Organization Structure.....3

Strategic Context.....4

Budget Comparison and Adjustments10

Personnel Compensation and Benefits.....12

Non Pay Budget Exhibits.....13

Supplemental Budget Justification Exhibits14

Countering Weapons of Mass Destruction

Appropriation Organization Structure

Organization Name	Level	Fund Type
Countering Weapons of Mass Destruction	Component	
Operations and Support	Appropriation	
Mission Support	PPA	Discretionary - Appropriation
Capability and Operations Support	PPA	Discretionary - Appropriation
Procurement Construction and Improvements	Appropriation	
Assets and Infrastructure Acquisition	PPA,Investment	Discretionary - Appropriation
Research and Development	Appropriation	
CWMD Research and Development	PPA	Discretionary - Appropriation
Federal Assistance	Appropriation	
Capability Building	PPA	Discretionary - Appropriation

Countering Weapons of Mass Destruction Strategic Context

Component Overview

The strategic context presents the performance budget by tying together strategy, budget resource requests, programs, or PPAs, and performance measures that gauge the delivery of results to our stakeholders. The Common Appropriation Structure (CAS) allows DHS to integrate the strategic programmatic view with our budget view of resources. With this structure, a significant portion of the Level 1 PPAs represent what DHS refers to as our mission programs. A mission program is a group of activities acting together to accomplish a specific high-level outcome external to DHS and include operational processes, skills, technology, human capital, and other resources. The Capability and Operational Support and the Capability Building programs for the Countering Weapons of Mass Destruction Office (CWMD) have publically reported measures. These measures are presented in two measure sets, strategic and management measures. Strategic measures communicate results delivered for our agency goals and are considered our Government Performance and Results Act Modernization Act of 2010 (GPRAMA) measures. Additional management measures are displayed to provide a more thorough context of expected program performance for the Component related to its budgetary plans.

Capability and Operational Support

Strategic Measures

Measure: Average time (in hours) to initiate a BioWatch National Conference Call to discuss the detection of a biological agent of concern and assess the risk to public health with federal, state, and local partners						
Description: This measure calculates the time in hours between a BioWatch Actionable Result (BAR) Declaration and the BioWatch National Conference Call (BWNCC) with local, state and federal partners. A BAR is declared when positive laboratory test results detects a biological agent present with a geographical area or within an indoor facility. The BioWatch National Conference Call is a formal procedure initiated by DHS to notify federal, state, and local resources. During an incident where a BAR is declared, the correlation between the time it takes to inform and coordinate between federal, state and local jurisdictional resources will impact the number of lives to be saved by the coordinated response. In most cases, the highest effect would be detecting and locating hostile use of chemical, biological, radiological, or nuclear materials.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	---	---	---	<=3.0	<=3.0	<=3.0
Result:	---	---	---	2.0	TBD	TBD

Department of Homeland Security

Countering Weapons of Mass Destruction

Measure: Percent of cargo conveyances that pass through radiation portal monitors upon entering the nation via land border and international rail ports of entry						
Description: This measure gauges the proportion of cargo scanned by radiation detection equipment deployed to the Nation's land border crossing ports of entry and international rail ports of entry. It is expressed in terms of the percent of cargo conveyances scanned by radiation portal monitors (RPM) which enter the Nation through land ports of entry and by international rail. The Countering Weapons of Mass Destruction Office procures and/or installs RPMs at ports of entry, and the U.S. Customs and Border Protection (CBP) conducts the cargo scanning using RPMs to prevent nuclear and other radioactive materials that are out of regulatory control from entering the country via cargo conveyances.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	FOUO	FOUO	FOUO	FOUO	FOUO	FOUO
Result:	FOUO	FOUO	FOUO	FOUO	TBD	TBD

Measure: Percent of containerized cargo conveyances that pass through radiation portal monitors at sea ports of entry						
Description: This measure gauges the amount of containerized cargo scanned by the radiation detection equipment deployed to the Nation's sea ports of entry. It is expressed in terms of the percent of containerized cargo conveyances that are scanned by radiation portal monitors (RPM) entering the nation through sea ports of entry. The Countering Weapons of Mass Destruction Office procures and/or installs RPMs at sea ports of entry and the U.S. Customs and Border Protection (CBP) conducts the cargo scanning using the RPMs to prevent nuclear and other radioactive materials that are out of regulatory control from entering into the country via cargo containers at sea ports of entry.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	FOUO	FOUO	FOUO	FOUO	FOUO	FOUO
Result:	FOUO	FOUO	FOUO	FOUO	TBD	TBD

Measure: Time between laboratory receipt of BioWatch detector samples to completion of screening for known biological micro-organisms of interest (in hours)						
Description: This measure reflects how quickly BioWatch laboratories are completing the screening tests of field samples from BioWatch detectors to determine if known biological microorganisms of interest are present. This screening may potentially consist of two steps. The first step to determine if a potentially harmful biological agent exists in the sample. If a positive results is found, then the sample testing moves to the second set of panel tests to confirm the results, and is then followed by reporting by the local laboratory representative if a confirmed result is found. This measure will be determined and recorded daily at each operational laboratory. The system-wide average will be calculated to determine if degradation in the ability to generate results within the required time frame is occurring across the program. This measure gauges the ability to determine if a known biological agent of interest has been confirmed and notify the proper authorities.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	---	---	---	<=7.0	<=7.0	<=7.0
Result:	---	---	---	5.0	TBD	TBD

Management Measures

Department of Homeland Security

Countering Weapons of Mass Destruction

Measure: National Biosurveillance Integration System operational response time to incoming queries relative to biosurveillance (in hours)						
Description: Elapsed time between NBIC receiving relevant information and disseminating to interagency partners. This time includes search requirements within applicable systems and getting permission to release the information.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	<20.00	<20.00	<20.00	<20.00	<69.00	<69.00
Result:	4.06	6.15	13	112.94	TBD	TBD

Measure: Percent of authorized BioWatch laboratories passing required proficiency tests to ensure they are capable of identifying known biological microorganisms of interest						
Description: This measure reflects periodic proficiency tests to ensure compliance of BioWatch laboratories with standards used by the Countering Weapons of Mass Destruction Office to ensure proficiency in conducting tests for known biological micro-organisms of interest. These standards are proscribed by the International Organization for Standardization ISO/IEC 17043, and used for proficiency testing providers who wish to demonstrate their competence with a set of internationally-acceptable requirements. This measure provides confidence that the laboratories being relied upon are operated competently in accordance with specified technical and management system requirements. Ensuring proficiency has enormous ramifications to ensure false positive (that a particular condition or attribute is present) and false negative (that a particular condition or attribute is absent) errors do not occur.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	---	---	---	100.0%	100.0%	100.0%
Result:	---	---	---	100.0%	TBD	TBD

Measure: Percent of medical contract providers providing medical services that meet credential requirements						
Description: This measure communicates the results of reviews to ensure contract personnel who are providing medical services to detainees have current credentials and no disqualifying information that would make them unsuitable for the job. Medical contract providers provide support to operators in the field, such as Border Patrol Agents. These reviews are conducted by the Countering Weapons of Mass Destruction Office Medical Quality Management Branch. Credential verifications and reviews against the National Practitioner Database are conducted to ensure that workers' credentials have not been invalidated through expired licenses, malpractice or other disqualifying activity. This provides confidence that only qualified personnel are providing medical services in support of the homeland security mission.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	---	---	---	100.0%	100.0%	100.0%
Result:	---	---	---	100.0%	TBD	TBD

*Capability Building**Strategic Measure*

Measure: Number of people covered by Securing the Cities program preventive radiological and nuclear (rad/nuc) detection capabilities (in millions)						
Description: The Securing The Cities (STC) program provides financial assistance to state, local, and tribal organizations to develop a robust regional radiological/nuclear detection program. For the STC program to count the population as covered by a robust radiological/nuclear detection capability, the region must demonstrate that 10% or more of its standing law enforcement are trained and equipped to conduct primary screening and patrolling as part of their daily routine duties and there are equipped and trained personnel to conduct secondary screening and alarm adjudication. In addition, the region must conduct at least one multi-jurisdictional exercise a year, and allow the exchange of information among regional partners and with federal agencies, and mutually assist each other in performing the radiological/nuclear detection mission. If the measure is met, the entire population from the statistical area is counted as covered.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	23.0	23.0	37.0	37.0	46.0	49.0
Result:	23.0	23.0	37.0	37.0	TBD	TBD

Management Measures

Measure: Number of comprehensive evaluations and demonstrations of new and improved technologies to protect against nuclear terrorism						
Description: This measure includes several technology development activities: feasibility evaluations completed of proposed radiological and nuclear (rad/nuc) detection and forensics technologies through the Academic Research Initiative and the Exploratory Research Program; proof-of-concept demonstrations completed of emerging rad/nuc detection and forensics technologies through the Exploratory Research Program; technology demonstrations and characterizations completed of promising rad/nuc detection and forensics technologies in an operationally relevant environment through the Advanced Technology Demonstration program; and test campaigns planned and executed for systems development testing and commercial systems evaluation testing. Development and acquisition programs are supported by a rigorous and objective test and evaluation program to characterize technologies and systems to understand technical performance, operational effectiveness, and system limitations						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	65	65	45	45	50	9
Result:	48	48	53	16	TBD	TBD

Department of Homeland Security

Countering Weapons of Mass Destruction

Measure: Number of exercises, assessments, and deployments to enhance federal, state, local and tribal agencies' readiness to combat nuclear terrorism						
Description: Number of operational support exercises, assessments, and deployments conducted by the Countering Weapons of Mass Destruction Office that enhance the Global Nuclear Detection Architecture (GNDA) by assisting federal, state, local and tribal partners to improve their rad/nuc detection tactics, techniques and procedures. This measure also includes the number of interagency nuclear forensics exercises in which the Countering Weapons of Mass Destruction Office serves as the Lead Planner. In leading these nuclear forensics exercises, the Countering Weapons of Mass Destruction Office ensures a consistent and comprehensive approach to assessing the government's operational capability to perform the nuclear forensics mission.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	110	144	164	164	162	169
Result:	161	248	266	177	TBD	TBD

Measure: Number of undergraduate, graduate, and post-doctorate fellowships and internships, early-career awards, and academic research awards in nuclear forensics and radiation detection-related specialties						
Description: This measure gauges the total number of undergraduate, graduate, and post-doctorate fellowships in nuclear forensics- and radiation detection-related sciences, research internships in nuclear forensics, and education awards and junior faculty awards per fiscal year to support nuclear-related academic programs. Recipients of the various Nuclear Forensics Fellowships and Faculty Award programs are selected from a competitive, merit-based application process. The Academic Research Initiative is a collaborative program with the National Science Foundation. These programs seek to advance fundamental knowledge for nuclear and radiological threat detection and related sciences with emphasis on fundamental research to develop human capital for the nuclear science and engineering professions.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	65	51	51	51	53	51
Result:	72	76	72	51	TBD	TBD

Measure: Percent of authorized BioWatch laboratories passing required proficiency tests to ensure they are capable of identifying known biological microorganisms of interest						
Description: This measure reflects periodic proficiency tests to ensure compliance of BioWatch laboratories with standards used by the Countering Weapons of Mass Destruction Office to ensure proficiency in conducting tests for known biological micro-organisms of interest. These standards are proscribed by the International Organization for Standardization ISO/IEC 17043, and used for proficiency testing providers who wish to demonstrate their competence with a set of internationally-acceptable requirements. This measure provides confidence that the laboratories being relied upon are operated competently in accordance with specified technical and management system requirements. Ensuring proficiency has enormous ramifications to ensure false positive (that a particular condition or attribute is present) and false negative (that a particular condition or attribute is absent) errors do not occur.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	---	---	---	100.0%	100.0%	100.0%
Result:	---	---	---	100.0%	TBD	TBD

Measure: Percent of planned nuclear and radiation detection equipment acquired to combat nuclear terrorism						
Description: This measure reports the ratio of fixed, mobile, and portable nuclear and radiation detection equipment that the Countering Weapons of Mass Destruction Office acquires for federal operators to protect against radiological and nuclear threats to the baseline set out in the spend plan for a particular year. The spend plan is updated as requirements are identified by the federal operators and funding is appropriated. All equipment will be acquired in accordance with the DHS Acquisition Directive 102-01 and will meet codified performance and operational requirements.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	95%	95%	95%	95%	95%	95%
Result:	79%	36%	88%	79%	TBD	TBD

Measure: Percent of Research & Development program and project milestones successfully achieved						
Description: This measure will gauge how well Research and Development program and project activities and their progress milestones are executed by the Countering Weapons of Mass Destruction Office's Transformational and Applied Research Directorate against numerous types of projects that are planned for and budgeted each year. A steady or slightly increasing number of milestones met is an indicator of effective program management.						
Fiscal Year:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Target:	---	---	---	95.0%	95.0%	95.0%
Result:	---	---	---	89.0%	TBD	TBD

Countering Weapons of Mass Destruction Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Operations and Support	-	-	-	-	-	-	248	232	\$209,264	248	232	\$209,264
Procurement Construction and Improvements	-	-	-	-	-	-	-	-	\$74,896	-	-	\$74,896
Research and Development	-	-	-	-	-	-	-	-	\$80,443	-	-	\$80,443
Federal Assistance	-	-	-	-	-	-	-	-	\$64,663	-	-	\$64,663
Total	-	-	-	-	-	-	248	232	\$429,266	248	232	\$429,266
Subtotal Discretionary - Appropriation	-	-	-	-	-	-	248	232	\$429,266	248	232	\$429,266

The Countering Weapons of Mass Destruction Office (CWMD) requests \$429.3M, 248 positions, and 232 FTEs in FY 2019.

CWMD was created in December of 2017 to elevate and focus the CWMD missions within DHS and to provide a focal point for the interagency. The danger from hostile state and non-state actors who are trying to acquire nuclear, chemical, radiological, and biological weapons is increasing. CWMD's objective is to support the President's National Security Strategy and lead the Department's efforts to develop and enhance CWMD programs and capabilities that defend against WMD, and combat bio-threats and pandemics. CWMD will give our frontline defenders—including homeland security, law enforcement, and intelligence professionals—the tools and resources to stop WMD terrorist acts before they take place. CWMD's mission focus is to close gaps and reduce the risk of terrorism by detecting and disrupting WMD and the pathways to the United States. CWMD serves as the Department's representative at domestic, interagency, and international venues related to CWMD strategy, policy, planning, investment, acquisition and joint operational matters. CWMD supports DHS and partners' frontline operations, and addresses critical vulnerabilities in preventing, protecting against, responding to, and mitigating nuclear, chemical, radiological, and biological, threats and incidents. Further, CWMD leads the Department's emerging infectious disease preparedness and response activities.

Countering Weapons of Mass Destruction Budget Authority and Obligations

Budget Authority <i>(Dollars in Thousands)</i>	FY 2017	FY 2018	FY 2019
Enacted/Request	-	-	\$429,266
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	-	-	\$429,266
Collections – Reimbursable Resources	-	-	\$3,175
Total Budget Resources	-	-	\$432,441
Obligations (Actual/Projections/Estimates)	-	-	\$432,441
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	248
Enacted/Request FTE	-	-	232
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	248
FTE (Actual/Estimates/Projections)	-	-	232

Countering Weapons of Mass Destruction Personnel Compensation and Benefits

Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Operations and Support	-	-	-	-	-	-	-	-	248	232	\$48,605	\$180.34	248	232	\$48,605	\$180.34
Total	-	-	-	-	-	-	-	-	248	232	\$48,605	\$180.34	248	232	\$48,605	\$180.34
Discretionary - Appropriation	-	-	-	-	-	-	-	-	248	232	\$48,605	\$180.34	248	232	\$48,605	\$180.34

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.1 Full-time Permanent	-	-	\$31,697	\$31,697
11.5 Other Personnel Compensation	-	-	\$462	\$462
11.8 Special Personal Services Payments	-	-	\$6,766	\$6,766
12.1 Civilian Personnel Benefits	-	-	\$9,680	\$9,680
Total - Personnel Compensation and Benefits	-	-	\$48,605	\$48,605
Positions and FTE				
Positions - Civilian	-	-	248	248
FTE - Civilian	-	-	232	232

Countering Weapons of Mass Destruction Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Operations and Support	-	-	\$160,659	\$160,659
Procurement Construction and Improvements	-	-	\$74,896	\$74,896
Research and Development	-	-	\$80,443	\$80,443
Federal Assistance	-	-	\$64,663	\$64,663
Total	-	-	\$380,661	\$380,661
Discretionary - Appropriation	-	-	\$380,661	\$380,661

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	-	-	\$2,108	\$2,108
23.1 Rental Payments to GSA	-	-	\$11,722	\$11,722
24.0 Printing and Reproduction	-	-	\$31	\$31
25.1 Advisory and Assistance Services	-	-	\$74,353	\$74,353
25.2 Other Services from Non-Federal Sources	-	-	\$18,759	\$18,759
25.3 Other Goods and Services from Federal Sources	-	-	\$74,726	\$74,726
25.5 Research and Development Contracts	-	-	\$44,642	\$44,642
25.7 Operation and Maintenance of Equipment	-	-	\$4,967	\$4,967
26.0 Supplies and Materials	-	-	\$11,434	\$11,434
31.0 Equipment	-	-	\$85,193	\$85,193
41.0 Grants, Subsidies, and Contributions	-	-	\$52,726	\$52,726
Total - Non Pay Object Classes	-	-	\$380,661	\$380,661

**Countering Weapons of Mass Destruction
Supplemental Budget Justification Exhibits**

Working Capital Fund

Appropriation and PPA <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Operations and Support	-	-	\$18,844
Mission Support	-	-	\$18,844
Total Working Capital Fund	-	-	\$18,844

Countering Weapons of Mass Destruction Status of Congressionally Requested Studies, Reports and Evaluations

No Countering Weapons of Mass Destruction Office, legacy Domestic Nuclear Detection Office, or legacy Office of Health Affairs reports to the Appropriations committees remain unsubmitted.

Countering Weapons of Mass Destruction Authorized/Unauthorized Appropriations

Budget Activity <i>Dollars in Thousands</i>	Last year of Authorization	Authorized Level	Appropriation in Last Year of Authorization	FY 2019 President's Budget
	Fiscal Year	Amount	Amount	Amount
Operations and Support				\$209,264
Mission Support				\$83,321
Capability and Operational Support				\$125,943
Procurement, Construction, and Improvements				\$74,896
Asset and Infrastructure Acquisition				\$74,896
Research and Development				\$80,443
CWMD Research and Development				\$80,443
Federal Assistance				\$64,663
Capability Building				\$64,663
Total Direct Authorization/Appropriation				\$429,266

Countering Weapons of Mass Destruction Proposed Legislative Language

Operations and Support

For necessary expenses of the Countering Weapons of Mass Destruction Office for operations and support, as authorized by law, \$209,264,000: Provided, That not to exceed \$4,500 shall be for official reception and representation expenses.

Language Provision	Explanation
<u>For necessary expenses of the Countering Weapons of Mass Destruction Office for operations and support, as authorized by law, \$209,264,000: Provided, That not to exceed \$4,500 shall be for official reception and representation expenses.</u>	Initial appropriations language request for the CWMD Office Operations and Support account.

Procurement, Construction, and Improvements

For necessary expenses of the Countering Weapons of Mass Destruction Office for procurement, construction, and improvements, \$74,896,000, to remain available until September 30, 2021.

Language Provision	Explanation
<u>For necessary expenses of the Countering Weapons of Mass Destruction Office for procurement, construction, and improvements, \$74,896,000, to remain available until September 30, 2021.</u>	Initial appropriations language request for the CWMD Office Procurement, Construction, and Improvements account.

Research and Development

For necessary expenses of the Countering Weapons of Mass Destruction Office for research and development, \$80,443,000, to remain available until September 30, 2021.

Language Provision	Explanation
<u>For necessary expenses of the Countering Weapons of Mass Destruction Office for research and development, \$80,443,000, to remain available until September 30, 2021.</u>	Initial appropriations language request for the CWMD Office Research and Development account.

Federal Assistance

For necessary expenses of the Countering Weapons of Mass Destruction Office for Federal assistance through grants, contracts, cooperative agreements, and other activities, \$64,663,000, to remain available until September 30, 2021.

Language Provision	Explanation
<u>For necessary expenses of the Countering Weapons of Mass Destruction Office for Federal assistance through grants, contracts, cooperative agreements, and other activities, \$64,663,000, to remain available until September 30, 2021.</u>	Initial appropriations language request for the CWMD Office Federal Assistance account.

Countering Weapons of Mass Destruction Collections - Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>		FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Change		
		Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Defense - Department of Defense	Source	-	-	-	-	-	-	-	-	\$2,370	-	-	\$2,370
Operations and Support	Location	-	-	-	-	-	-	-	-	\$2,370	-	-	\$2,370
Capability and Operations Support	Location	-	-	-	-	-	-	-	-	\$2,370	-	-	\$2,370
Department of Defense - Navy, Marine Corps	Source	-	-	-	-	-	-	-	-	\$285	-	-	\$285
Operations and Support	Location	-	-	-	-	-	-	-	-	\$285	-	-	\$285
Capability and Operations Support	Location	-	-	-	-	-	-	-	-	\$285	-	-	\$285
Department of Homeland Security - Federal Emergency Management Agency	Source	-	-	-	-	-	-	-	-	\$260	-	-	\$260
Operations and Support	Location	-	-	-	-	-	-	-	-	\$260	-	-	\$260
Mission Support	Location	-	-	-	-	-	-	-	-	\$260	-	-	\$260
Department of Homeland Security - US Customs and Border Protection	Source	-	-	-	-	-	-	-	-	\$260	-	-	\$260
Operations and Support	Location	-	-	-	-	-	-	-	-	\$260	-	-	\$260
Mission Support	Location	-	-	-	-	-	-	-	-	\$260	-	-	\$260
Total Collections		-	-	-	-	-	-	-	-	\$3,175	-	-	\$3,175

Department of Homeland Security

Countering Weapons of Mass Destruction

Operations and Support



Fiscal Year 2019
Congressional Justification

Table of Contents

Operations and Support1

 Budget Comparison and Adjustments..... 3

 Personnel Compensation and Benefits..... 10

 Non Pay Budget Exhibits..... 12

Mission Support– PPA 13

 Budget Comparison and Adjustments..... 13

 Personnel Compensation and Benefits..... 17

 Non Pay Budget Exhibits..... 19

Capability and Operations Support – PPA..... 21

 Budget Comparison and Adjustments..... 21

 Personnel Compensation and Benefits..... 27

 Non Pay Budget Exhibits..... 29

Operations and Support

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Mission Support	-	-	-	-	-	-	248	232	\$83,321	248	232	\$83,321
Capability and Operations Support	-	-	-	-	-	-	-	-	\$125,943	-	-	\$125,943
Total	-	-	-	-	-	-	248	232	\$209,264	248	232	\$209,264
Subtotal Discretionary - Appropriation	-	-	-	-	-	-	248	232	\$209,264	248	232	\$209,264

Overview

The Department's Countering Weapons of Mass Destruction Office (CWMD) exists to protect the American people and the homeland from the dangers posed by hostile state and non-state actors who would acquire and use nuclear, chemical, radiological or biological materials in the form of weapons of mass destruction (WMD) to harm Americans or U.S. interests. CWMD does this through its prevention, detection, forensics mission activities. This mission aligns with Pillar I of the President's National Security Strategy: Protect the American People, the Homeland, and the American Way of Life; Secure U.S. Borders and Territory; Defend Against Weapons of Mass Destruction.

Operations and Support (O&S) funds chemical, biological, radiological, nuclear, and medical support programs and activities. O&S also provides for readiness activities in support of Federal, state, local, tribal and territorial (FSLTT) and international operators, and DHS operating components. CWMD pursues this by establishing, maintaining, and supporting programs and activities to defend against WMD, and combat biothreats and pandemics. O&S funding supports the costs incurred for the day-to-day operation of the organization, including, but not limited to salaries, travel, and enterprise business services; as well as development of CWMD capabilities through strategic planning and analysis; supporting components and other agencies to define requirements supporting operations; ensuring a robust test and evaluation program, and the procurement of CWMD equipment. Programs and activities outlined in the O&S account align operational programs and activities across the WMD threat space and allow for consistent and persistent engagement with FSLTT partners and DHS components. CWMD O&S includes management of bio-detection operations, coordination of DHS biodefense activities, and support for activities that help communities prepare and build capacity to detect, respond to, and recover from biological, chemical, radiological and/or nuclear events. CWMD programs and activities exist to fulfill DHS mission areas involving chemical, biological, radiological and nuclear threats and are in alignment with the National Security Strategy. The CWMD O&S appropriation is composed of functional activities previously associated with the Domestic Nuclear Detection Office (DNDO) and the Office of Health Affairs (OHA).

- **Mission Support PPA**

Mission Support funds personnel compensation and benefits for CWMD employees and provides enterprise leadership, management, and business administration in support of daily operations. Key capabilities include workforce management, financial management, physical and personnel security, goods and services acquisition, information technology, property and assets management, communications, and general management and administration. Funds are also provided to the Working Capital Fund, which provides such services as rent and information technology infrastructure support.

- **Capability & Operational Support (C&OS) PPA**

The Capability & Operational Support PPA provides situational awareness and decision support for DHS leadership and Federal partners; the development of CWMD capabilities through strategic planning and analysis; assisting DHS operational components and other agencies in defining requirements necessary to achieve their mission; and the procurement, testing, and evaluation of CWMD equipment. CWMD supports components and other agencies through the definition of requirements, ensuring a robust test and evaluation program, and the procurement of chemical, biological, and radiological detection equipment that can be carried, worn, or easily moved to support operational end-users. CWMD manages and supports the national bio-detection system, coordinates DHS biological defense activities, and supports preparedness for biological and chemical events to help communities prepare, respond, and recover. C&OS also supports bio-detection in more than 30 jurisdictions, including activities such as sample collection, laboratory analysis and support, consumables, reagents, and local quality checks.

Operations and Support Budget Authority and Obligations

Budget Authority <i>(Dollars in Thousands)</i>	FY 2017	FY 2018	FY 2019
Enacted/Request	-	-	\$209,264
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	-	-	\$209,264
Collections – Reimbursable Resources	-	-	\$3,175
Total Budget Resources	-	-	\$212,439
Obligations (Actual/Projections/Estimates)	-	-	\$212,439
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	248
Enacted/Request FTE	-	-	232
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	248
FTE (Actual/Estimates/Projections)	-	-	232

Operations and Support Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>		FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
		Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Defense - Department of Defense	Source	-	-	-	-	-	-	-	-	\$2,370
Department of Defense - Navy, Marine Corps	Source	-	-	-	-	-	-	-	-	\$285
Department of Homeland Security - Federal Emergency Management Agency	Source	-	-	-	-	-	-	-	-	\$260
Department of Homeland Security - US Customs and Border Protection	Source	-	-	-	-	-	-	-	-	\$260
Total Collections		-	-	-	-	-	-	-	-	\$3,175

Operations and Support Summary of Budget Changes

Budget Formulation Activity (Dollars in Thousands)	Positions	FTE	Amount
FY 2017 Enacted	-	-	-
FY 2018 President's Budget	-	-	-
FY 2019 Base Budget	-	-	-
Transfer to CWMD/O&S/C&OS from DNDO/PC&I/HPRNS for CWMD	-	-	\$13,167
Transfer to CWMD/O&S/C&OS from DNDO/R&D/APA for CWMD	-	-	\$15,937
Transfer to CWMD/O&S/C&OS from DNDO/R&D/DCA for CWMD	-	-	\$34,127
Transfer to CWMD/O&S/C&OS from DNDO/R&D/NF for CWMD	-	-	\$8,654
Transfer to CWMD/O&S/CO&S from OHA/O&S/CBR for CWMD	-	-	\$51,827
Transfer to CWMD/O&S/CO&S from OHA/O&S/HMR for CWMD	-	-	\$672
Transfer to CWMD/O&S/CO&S from OHA/O&S/IO for CWMD	-	-	\$1,400
Transfer to CWMD/O&S/MS from A&O for CWMD	7	7	\$1,223
Transfer to CWMD/O&S/MS from DNDO/O&S/MS for CWMD	158	144	\$54,664
Transfer to CWMD/O&S/MS from OHA/O&S/MS for CWMD	79	73	\$22,652
Transfer to CWMD/O&S/MS from OSEM for CWMD	4	4	\$1,014
Transfer to MGMT/CFO from CWMD for Centralized Training	-	-	(\$19)
Transfer to MGMT/CHCO from CWMD due to NFC Payroll Services Costs Removal	-	-	(\$50)
Transfer to MGMT/CIO from CWMD due to CIO DHS One Net Transfer	-	-	(\$49)
Total Transfers	248	228	\$205,219
Annualization - Personnel Adjustments	-	4	\$565
Annualization of FY 2018 Pay Raise	-	-	\$185
GSA Rent Increase	-	-	\$2,000
WCF Activity Cost Increase	-	-	\$1,136
Total, Pricing Increases	-	4	\$3,886
Total Adjustments-to-Base	248	232	\$209,105
FY 2019 Current Services	248	232	\$209,105
Requirements, Capability and Architecture Analysis	-	-	\$159
Total, Program Increases	-	-	\$159
FY 2019 Request	248	232	\$209,264
FY 2018 TO FY 2019 Change	248	232	\$209,264

Operations and Support Justification of Pricing Changes

Pricing Changes (Dollars in Thousands)	FY 2019 President's Budget		
	Positions	FTE	Amount
Pricing Change 1 - Annualization - Personnel Adjustments	-	4	\$565
Mission Support	-	4	\$565
Pricing Change 2 - Annualization of FY 2018 Pay Raise	-	-	\$185
Mission Support	-	-	\$185
Pricing Change 3 - GSA Rent Increase	-	-	\$2,000
Mission Support	-	-	\$2,000
Pricing Change 4 - WCF Activity Cost Increase	-	-	\$1,136
Mission Support	-	-	\$1,136
Total Pricing Changes	-	4	\$3,886

Pricing Change 1 -- Annualization - Personnel: Includes salaries and benefits to fund the full complement of legacy Office of Health Affairs (OHA) personnel brought on board in FY 2018.

Pricing Change 2 – Annualization of FY 2018 Pay Raise: This pricing change reflects the effects of annualizing the FY 2018 pay increase.

Pricing Change 3 – General Services Administration (GSA) Rent Increase: The increase in rental payments to GSA is due to delays in moving to the St. Elizabeths campus. CWMD is actively working with DHS headquarters and GSA to resolve this issue and reduce the rent burden.

Pricing Change 4 – Working Capital Fund (WCF) Activity Cost Increase: This pricing change includes increases in the service level agreements for financial system management as well as anticipated increases in the WCF activities, such as the National Capital Region Infrastructure Operations.

Operations and Support Justification of Program Changes

Program Changes (Dollars in Thousands)	FY 2019 President's Budget		
	Positions	FTE	Amount
Program Change 1 - Requirements, Capability and Architecture Analysis	-	-	\$159
Capability and Operations Support	-	-	\$159
Total Program Changes	-	-	\$159

Program Change 1 - Requirements, Capability and Architecture Analysis

Description

This program change reflects an increase of \$0.2M to the Strategic Planning and Analysis Program to enable CWMD to work with Federal, state and local partners to establish technical requirements to enhance operational capability to deter and disrupt potential WMD threats.

Justification

In FY 2018, CWMD initiated a pilot project with operational partners to evaluate response agencies' ability to integrate wearable detection capability into existing concepts of operations. The results of the pilot will inform the need, feasibility and scope of a longer-term project.

Performance

Based on the results, information gained, and feasibility of implementing a long-term solution, CWMD would work with operational partners to develop the technical requirements that would be needed to initiate a project to implement a sustainable capability.

Operations and Support Personnel Compensation and Benefits

Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Mission Support	-	-	-	-	-	-	-	-	248	232	\$46,308	\$180.34	248	232	\$46,308	\$180.34
Capability and Operations Support	-	-	-	-	-	-	-	-	-	-	\$2,297	-	-	-	\$2,297	-
Total	-	-	-	-	-	-	-	-	248	232	\$48,605	\$180.34	248	232	\$48,605	\$180.34
Discretionary - Appropriation	-	-	-	-	-	-	-	-	248	232	\$48,605	\$180.34	248	232	\$48,605	\$180.34

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.1 Full-time Permanent	-	-	\$31,697	\$31,697
11.5 Other Personnel Compensation	-	-	\$462	\$462
11.8 Special Personal Services Payments	-	-	\$6,766	\$6,766
12.1 Civilian Personnel Benefits	-	-	\$9,680	\$9,680
Total - Personnel Compensation and Benefits	-	-	\$48,605	\$48,605
Positions and FTE				
Positions - Civilian	-	-	248	248
FTE - Civilian	-	-	232	232

Operations and Support

Permanent Positions by Grade – Appropriation

Grades and Salary Range (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
Total, SES	-	-	13	13
Total, EX	-	-	3	3
GS-15	-	-	87	87
GS-14	-	-	73	73
GS-13	-	-	47	47
GS-12	-	-	9	9
GS-11	-	-	11	11
GS-3	-	-	1	1
Other Graded Positions	-	-	4	4
Total Permanent Positions	-	-	248	248
Total Perm. Employment (Filled Positions) EOY	-	-	248	248
Position Locations				
Headquarters	-	-	248	248
Averages				
Average Personnel Costs, ES Positions	-	-	190,482	190,482
Average Personnel Costs, GS Positions	-	-	130,428	130,428
Average Grade, GS Positions	-	-	14	14

Operations and Support Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Mission Support	-	-	\$37,013	\$37,013
Capability and Operations Support	-	-	\$123,646	\$123,646
Total	-	-	\$160,659	\$160,659
Discretionary - Appropriation	-	-	\$160,659	\$160,659

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	-	-	\$1,675	\$1,675
23.1 Rental Payments to GSA	-	-	\$11,722	\$11,722
24.0 Printing and Reproduction	-	-	\$31	\$31
25.1 Advisory and Assistance Services	-	-	\$50,476	\$50,476
25.2 Other Services from Non-Federal Sources	-	-	\$18,163	\$18,163
25.3 Other Goods and Services from Federal Sources	-	-	\$48,146	\$48,146
25.7 Operation and Maintenance of Equipment	-	-	\$4,967	\$4,967
26.0 Supplies and Materials	-	-	\$11,434	\$11,434
31.0 Equipment	-	-	\$13,395	\$13,395
41.0 Grants, Subsidies, and Contributions	-	-	\$650	\$650
Total - Non Pay Object Classes	-	-	\$160,659	\$160,659

*Mission Support– PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Mission Support	-	-	-	-	-	-	248	232	\$83,321	248	232	\$83,321
Total	-	-	-	-	-	-	248	232	\$83,321	248	232	\$83,321
Subtotal Discretionary - Appropriation	-	-	-	-	-	-	248	232	\$83,321	248	232	\$83,321

PPA Description. Mission Support funds personnel compensation and benefits for all CWMD employees and provide enterprise leadership, management, and business administration in support of daily operations. Key capabilities include workforce management, financial management, physical and personnel security, goods and services acquisition, information technology, property and assets management, communications, and general management and administration. Funds are also provided to the Working Capital Fund, which provides services such as rent and information technology infrastructure support.

Program Descriptions

Office of the Assistant Secretary: The Office of the Assistant Secretary provides overall management of CWMD and develops long-range management plans for the efficient and effective operation of the organization. The office develops and reviews CWMD strategic direction, policy, and issues internal guidance to employees that is consistent with regulations, and the authority delegated by DHS. The office is supported by Chief of Staff, Executive & Legislative Affairs, and Communications staff.

Enterprise Services: Includes \$46.3M in resources for all CWMD personnel compensation, and detailees, as well as additional resources for activities that provide enterprise leadership, management, and business administration services to support efficient and effective operations. Business requirements include financial management systems & operations, workforce management, information technology, facility management, and personnel security services and funding for reimbursable detailees. Funds are also provided to the Working Capital Fund, which provides services such as rent and information technology infrastructure support.

Mission Support - PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	-	-	\$83,321
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	-	-	\$83,321
Collections – Reimbursable Resources	-	-	\$520
Total Budget Resources	-	-	\$83,841
Obligations (Actual/Projections/Estimates)	-	-	\$83,841
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	248
Enacted/Request FTE	-	-	232
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	248
FTE (Actual/Estimates/Projections)	-	-	232

Mission Support – PPA Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Homeland Security - Federal Emergency Management Agency Source	-	-	-	-	-	-	-	-	\$260
Department of Homeland Security - US Customs and Border Protection Source	-	-	-	-	-	-	-	-	\$260
Total Collections	-	-	-	-	-	-	-	-	\$520

Mission Support – PPA Summary of Budget Changes

Budget Formulation Activity (Dollars in Thousands)	Positions	FTE	Amount
FY 2017 Enacted	-	-	-
FY 2018 President's Budget	-	-	-
FY 2019 Base Budget	-	-	-
Transfer to CWMD/O&S/MS from A&O for CWMD	7	7	\$1,223
Transfer to CWMD/O&S/MS from DNDO/O&S/MS for CWMD	158	144	\$54,664
Transfer to CWMD/O&S/MS from OHA/O&S/MS for CWMD	79	73	\$22,652
Transfer to CWMD/O&S/MS from OSEM for CWMD	4	4	\$1,014
Transfer to MGMT/CFO from CWMD for Centralized Training	-	-	(\$19)
Transfer to MGMT/CHCO from CWMD due to NFC Payroll Services Costs Removal	-	-	(\$50)
Transfer to MGMT/CIO from CWMD due to CIO DHS One Net Transfer	-	-	(\$49)
Total Transfers	248	228	\$79,435
Annualization - Personnel Adjustments	-	4	\$565
Annualization of FY 2018 Pay Raise	-	-	\$185
GSA Rent Increase	-	-	\$2,000
WCF Activity Cost Increase	-	-	\$1,136
Total, Pricing Increases	-	4	\$3,886
Total Adjustments-to-Base	248	232	\$83,321
FY 2019 Current Services	248	232	\$83,321
FY 2019 Request	248	232	\$83,321
FY 2018 TO FY 2019 Change	248	232	\$83,321

Mission Support – PPA Personnel Compensation and Benefits

Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Mission Support	-	-	-	-	-	-	-	-	248	232	\$46,308	\$180.34	248	232	\$46,308	\$180.34
Total	-	-	-	-	-	-	-	-	248	232	\$46,308	\$180.34	248	232	\$46,308	\$180.34
Discretionary - Appropriation	-	-	-	-	-	-	-	-	248	232	\$46,308	\$180.34	248	232	\$46,308	\$180.34

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.1 Full-time Permanent	-	-	\$31,697	\$31,697
11.5 Other Personnel Compensation	-	-	\$462	\$462
11.8 Special Personal Services Payments	-	-	\$4,469	\$4,469
12.1 Civilian Personnel Benefits	-	-	\$9,680	\$9,680
Total - Personnel Compensation and Benefits	-	-	\$46,308	\$46,308
Positions and FTE				
Positions - Civilian	-	-	248	248
FTE - Civilian	-	-	232	232

Pay Cost Drivers

Leading Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate
Personnel Compensation and Benefits	-	-	-	-	-	-	232	\$46,308	\$181.12	232	\$46,308	\$181.12
Total - Pay Cost Drivers	-	-	-	-	-	-	232	\$46,308	\$181.12	232	\$46,308	\$181.12

*The pay rate calculation does not include object classes 11.8 or 13.

NARRATIVE EXPLANATION OF CHANGES

FY 2019 President's Budget Request: The CWMD O&S Mission Support PPA for FY 2019 includes 232 FTE and \$46.3M for personnel, compensation, benefits and performance awards for Federal employees, as well as detailed support from the Office of General Counsel support. Also, included is funding for personnel detailed from DHS Operational Components and other interagency partners.

Average Rate FY 2019: Average FTE rate amounts to \$181,120. This pay rate calculation does not include object classes 11.8 or 13.0. FTE rates are higher than average due to the additional compensation authorized for physicians.

Mission Support PPA Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Mission Support	-	-	\$37,013	\$37,013
Total	-	-	\$37,013	\$37,013
Discretionary - Appropriation	-	-	\$37,013	\$37,013

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	-	-	\$206	\$206
23.1 Rental Payments to GSA	-	-	\$11,722	\$11,722
24.0 Printing and Reproduction	-	-	\$27	\$27
25.1 Advisory and Assistance Services	-	-	\$11,431	\$11,431
25.2 Other Services from Non-Federal Sources	-	-	\$445	\$445
25.3 Other Goods and Services from Federal Sources	-	-	\$8,888	\$8,888
25.7 Operation and Maintenance of Equipment	-	-	\$3,825	\$3,825
26.0 Supplies and Materials	-	-	\$234	\$234
31.0 Equipment	-	-	\$235	\$235
Total - Non Pay Object Classes	-	-	\$37,013	\$37,013

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Rental Payments to GSA	-	-	\$11,722	\$11,722
Advisory and Assistance Services	-	-	\$11,431	\$11,431
Other Goods & Services from Federal Sources	-	-	\$8,888	\$8,888
Operation and Maintenance of Equipment	-	-	\$3,825	\$3,825
Other Non Pay Cost Drivers	-	-	1,147	1,147
Total – Non Pay Cost Drivers	-	-	\$37,013	\$37,013

NON PAY NARRATIVE:

Rental Payments to GSA: The costs associated with Rental Payments to GSA reflect delays in moving to the St. Elizabeth's campus, which is causing CWMD to continue to pay an annualized rent premium. CWMD is actively working with DHS headquarters and GSA to resolve this issue and reduce the rent burden.

Advisory and Assistance Services: Costs in this category are driven by the Office of the Assistant Secretary, studies and analysis, and technical-policy-and business support personnel.

Other Goods & Services from Federal Sources: These costs represent financial system support, information technology operations, operating expenses (e.g. WCF-DHS Shared Services), and governance-infrastructure & cybersecurity.

Operation and Maintenance of Equipment: These costs will support CWMD business operations, related equipment, and facilities management.

Other Non Pay Cost Drivers: \$1.1M for business operations supplies/material, printing and reproduction, travel of personnel, training, facility support and reception funds.

*Capability and Operations Support – PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Capability and Operations Support	-	-	-	-	-	-	-	-	\$125,943	-	-	\$125,943
Total	-	-	-	-	-	-	-	-	\$125,943	-	-	\$125,943
Subtotal Discretionary - Appropriation	-	-	-	-	-	-	-	-	\$125,943	-	-	\$125,943

PPA Description

The Capability & Operational Support PPA provides situational awareness and decision support for DHS leadership and Federal partners; the development of CWMD capabilities through strategic planning and analysis; assisting DHS operational components and other agencies in defining requirements necessary to achieve their mission; and the procurement, testing, and evaluation of CWMD equipment. CWMD supports components and other agencies through the definition of requirements, ensuring a robust test and evaluation program, and the procurement of chemical/biological and radiological/nuclear detection equipment that can be carried, worn, or easily moved to support operational end-users. CWMD manages and supports the national bio-detection system, coordinates DHS biological defense activities, and supports preparedness for biological and chemical events to help communities build capabilities to prepare, respond, and recover. C&OS also supports bio-detection in more than 30 jurisdictions including sample collection, laboratory analysis and support, consumables, reagents, and local quality checks.

Program Descriptions:

Strategic Planning & Analysis: Provides \$16.9M to ensure that CWMD funding for the nuclear, chemical, radiological and biological mission areas are allocated consistent with CWMD operational requirements and priorities. Activities include the development of coordinated strategies, plans, and policy recommendations to counter WMD and ensure operational readiness against chemical, biological, radiological, nuclear threats. CWMD provides mission area information to support the DHS Office of Intelligence and Analysis' process to provide senior leaders with the most current and accurate WMD threat information available at any level of classification. Working with interagency partners, CWMD leads the development of requirements focused on enhancing and implementing the U.S. operational capability to detect and prevent WMD threats. CWMD coordinates with the Science & Technology Directorate and interagency partners on research and development requirements and, as necessary, conducts chemical, biological or integrated terrorism risk assessments, hazard, or material threat assessments as related to WMD. The activities of the former Global Nuclear Detection Architecture (GNDA) Analysis program were re-envisioned to address requirements across the WMD mission area.

Readiness Program – Operational Preparedness & Assessments: Provides \$9.2M to develop policy, plans, and exercises related to biological and chemical defense, infectious diseases, and health security to support the DHS mission. Program activities also include overt and covert operational assessments (i.e. red-teaming) providing operational partners with an opportunity to evaluate operational performance, and includes providing materials not available to operational partners that simulate real world threats.

Medical Support: Provides \$0.9M for expertise and activities to advise DHS leadership about health security issues, coordinate with the medical first responder community, and other stakeholders at all levels of government to prepare for, respond to, and recover from mass casualty incidents and health consequences of terrorism and disasters. Medical support provides oversight for DHS operational Emergency Medical Services (EMS) activities, including emergency care services provided for people in DHS care and custody. Medical readiness also provides DHS radiation health and safety expertise in support of headquarters and component radiation safety programs.

Chemical Support: Chemical support provide \$0.9M for CWMD programs and activities that enhance FSLTT and DHS component ability to effectively address chemical threats. Resources in the Operations & Support Appropriation provides chemical threat and toxicological subject matter expertise and leads the Department’s chemical defense advisory group. Chemical support engages with academia, law enforcement and first responder groups, and representative local communities, to identify gaps and enhance preparedness. Chemical support also works with DHS components and state and local authorities to promote best practices and alignment to help close priority gap areas.

Biological Support: Biological Support programs includes \$51.8M. These resources primarily support aspects of national bio-detection, including field sample collection, collector siting and operational support; equipment, consumables, assays, and reagents; and quality assurance and quality control. Program activities include modeling of operational or impact scenarios, subject matter reachback, development of reference materials, information sharing activities, as well a rapidly deployable, special event support. In addition, these resources support the department’s efforts to safeguard our nation’s food and agriculture against terrorist threats

Technical Forensics: This program provides \$8.7M to advance the science of nuclear forensics through the examination of materials recovered from radiological/nuclear events of an illicit or hostile nature, in order to determine their character and origin for legal proceedings or national security. In addition, this program ensures forensics readiness through joint planning, working with other agencies to conduct exercise and assess capabilities, and promoting international engagements. This program also includes the National Nuclear Forensics Expertise Development Programs, which maintains technical expertise through support to graduate and undergraduate students, as authorized by the Nuclear Forensics and Attribution Act (Public Law 111-140).

Test & Evaluation (T&E): Provides \$24.3M to fund T&E programs to characterize, verify, and validate technical performance, and assess the operational effectiveness and suitability of technologies under development, as well as that of commercially available systems, and emerging technologies and systems prior to deployment (full operational capability). CWMD utilizes a suite of test instrumentation and automated data collection systems to enable testing teams to rapidly verify and validate data. The Standards project follows a development, use, and revision cycle to ensure consensus and technical capability standards remain effective for detection technology.

Acquisition: Includes \$13.2M to acquire and deploy portable detection equipment that can be carried, worn, or easily moved to support operational end-users. Most of the portable detection equipment is relatively lightweight, easy to use, and of sufficiently low cost for widespread deployment. In accordance with the DHS Joint Requirements Council procedures for rapid deployment of capabilities, CWMD utilizes portable detection equipment to counter emerging and persistent threats to the nation. These devices play a critical role in the layered defenses of the United States against terrorist attacks.

Capability and Operations Support PPA Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	-	-	\$125,943
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	-	-	\$125,943
Collections – Reimbursable Resources	-	-	\$2,655
Total Budget Resources	-	-	\$128,598
Obligations (Actual/Projections/Estimates)	-	-	\$128,598
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Capability and Operations Support – PPA Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Defense - Department of Defense Source	-	-	-	-	-	-	-	-	\$2,370
Department of Defense - Navy, Marine Corps Source	-	-	-	-	-	-	-	-	\$285
Total Collections	-	-	-	-	-	-	-	-	\$2,655

Capability and Operations Support – PPA

Summary of Budget Changes

Budget Formulation Activity (Dollars in Thousands)	Positions	FTE	Amount
FY 2017 Enacted	-	-	-
FY 2018 President's Budget	-	-	-
FY 2019 Base Budget	-	-	-
Transfer to CWMD/O&S/C&OS from DNDO/PC&I/HPRNS for CWMD	-	-	\$13,167
Transfer to CWMD/O&S/C&OS from DNDO/R&D/APA for CWMD	-	-	\$15,937
Transfer to CWMD/O&S/C&OS from DNDO/R&D/DCA for CWMD	-	-	\$34,127
Transfer to CWMD/O&S/C&OS from DNDO/R&D/NF for CWMD	-	-	\$8,654
Transfer to CWMD/O&S/CO&S from OHA/O&S/CBR for CWMD	-	-	\$51,827
Transfer to CWMD/O&S/CO&S from OHA/O&S/HMR for CWMD	-	-	\$672
Transfer to CWMD/O&S/CO&S from OHA/O&S/IO for CWMD	-	-	\$1,400
Total Transfers	-	-	\$125,784
Total Adjustments-to-Base	-	-	\$125,784
FY 2019 Current Services	-	-	\$125,784
Requirements, Capability and Architecture Analysis	-	-	\$159
Total, Program Increases	-	-	\$159
FY 2019 Request	-	-	\$125,943
FY 2018 TO FY 2019 Change	-	-	\$125,943

**Capability and Operations Support – PPA
Personnel Compensation and Benefits**

Pay Summary

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Capability and Operations Support	-	-	-	-	-	-	-	-	-	-	\$2,297	-	-	-	\$2,297	-
Total	-	-	-	-	-	-	-	-	-	-	\$2,297	-	-	-	\$2,297	-
Discretionary - Appropriation	-	-	-	-	-	-	-	-	-	-	\$2,297	-	-	-	\$2,297	-

Pay by Object Class

Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.8 Special Personal Services Payments	-	-	\$2,297	\$2,297
Total - Personnel Compensation and Benefits	-	-	\$2,297	\$2,297
Positions and FTE				
Positions - Civilian	-	-	-	-

Pay Cost Drivers

Leading Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate
Public Health Service Officer Costs	-	-	-	-	-	-	-	\$2,297	-	-	\$2,297	-
Total – Pay Cost Drivers	-	-	-	-	-	-	-	\$2,297	-	-	\$2,297	-

*The pay rate calculation does not include object classes 11.8 or 13.

NARRATIVE EXPLANATION OF CHANGES**Public Health Service Officer Costs:**

The table above displays the reimbursable payments (Object Class 11.8, “Special Personal Services Pay) that support personnel from the Health and Human Services (HHS), U.S. Public Health Service Corps only. CWMD has a Public Health Service Officer (PHSO) detailed from HHS helping staff with CWMD programs. There are no positions reflected here, since the PHSOs are reflected in HHS. Additionally, CWMD personnel are funded from the Mission Support PPA and not included in this PPA.

Capability and Operations Support PPA Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Capability and Operations Support	-	-	\$123,646	\$123,646
Total	-	-	\$123,646	\$123,646
Discretionary - Appropriation	-	-	\$123,646	\$123,646

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	-	-	\$1,469	\$1,469
24.0 Printing and Reproduction	-	-	\$4	\$4
25.1 Advisory and Assistance Services	-	-	\$39,045	\$39,045
25.2 Other Services from Non-Federal Sources	-	-	\$17,718	\$17,718
25.3 Other Goods and Services from Federal Sources	-	-	\$39,258	\$39,258
25.7 Operation and Maintenance of Equipment	-	-	\$1,142	\$1,142
26.0 Supplies and Materials	-	-	\$11,200	\$11,200
31.0 Equipment	-	-	\$13,160	\$13,160
41.0 Grants, Subsidies, and Contributions	-	-	\$650	\$650
Total - Non Pay Object Classes	-	-	\$123,646	\$123,646

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Advisory and Assistance Services	-	-	\$39,045	\$39,045
Other Services from Non-Federal Sources	-	-	\$17,718	\$17,718
Other Goods and Services from Federal Sources	-	-	\$39,258	\$39,258
Supplies and Materials	-	-	\$11,200	\$11,200
Equipment	-	-	\$13,160	\$13,160
Additional Non Pay Cost Drivers	-	-	\$3,265	\$3,265
Total – Non Pay Cost Drivers	-	-	\$123,646	\$123,646

NON PAY NARRATIVE:

Advisory and Assistance Services: A total of \$39.0M will provide for logistics support and technical contractor support associated with joint program activities (e.g. intelligence and analysis, strategic planning/policy development, requirements identification, and exercises).

Other Services from Non-Federal Sources: Provides for lab staffing, state and local preparedness/situational awareness, and Operations Center support in the amount of \$17.7M.

Other Goods and Services from Federal Sources: A total of \$39.3M will support interagency agreements with national labs, standards and conformity testing, operational analysis and technology assessments, red team operations, SIGMA detection project, chemical defense, bio-detection field operations (e.g. reagents, assays and consumables), and medical readiness.

Supplies and Materials: Operational support in the amount of \$11.2M.

Equipment: \$13.2M provides for the acquisition of portable radiation detection equipment, bio-detection technology enhancements, or other equipment requirements to meet emerging threats.

Additional Non Pay Cost Drivers: Includes travel and transportation of persons, printing and reproduction, operation and maintenance of equipment, and other expenses in the amount of \$3.3M.

Department of Homeland Security

Countering Weapons of Mass Destruction

Procurement, Construction, and Improvements



Fiscal Year 2019
Congressional Justification

Table of Contents

Procurement, Construction, and Improvements1

 Budget Comparison and Adjustments 3

 Non Pay Budget Exhibits..... 6

 Capital Investments Exhibits 7

Assets and Infrastructure Acquisition – Investment..... 8

 Capital Investments Exhibits 8

Procurement, Construction, and Improvements Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Assets and Infrastructure Acquisition	-	-	\$74,896	\$74,896
Total	-	-	\$74,896	\$74,896
Discretionary - Appropriation	-	-	\$74,896	\$74,896

The Countering Weapons of Mass Destruction Office (CWMD) Procurement, Construction and Improvements (PC&I) appropriation provides resources necessary for the planning, operational development, engineering, purchase, and deployment of assets that help the Department of Homeland Security (DHS) and its partners to prevent, protect against, respond to, and mitigate nuclear, chemical, radiological, and biological threats and incidents. The appropriation includes the following program, project, and activity (PPA):

- Assets and Infrastructure Acquisition:** This PPA provides resources for CWMD to acquire and deploy fixed and mobile large scale detection systems to support DHS operational end-users and address the full scope of requirements. The PPA includes the procurement and/or deployment of systems at land border crossings, seaports, international airports (including international preclearance sites), and international mail and express consignment courier facilities, and provides the scientific and technical expertise to design, acquire, and deploy these systems. CWMD coordinates with operational partners to refine and prioritize equipment requirements.

Procurement, Construction, and Improvements Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	-	-	\$74,896
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	-	-	\$74,896
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	-	-	\$74,896
Obligations (Actual/Projections/Estimates)	-	-	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Procurement, Construction, and Improvements Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	-
FY 2018 President's Budget	-	-	-
FY 2019 Base Budget	-	-	-
International Rail	-	-	\$3,100
Radiation Portal Monitor Program	-	-	\$24,046
Radiation Portal Monitor Replacement Program	-	-	\$47,750
Total Investment Elements	-	-	\$74,896
FY 2019 Request	-	-	\$74,896
FY 2018 TO FY 2019 Change	-	-	\$74,896

Procurement, Construction, and Improvements**Non Pay Budget Exhibits**

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
25.1 Advisory and Assistance Services	-	-	\$3,098	\$3,098
31.0 Equipment	-	-	\$71,798	\$71,798
Total - Non Pay Object Classes	-	-	\$74,896	\$74,896

Procurement, Construction, and Improvements
Capital Investments Exhibits

Capital Investments

Investment <i>(Dollars in Thousands)</i>	Unique Item Identifier	Acquisition Level	Procurement/ Construction	IT/Non-IT	MAOL	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Assets and Infrastructure Acquisition	-	2	Procurement	Non-IT	Yes	-	-	\$74,896

The Assets and Infrastructure Acquisition PPA includes the Radiation Portal Monitor Replacement Program (RPM RP) with Unique Item Identifier (UII) 000005961.

*Assets and Infrastructure Acquisition – Investment***Capital Investments Exhibits****Procurement/Acquisition Programs**

Investment <i>(Dollars in Thousands)</i>	Unique Item Identifier	Acquisition Level	Procurement/ Construction	IT/Non-IT	MAOL	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Assets and Infrastructure Acquisition	-	2	Procurement	Non-IT	Yes	-	-	\$74,896

Overview

The Assets and Infrastructure Acquisition includes resources to acquire and deploy fixed and mobile large scale Radiation Detection Equipment (RDE) to support DHS operational end-users, and address operational and technical detection requirements. This PPA includes the procurement and/or deployment of RDE systems at land border crossings, seaports, international airports (including international preclearance sites), and international mail and express consignment courier facilities, and provides the scientific and technical expertise to design, acquire, and deploy these systems.

CWMD acquisition programs and activities utilize an integrated life cycle management approach to develop, acquire, procure, deploy and sustain nuclear, chemical, radiological and biological detection systems when acquisition and deployment of an asset is determined to be necessary to support operational customers to mitigate threats. The FY 2019 President's Budget includes \$74.9M to support the development and implementation of radiological/nuclear (R/N) detection capabilities. CWMD integrates interagency efforts to develop nuclear detection technologies, evaluate detector performance, and ensure effective response to detection alarms. Due to the dynamic nature of the threat, acquisitions pertaining to R/N terrorism prevention are integrated through a deployment strategy that can readily respond to intelligence cues and requirements of operational partners. CWMD uses PC&I funding to acquire detection equipment for DHS Components. CWMD centrally manages and tracks those assets across their lifecycle until a final decision is made on where the equipment should be positioned. After an initial deployment period, which typically is represented by a manufacturer's warranty period, the operational user is responsible for sustainment of the end item(s) with CWMD maintaining configuration management of the deployed fleet of equipment.

Program Summaries

- **Acquisition:** The acquisition programs and activities execute an integrated lifecycle management approach to develop, acquire, procure, deploy and sustain nuclear, chemical, radiological and biological detection systems for supported operational customers that operate the

systems in the field. Within the PC&I appropriation, program resources are used to test and deploy assets and infrastructure with an expected acquisition value above \$250,000 per unit.

- Rapid Capabilities:** The Rapid Capabilities programs and activities execute rapid and/or sensitive acquisition development and procurement activities for nuclear, chemical, radiological and biological detection systems in response to emerging operational needs across the CWMD mission space. Rapid Capabilities initiatives implement acquisition procedures consistent with the Federal Acquisition Regulation (FAR), but at times may utilize authorities currently available to DHS and CWMD to rapidly develop, procure, and field capabilities that disrupt terrorist attempts to use WMD against the nation. The program optimizes innovation, and utilizes an agile approach to pilot the deployment of capability to immediately address the emerging need. The program would then transition the capability to a traditional program office for evaluation, and possible larger scale procurement, and capability advancement. Project requirements are informed by the need to address vulnerabilities or threats, and are not typically known until the year of execution.

CWMD follows the DHS Acquisition Management Directive that prescribes the governance over major acquisitions. This directive defines requirements for programs to complete phases of an acquisition plan and the Acquisition Decision Events (ADE) required for program execution. The DHS Acquisition Management Directive is available at: https://www.dhs.gov/sites/default/files/publications/102-01_Acquisition_Management_Directive_Rev02.pdf

The following table provides descriptions for the projects within the Assets and Infrastructure Acquisition PPA.

Projects	Level of Effort	General Description
Radiation Portal Monitor Program (RPMP)	Ongoing	RPMP is a post-Full Operating Capability (FOC) program with the objective to maintain scanning coverage at previously deployed sites. Major activities include: Decommission low-use/no-use RPMs and reconfigure sites as required; deploy new RPMs and redeploy previously decommissioned and refurbished RPMs as necessary to address required level of scanning capability at sites; deploy additional large-scale systems at ports of entry (POEs) or between POEs in the vicinity of the border; deploy improvements to fielded systems; and conduct test and evaluation of improvements.
RPM Replacement Program (RPM RP)	Ongoing	RPM RP is a project with the objective to acquire and deploy enhanced RPMs to begin to recapitalize the current fleet of fixed portal monitors
On Dock Rail (ODR)	Complete	ODR is a project to provide more efficient scanning to detect and classify R/N threat sources in intermodal cargo containers transferred directly from ship to rail car. In FY 2019, ODR program will be complete pending identification of additional ports requesting an ODR solution.
International Rail (IRAIL)	Ongoing	IRAIL is a project to detect and identify nuclear or other radioactive materials out of regulatory control entering the United States via freight rail.

Countering Weapons of Mass Destruction
Assets and Infrastructure Acquisition PPA Summary

Procurement, Construction, and Improvements

Assets and Infrastructure Acquisition Investments <i>(Dollars in Thousands)</i>	Unique Item Identifier	Acquisition Level	Procurement/ Construction	IT / Non IT	MAOL	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Radiation Portal Monitor Program (RPMP)	N/A	Post FOC	Procurement	Non-IT	No			\$24,046
Radiation Portal Monitor Replacement Program (RPM RP)	024-000005961	Level 2	Procurement	Non-IT	Yes			\$47,750
On-Dock Rail (ODR)	N/A	Level 3	Procurement	Non-IT	No			-
International Rail (IRAIL)	N/A	Level 3	Procurement	Non-IT	No			\$3,100
TOTAL								\$74,896

Radiation Portal Monitor (RPM)**Investment Description – FY19: \$24.046M**

RPMs are used at U.S. land and sea POEs by U.S. Customs and Border Protection (CBP) to scan cargo and conveyances in order to prevent the smuggling of R/N threats or threat materials into the United States, while facilitating the flow of legitimate trade and commerce.

The RPM Program supports CBP's efforts to maintain scanning coverage at POEs, and meet the *Security and Accountability For Every (SAFE) Port Act of 2006 (Public Law 107—347)*. As POEs are reconfigured or expanded, RPMs must be relocated, decommissioned, and/or additional RPM systems must be deployed to maintain current scanning capabilities. In addition, improvements will be deployed to systems in the field to extend the service life of RPMs, as well as augment detection efficacy, operational performance, and operational efficiency.

CWMD plans to continue managing the deployment of the remaining polyvinyl toluene (PVT)-based systems in its inventory and to deploy selected improvements that have been projected to enhance operational or threat detection performance for fielded systems in FY 2019.

Justification

The FY 2019 President's Budget provides funding required to ensure RPMs are relocated as necessary to support port reconfigurations and expansions and maintain scanning coverage; to ensure necessary improvements are made as the systems continue to age, since initial installations began in 2003; and to continue installation of remote operations capability to reduce the manpower burden for CPB RPM operations. Reducing the CBP manpower required to operate RPMs allows CBP to apply those resources elsewhere in the ports to focus on other efforts.

FY 2017 Planned Key Milestone Events

- Initiated 99 RPM installs and 164 decommissions.
- Completed 103 RPM installs and 178 decommissions*.
- Began operation of Trans Pacific conveyor-based RPM system at Port of Los Angeles/Long Beach, CA.
- Conducted system optimization, testing and analysis of spectroscopic RPMs at the Port of Savannah, GA for future deployment.
- Began initial operations of spectroscopic RPMs at the Port of Savannah, GA.
- Conducted remote operations single lane and multi-lane pilots at the Port of Savannah, GA.

FY 2018 Planned Key Milestone Events

- Initiate 71 RPM installs and 23 decommissions.
- Initiate deployment of remote operations equipment and software updates at selected POEs (e.g., Enhanced Radiological Nuclear Inspection and Evaluation (ERNIE)).

FY 2019 Planned Key Milestone Events

- Initiate 57 RPM installs and 11 decommissions.
- Continue deployment of remote operations equipment and software updates at selected POEs.

* Due to the number of variables affecting completion dates of RPM installs and decommissions, the reported RPM installs and decommissions initiated each fiscal year instead of those completed each FY.

Countering Weapons of Mass Destruction**Procurement, Construction, and Improvements****Overall Investment Funding**

	Prior Years	FY 2017	FY 2018	FY 2019
Operations and Support		-	-	-
Procurement, Construction, and Improvements				\$24,046
Research and Development				-
Project Funding				\$24,046
Obligations				
Expenditures				

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-X-00060	Pacific Northwest National Lab	IAA	3/15	3/15	3/20	N/A	\$75,100
HSHQDC-16-PA001	General Service Administration	RWA	5/16	6/16	9/18	N/A	\$2,176
HSHQDC-16-PA009	General Service Administration	RWA	9/16	9/16	12/18	N/A	\$301
HSHQDC-17-IPA006	CBP Border Security Deployment Program (BSDP)	IAA	5/17	5/17	5/22	N/A	\$3,200
HSHQDC-17-IPA008	CBP Data Analysis Center – Threat Evaluation Reduction (DAC-TER)	RWA	6/17	6/17	6/22	N/A	\$911
To be assigned at time of award	General Service Administration	RWA	TBD	TBD	TBD	N/A	\$383K
HSHQDC-15-00108	CBP Office of Technology Innovation and Acquisition (OTIA)	IAA	6/15	6/15	12/16	N/A	\$773
HSHQDC-17-PA001	General Service Administration	RWA	1/17	1/17	9/18	N/A	\$6,551

Significant Changes to Investment since Prior Year Enacted

None.

Countering Weapons of Mass Destruction
Investment Schedule

Procurement, Construction, and Improvements

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
Initiate 99 RPM installs and 164 decommissions			1QTR/FY17	
Complete 103 RPM installs and 178 decommissions				4QTR/FY17
Achieve Trans Pacific system Go-Live				1QTR/FY17
Deploy spectroscopic RPMs at Port of Savannah, GA			1QTR/FY17	4QTR/FY17
Begin initial operations of spectroscopic RPMs at the Port of Savannah, GA.				4QTR/FY17
Conduct remote operations multi-lane pilot at Savannah, GA			2QTR/FY17	4QTR/FY17
Initiate deployment of remote operations equipment at selected POEs.				4QTR/FY17
	FY 2018			
Initiate 71 RPM installs and 23 decommissions			1QTR/FY18	4QTR/FY18
Continue deployment of remote operations equipment at selected POEs			1QTR/FY18	4QTR/FY18
Deployment of software updates at selected POEs			1QTR/FY18	4QTR/FY18
	FY 2019			
Initiate 57 RPM installs and 11 decommissions.			1QTR/FY19	4QTR/FY19
Continue deployment of remote operations equipment and software updates at selected POEs.			1QTR/FY19	4QTR/FY19

Radiation Portal Monitor Replacement Program**Investment Description – FY19: \$47.750M**

RPMs are used at U.S. land and sea POEs by CBP to scan cargo and conveyances in order to prevent the smuggling of R/N threats or threat materials into the United States, while facilitating the flow of legitimate trade and commerce.

The RPM RP will support needed enhancements to CBP R/N materials detection and identification capabilities at high-volume POEs by addressing the five key drivers of enhancing mission effectiveness: (1) monitoring the state of health; (2) modernizing; (3) addressing emerging needs; (4) increasing reliability, availability; and (5) maintainability. These drivers were developed jointly by CBP and Pacific Northwest National Laboratory to guide DHS RPM recapitalization and modernization efforts.

The focus of the current RPM RP is the selective deployment of new RPMs to enhance mission effectiveness, gain operational efficiencies, and to address emerging mission needs. Currently, the program plans are to acquire and deploy approximately 200 RPMs between fiscal years 2018-2022. CWMD plans to procure nine systems in FY 2018 and 80 systems in FY 2019. The RPM RP source selection began in the 2nd quarter of FY 2017.

Justification

RPM RP is aligned to several overarching technical requirements for improving R/N detection, including the following areas:

- 1) Deploy detection systems for scanning of cargo and conveyances for R/N materials at U.S. POEs; and
- 2) Ensure steady state operations of deployed radiation detection systems do not unduly disrupt commercial cargo and passenger flow.

The FY 2019 President's Budget provides funding required to increase the inventory of RPMs to meet current and expected near-term demand. This funding will also allow the replacement of older units that cannot accommodate new revised operational settings that help mitigate nuisance alarms, which is precluding the implementation of remote operations capability.

FY 2017 Key Milestone Events

- Hosted an Industry Day for potential bidders on the RPM RP procurement.
- Received acquisition decision to proceed into the obtain phase of DHS Acquisition Management process.
- Completed setup of modeling tools and infrastructure to support a vendor collection event to assess solution performance against defined threat matrix.
- Released the final request for proposal (RFP) to initiate the procurement.
- Completed an initial evaluation of proposals and conducted first down select of systems being evaluated.
- Commenced characterization and environmental test campaigns.
- Commenced preliminary security test and evaluation (Cyber and network assessment).
- Completed characterization test of systems capabilities to operate in differing environmental conditions.
- Evaluate the operational effectiveness, suitability, and cybersecurity of the candidate RPMs in their intended operational environment.

FY 2018 Planned Key Milestone Events

- Complete environmental testing to assess system performance in a different environment conditions.
- Complete a comparative assessment of candidate systems against a defined threat matrix.
- Conduct second downselect of vendor's systems proposed to meet the requirements of the acquisition.
- Award up to three Indefinite Delivery Indefinite Quantity (IDIQ) contract for RPM integration and test articles.
- Obtain acquisition approval to initiate Low Rate Initial Production (LRIP).
- Commence stream of commerce and integration testing to assess performance in operational conditions and integration with CBP systems.

FY 2019 Planned Key Milestone Events

- Complete the stream of commerce and integration tests initiated in FY 2018.
- Provide an assessment of the variation in optimized solution performance against a defined treat matrix of candidate systems.
- Obtain acquisition approval to conduct IDIQ delivery order contract award.
- Award up to three IDIQ contracts for RPM integration and test articles.
- Evaluate the operational effectiveness, suitability, and cybersecurity of the candidate RPMs in their intended operational environment.

Overall Investment Funding

	Prior Years	FY 2017	FY 2018	FY 2019
Operations and Support		-	-	-
Procurement, Construction, and Improvements				\$47,750
Research and Development		-	-	-
Project Funding				\$47,750
Obligations				
Expenditures				

Countering Weapons of Mass Destruction
Procurement, Construction, and Improvements
Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDN-16-X-00049	Defense Threat Reduction Agency	IAA	8/16	8/16	3/18		\$1,300
HSHQDC-15-X-00092	Los Alamos National Lab	IAA	8/16	8/16	3/18		\$300
HSHQDC-15-X-00096	Oak Ridge National Lab	IAA	8/16	8/16	3/18		\$1,635
HSHQDC-15-X-00136	Sandia National Lab	IAA	8/16	8/16	3/18		\$765
HSHQDN-16-X-00027	Brookhaven National Lab	IAA	3/17	3/17	3/18		\$300
HSHQDC-13-C-00005	Johns Hopkins University Applied Physics Laboratory	Cost Plus Fixed Fee (CPFF)	5/16	5/16	3/18		\$685
HSHQDC-15-X-00096	Oak Ridge National Lab	IAA	2/14	1/15	12/18		\$1,635
HSHQDN-16-X-00006	Idaho National Lab	IAA	4/16	4/16	4/19		\$119
HSHQDC-15-X-00098	Savannah River National Lab	IAA	6/15	7/15	6/18		\$250
HSHQDC-15-X-00092	Los Alamos National Lab	IAA	8/16	8/16	3/18		\$300
HSHQDN-16-X-00007	Los Alamos National Lab	IAA	8/16	8/16	3/18		\$700
HSHQDN-16-X-00049	Defense Threat Reduction Agency/White Sands Missile Range	IAA	5/17	5/17	3/18		\$1,236
HSHQDN-16-X-00049 8/16-8/19	Defense Threat Reduction Agency (DTRA)	IAA	5/17	5/17	3/18		\$550
HSHQDC-13-C-00005	Johns Hopkins University Applied Physics Laboratory	CPFF	5/17	5/17	3/18		\$435
To be determined at time of award	PMO Contractor Support/SETA SESP	Commercial Contracts	10/17	10/17	10/20		\$3,241
To be determined at time of award	To be determined at time of award	IDIQ	6/18	6/18	6/19		\$2,566
To be determined at time of award	To be determined at time of award	IDIQ	6/19	6/19	6/20		\$48,415

Countering Weapons of Mass Destruction**Procurement, Construction, and Improvements****Significant Changes to Investment since Prior Year Enacted**

None.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
Received Acquisition Decision Approval to enter Requirements, Design, Test Phase			2QTR/FY17	3QTRFY17
Hosted an Industry Day for potential bidders on the RPM RP procurement				1QTR/FY17
Completed setup of modeling tools and infrastructure to support a vendor collection event to assess solution performance against defined threat matrix				2QTR/FY17
Released Final RFP				2QTR/FY17
Completed initial evaluation of proposals/conducted for first downselect in acquisition plan				3QTR/FY17
Commenced characterization and environmental test campaigns			3QTR/FY17	1QTR/FY18
Commenced Preliminary Security Test and Evaluation (cyber and network assessment)			4QTR/FY17	4QTR/FY17
Completed characterization testing				4QTR/FY17
	FY 2018			
Complete comparative assessment of candidate systems				1QTR/FY18
Complete Environmental Testing				1QTR/FY18
Conduct second downselect of the acquisition plan				2QTR/FY18
Obtain Acquisition Decision Approval to initiate Low Rate Initial Production (LRIP)				3QTR/FY18
Award up to three contracts for RPM integration and test articles				3QTR/FY18
Commence Stream of Commerce and Integration Testing			4QTR/FY18	
	FY 2019			
Complete Stream of Commerce and Integration Testing.				2QTR/FY19
Complete review of optimized solution performance against a defined treat matrix of candidate systems				1QTR/FY19
Conduct Field Validation			2QTR/FY19	2QTR/FY19
Conduct Operational Testing			3QTR/FY19	3QTR/FY19
Obtain Acquisition Decision Approval to conduct IDIQ delivery order contract award				4QTR/FY19

On-Dock Rail (ODR)**Investment Description – FY19: \$0**

The ODR program is intended to provide increased scanning and detecting efficiencies while screening for R/N material entering the United States at sea POEs via cargo containers.

Justification

ODR is aligned to several overarching technical requirements for improving R/N detection, including the following areas:

- 1) Deploy detection systems for scanning of cargo and conveyances at U.S. ports of entry for R/N materials; and
- 2) Ensure steady state operations of deployed radiation detection systems do not unduly disrupt commercial cargo flow.

ODR solutions are appropriate when a terminal is experiencing stream of commerce limitations based on the operationally-inefficient and cost-ineffective use of mobile RPMs. The program is currently completing deployment of an upgraded prototype system called the Straddle Carrier Portal (SCP) at the Port of Tacoma, Pierce County Terminal, which will implement efficiencies in the handling of containerized cargo and reduce the steps needed to conduct scanning for radiological material. This ODR solution features two fixed R/N scanning systems that can accommodate Straddle Carrier Portals with intermodal cargo containers. In FY 2018, CWMD intends to complete the construction of a similar system at Maher Terminal in the Port of New York/New Jersey.

No further funds are included in the FY 2019 President's Budget for this program. The ODR program will be complete pending identification of additional ports requesting an ODR solution.

FY 2017 Key Milestone Events

- Completed internal governance review and achieved Acquisition Management milestones to enter the Requirements/Design/Select Phase of the acquisition. .
- Began construction of ODR at the Port of Tacoma.
- Conducted performance testing of ODR at the Port of Tacoma.

FY 2018 Planned Key Milestone Events

- Complete deployment of the Straddle Carrier Portal at the Port of Tacoma.
- Conduct Operational Assessment at Port of Tacoma.
- Begin the Post-Implementation Review for Straddle Carrier Portal at the Port of Tacoma.
- Begin SCP fabrication, site design, and construction at Maher Terminal.

FY 2019 Planned Key Milestone Events

- Complete deployment of Straddle Carrier Portal at Maher Terminal.

Countering Weapons of Mass Destruction**Procurement, Construction, and Improvements****Overall Investment Funding**

	Prior Years	FY 2017	FY 2018	FY 2019
Operations and Support		-	-	-
Procurement, Construction, and Improvements				-
Research and Development				-
Project Funding				-
Obligations				
Expenditures				

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-X-00131	Pacific Northwest National Lab	IAA		7/15	7/18		\$725
HSHQDC-13-C-00005	JHU-Applied Physics Lab	IAA	11/12	11/12	11/17		\$1,489
HSHQDC-11-X-00104	Savannah River National Lab	IAA		2/11	12/16		\$800
HSHQDC-16-X-00063	Savannah River National Lab	IAA		3/16	9/21		\$2,840
HSHQDC-15-X-00060	Pacific Northwest National Lab	IAA		3/15	3/20		\$1,940
HSHQDC-15-X-00098	Savannah River National Lab	IAA		7/15	8/18		\$1,150
HSHQDC-15-X-00098	Savannah River National Lab	IAA	7/15	7/15	8/18		\$250
HSHQDC-13-C-00005	JHU-Applied Physics Lab	Existing IAA	11/12	11/12	11/17		\$350
HSHQDN-16-X-00047	Pacific Northwest National Lab	Existing IAA	8/16	8/16	8/21		\$750
HSHQDN-16-X-00047	Pacific Northwest National Lab	Existing IAA	8/16	8/16	8/21		\$300
HSHQDC-16-X-00063	Savannah River National Lab	Existing IAA	3/16	3/16	9/21		\$1,350
To be determined at time of award	Sandia National Lab	New IAA	6/17	6/17	12/22		\$400

Significant Changes to Investment since Prior Year Enacted

None.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
Completed Governance approval for the Analyze Select Phase of the project			1QTR/FY17	1QTR/FY17
Construction of ODR at Port of Tacoma			3QTR/FY17	1QTR/FY18
Conduct ODR Performance Testing Milestone (MS)-4 and MS-5			1QTR/FY17	1QTR/FY17
Deployment at Port of Tacoma			3QTR/FY17	2QTR/FY18
	FY 2018			
Conduct Operational Assessment at Port of Tacoma			1QTR/FY18	2QTR/FY18
SCP fabrication, site design and construction at Maher Terminal			1QTR/FY18	QTR/FY18
	FY 2019			
Post-Implementation Review for SCP at Port of Tacoma	N/A	N/A	3QTR/FY19	4QTR/FY19

International Rail (IRAIL)**Investment Description**

The International Rail program will analyze options, develop a programmatic approach, and generate requirements for solutions to detect and categorize nuclear or other radioactive materials out of regulatory control entering the United States via freight rail cargo through the active POEs, as identified in the Trade Act of 2002 (P.L. 107-210). CWMD IRAIL Program, in coordination with the CBP Non-Intrusive Inspection (NII) Program, plans to conduct a joint procurement for an integrated NII/RDE solution to be implemented at rail POEs (called: Integrated Rail Inspection System (IRIS)).

Justification

DHS has identified the requirement to improve the capability to scan cargo at international rail crossings as a priority.

FY 2017 Key Milestone Events

- Conducted market research with release of a request for information (RFI) (R&D-funded).
- Analyzed RFI results and developed a draft market research report (R&D-funded).

FY 2018 Planned Key Milestone Events

- Establish test objectives for IRIS Testing.
- Release a RFP to determine the state of the marketplace and potential solutions to meet project requirements.
- Award IDIQ contract to procure first delivery order (one integrated RDE/NII unit for test and evaluation).

FY 2019 Planned Key Milestone Events

- Conduct characterization casting on integrated RDE/NII System
- CWMD and CBP will decide either to continue integrated RDI/NII system procurements, or pursue a new IRIS RFP.
- Award IDIQ contract to procure first delivery order (one integrated RDE/NII unit for test and evaluation).

Countering Weapons of Mass Destruction**Procurement, Construction, and Improvements****Overall Investment Funding***

	Prior Years	FY 2017	FY 2018	FY 2019
Operations and Support				-
Procurement, Construction, and Improvements				\$3,100
Research and Development				\$1,500
Project Funding				\$4,600
Obligations				
Expenditures				

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
To be determined at the time of contract award	CBP	IAA	5/18	5/18	12/23		TBD
HSHQDN-16-X-00007	Los Alamos National Lab	IAA	6/16	6/16	3/18		\$080
HSHQDC-15-C-B0031	Rapiscan	CPFF	6/15	6/16	2/18		\$226

Significant Changes to Investment since Prior Year Enacted

None.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2018			
Conduct market research with RFI release			2QTR/FY17	3QTR/FY17
Support development of RFP and test plans			3QTR/FY17	4QTR/FY17
	FY 2019			
Release RFP			1QTR/FY18	1QTR/FY18
Procure first unit(s) for test and evaluation			4QTR/FY18	4QTR/FY18

Department of Homeland Security

Countering Weapons of Mass Destruction

Research and Development



Fiscal Year 2019
Congressional Justification

Table of Contents

Research and Development1

 Budget Comparison and Adjustments..... 3

 Non Pay Budget Exhibits..... 8

CWMD Research and Development – PPA 9

 Budget Comparison and Adjustments..... 9

 Non Pay Budget Exhibits..... 15

 Technology Readiness Level Exhibit 17

Research and Development

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
CWMD Research and Development	-	-	-	-	-	-	-	-	\$80,443	-	-	\$80,443
Total	-	-	-	-	-	-	-	-	\$80,443	-	-	\$80,443
Subtotal Discretionary - Appropriation	-	-	-	-	-	-	-	-	\$80,443	-	-	\$80,443

The Countering Weapons of Mass Destruction Office (CWMD) Research and Development (R&D) appropriation provides resources necessary to identify, explore, and demonstrate new technologies and capabilities that will help enable the Department of Homeland Security (DHS) and its partners to prevent, protect against, respond to, and mitigate nuclear, chemical, radiological, and biological threats and incidents. The appropriation includes the following Program, Project, and Activity (PPA):

- CWMD Research and Development:** Identifies, explores, develops, and demonstrates science and technologies that address gaps in the detection architecture. The programs and activities also improve the performance of detection and forensics capabilities, and/or significantly reduce the operational burden of detection systems in the field.

Research and Development Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	-	-	\$80,443
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	-	-	\$80,443
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	-	-	\$80,443
Obligations (Actual/Projections/Estimates)	-	-	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Research and Development Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	-
FY 2018 President's Budget	-	-	-
FY 2019 Base Budget	-	-	-
Transfer to CWMD/R&D from DNDO/R&D/DCD for CWMD	-	-	\$15,155
Transfer to CWMD/R&D from DNDO/R&D/NF for CWMD	-	-	\$9,707
Transfer to CWMD/R&D from DNDO/R&D/TRD for CWMD	-	-	\$60,581
Total Transfers	-	-	\$85,443
Total Adjustments-to-Base	-	-	\$85,443
FY 2019 Current Services	-	-	\$85,443
Academic Research Initiative	-	-	(\$3,000)
Exploratory Research	-	-	(\$2,000)
Total, Program Decreases	-	-	(\$5,000)
FY 2019 Request	-	-	\$80,443
FY 2018 TO FY 2019 Change	-	-	\$80,443

Research and Development Justification of Program Changes

Program Changes (Dollars in Thousands)	FY 2019 President's Budget		
	Positions	FTE	Amount
Program Change 1 - Academic Research Initiative	-	-	(\$3,000)
CWMD Research and Development	-	-	(\$3,000)
Program Change 2 - Exploratory Research	-	-	(\$2,000)
CWMD Research and Development	-	-	(\$2,000)
Total Program Changes	-	-	(\$5,000)

Program Change 1 – Decrease for Research and Development Program Academic Research Initiative

Description

The fiscal year (FY) 2019 President's Budget reduces funding for the Academic Research Initiative (ARI) program by \$3.0M. The program change will defer initiating new research projects until CWMD completes the assessment of ongoing activities to determine which FY 2018 activity would receive the next increment of funding; and the availability of funding for any new starts.

Justification

ARI has two primary objectives: 1) advance fundamental knowledge in the sciences and engineering related to radiological and nuclear threat detection and forensics needed to solve long-term, high-risk challenges; and 2) develop the next generation workforce in the nuclear sciences, engineering, and related fields. The ARI program focuses on high-risk long-term challenges generally requiring significant time (>5 years) before the technology under study can be ready for possible development into an operational capability. In addition, these basic research efforts are generally not linked to an end user. Shifting research from the ARI program will allow resources to be reallocated for efforts that can immediately improve radiological/nuclear detection capabilities for operational users.

Performance

The elimination of new ARI research projects is necessary, so CWMD can focus resources on priority initiatives. CWMD places a premium on projects that have already been initiated, and are more likely to provide near-term detection capability to operational partners, thereby helping to protect the United States from radiological/nuclear threats.

Program Change 2 – Decrease for Research and Development Program Exploratory Research**Description**

The FY 2019 President's Budget reduces funding for the Exploratory Research (ER) projects by \$2.0M. The program change will defer initiating new research projects until CWMD completes the assessment of ongoing activities to determine which FY 2018 activity would receive another increment of additional funding; and the availability of funding for any new starts.

Justification

ER projects explore innovative, high-risk technologies that address gaps in United States Radiological/Nuclear detection capabilities, provide improvements in performance or reduction in cost of R/N detection capabilities, and enhance nuclear forensics capabilities. This activity includes research ranging from high-risk long-term projects to applied efforts with a clear focus on supporting operational capabilities. The program's research efforts were reviewed and those efforts which were linked to an end user and showed the promise to provide a near-term enhancement of operational capability were retained. Research efforts identified as having an unclear link to an end user and/or were early, high-risk applied research projects were considered a lower priority, and thus less likely to receive funding.

Performance

The elimination of new ER projects is necessary, so CWMD can focus resources on priority initiatives. CWMD places a premium on projects that have already been initiated, and are more likely to provide near-term detection capability to operational partners, thereby helping to protect the United States from radiological/nuclear threats.

Research and Development Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
CWMD Research and Development	-	-	\$80,443	\$80,443
Total	-	-	\$80,443	\$80,443
Discretionary - Appropriation	-	-	\$80,443	\$80,443

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	-	-	\$173	\$173
25.1 Advisory and Assistance Services	-	-	\$12,119	\$12,119
25.3 Other Goods and Services from Federal Sources	-	-	\$14,536	\$14,536
25.5 Research and Development Contracts	-	-	\$44,642	\$44,642
41.0 Grants, Subsidies, and Contributions	-	-	\$8,973	\$8,973
Total - Non Pay Object Classes	-	-	\$80,443	\$80,443

CWMD Research and Development – PPA**Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
CWMD Research and Development	-	-	-	-	-	-	-	-	\$80,443	-	-	\$80,443
Total	-	-	-	-	-	-	-	-	\$80,443	-	-	\$80,443
Subtotal Discretionary - Appropriation	-	-	-	-	-	-	-	-	\$80,443	-	-	\$80,443

PPA Description

The FY 2019 President's Budget includes \$80.4M for the CWMD PPA in the R&D appropriation. This PPA identifies, explores, develops, and demonstrates science and technologies that address gaps in the detection architecture. The programs and activities also improve the performance of detection and forensics capabilities, and/or significantly reduce the operational burden of detection systems in the field.

CWMD works closely with supported operational customers to ensure the effective transition of technologies to the field. Technology transition activities includes efforts to transfer technologies to the industrial base for development and commercialization of capabilities to counter WMD threats. CWMD coordinates with the Science & Technology Directorate (S&T) to ensure that research and development projects are allocated consistent with CWMD operational requirements and priorities. Projects in this account mature radiological/nuclear technology for Technology Readiness Levels (TRL) 1-6, and all projects in the CWMD mission area with a TRL 6-7.

Program Descriptions

Research and Development: CWMD manages programs and activities to identify, explore, develop and demonstrate science and technologies that address gaps in the detection architecture. The program activities also improve the performance of detection and forensics capabilities, and/or significantly reduce the operational burden of detection systems in the field. CWMD works closely with supported operational customers to ensure the effective transition of technologies to the field. This program includes Technology Advancement projects, formerly part of the Technical Nuclear Forensics Program; as well as Small Business Innovation Research (SBIR) projects in CWMD.

Research and Development Program Projects

Projects	Level of Effort	General Description
Academic Research Initiative (ARI)	Ongoing	Two primary objectives: 1) advance fundamental knowledge in the sciences and engineering related to radiological and nuclear threat detection and forensics needed to solve long-term, high-risk challenges; and 2) develop the next generation workforce in the nuclear sciences, engineering, and related fields. Provide continued investment in fundamental science, engineering, and related fields to build capability at the university level. Provides continued investment in fundamental science, engineering, and related fields to build capability at the university level.
Exploratory Research	Ongoing	Explores innovative, high-risk technologies that address gaps in U.S. R/N detection capabilities, provide improvements in performance or reduction in cost of R/N detection capabilities, and enhance nuclear forensics capabilities.
Advanced Technology Demonstration TRL 4-5	Ongoing	Performs accelerated development, characterization, and demonstration of leading-edge technologies that address critical gaps in nuclear detection and forensics capabilities. Technology concepts are developed into prototype systems called Performance Test Units (PTU), which provide reliable and scalable performance measurements in a challenging and realistic simulated or controlled operational environment.
Small Business Innovative Research	Ongoing	Enables technological innovation by strengthening the role of small business concerns in federally funded R&D. The CWMD SBIR program is specifically focused on meeting Federal research and development needs for R/N detection.
Forensics Technology Advancement	Ongoing	Advances the science of forensics - the examination of materials recovered from R/N events of an illicit or hostile nature in order to determine their character and origin in the context of legal proceedings or national security. Advances the USG capability to rapidly, accurately, and credibly characterize and identify the nature, origin, and process history of nuclear materials seized before a detonation. These techniques allow experts to provide technical conclusions about seized materials based on known signatures, comparative samples of materials, and modeling of manufacturing processes. Advances forensics methodologies to provide results with well-understood uncertainties and develops signatures and data evaluation tools to support attribution assessments.

Acquisition: CWMD acquisition activities adhere to the Department's integrated lifecycle management approach to develop, acquire, procure, deploy and sustain nuclear, chemical, radiological and biological detection systems for supported operational customers that operate the systems in the field. The R&D appropriation ensures that the program resources are used to support capability development projects that are characterized as late stage TRL (6-7).

CWMD follows the DHS Acquisition Management Directive that prescribes the governance over major acquisitions. This directive defines requirements for programs to complete the phases of an acquisition plan and Acquisition Decision Events (ADE) to move the program to completion. The DHS Acquisition Management Directive is available at: https://www.dhs.gov/sites/default/files/publications/102-01_Acquisition_Management_Directive_Rev02.pdf

Acquisition Program Projects

Projects	Level of Effort	General Description
Wide-Area Search and Identification (WASID)	Ongoing	Combines the requirements of the Human Portable Radiation Detection System Helium-3 (^3He) Alternative Implementation Backpack Program (HAIBP) with the need for expanding backpack capability to include isotope identification. Will transition DHS away from ^3He -dependent systems. Will look to transition mature Wearable, Intelligent Nuclear Detection (WIND) technologies to a deployable capability.
International Rail (IRAIL)	Ongoing	Identifies and detects R/N material entering the United States via freight rail. Supports the CBP-led Integrated Rail Inspection System (IRIS) Program by leading the radiation detection equipment (RDE) sub-system procurement, and test and evaluation efforts. Includes the development of a capability that integrates different sensor types such as Non-Intrusive Inspection (NII) and radiation detection equipment (RDE) which can be applied to other pathways as well, and which will provide CBP officer efficiencies and support data analytics.
Maritime Non-Containerized Cargo (MNCC)	Ongoing	Provides efficient and effective scanning of the most diverse cargo types -- break bulk cargo (transported unpackaged in large quantities) and roll-on, roll-off (vehicles, bags, bundles, crates, loose materiel, and containerized liquid) -- for R/N material entering the United States at sea POEs.
Small Vessel Standoff Detection (SVSD)	Ongoing	Addresses the goal of developing and fielding for the USCG and CBP a greater capability to conduct boat-to-boat R/N detection. Will provide the USCG and CBP increased R/N detection capability, including increased stand-off distance, detection frequency, and integration with the vessel's structure and components.
SIGMA	Ongoing	A cost-effective, operationally practical, continuous and ubiquitous R/N detection capability. Includes low cost radiation detectors with spectroscopic gamma and neutron sensing capability, packaged as automated and networked threat detection and identification capability with web-based command and control.
Mobile and Relocatable Radiological and Nuclear Detection (MRRND)	Ongoing	Addresses the following objectives: (1) provide an enhanced capability using mobile systems/surge assets to detect and classify R/N threat sources and weapon components that may be smuggled into the U.S.; (2) Procure and deploy more agile, surge capable, relocatable and mobile R/N scanning assets; and (3) create flexible and dynamic detection capabilities that provide an agile, adaptable, and mobile architecture.
Radiation Portal Monitor Open Systems Architecture (ROSA)	Ongoing	The follow-on to Radiation Portal Monitor Replacement (RPM RP) program, that will explore an open systems architecture model as an option to recapitalize the remainder of the legacy RPM fleet beyond the approximately 200 units planned under RPM RP. This will be modular with a defined set of hardware and software interfaces that enable assembly of an RPM from a set of commercial-off-the-shelf (COTS) components.
Advance Technology Capabilities TRL 6-7	Ongoing	Performs accelerated development, characterization, and demonstration of leading-edge technologies that address critical gaps in detection capability in support of the CWMD Mission. Technology concepts are developed into prototype systems which provide reliable and scalable performance measurements to be tested in an operational environment.

Rapid Capabilities: CWMD executes rapid and/or sensitive acquisition development and procurement activities for nuclear, chemical, radiological and biological detection systems in response to emerging operational needs across the CWMD mission space. Rapid Capabilities initiatives implement FAR-based acquisition procedures, but at times, may utilize acquisition authorities available to DHS and CWMD to rapidly develop, procure and field capabilities that disrupt terrorist attempts to utilize weapons of mass destruction. The Rapid Capabilities program optimizes innovation, and utilizes an agile approach to acquire and deploy small numbers of the initial increment of capability to immediately address the emerging need. It then transitions the capability to a traditional program office for normalization, larger scale procurement, and capability advancement. Project requirements are informed by the need to address vulnerabilities or threats, and are not typically known until the year of execution.

Solution Development Process (SDP): CWMD maintains a business model that implements a rigorous statutory and regulatory compliant resource and program governance approach that enhances capability delivery, improves organizational functions, establishes internal controls, and increases accountability. The SDP integrates DHS policy and review processes with internal developmental activities, and facilitates the more rapid delivery of preventive CWMD solutions. Additionally, the SDP provides a comprehensive process for CWMD capability delivery from gap identification to post-deployment lifecycle management activities.

CWMD Research and Development – PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	-	-	\$80,443
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	-	-	\$80,443
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	-	-	\$80,443
Obligations (Actual/Projections/Estimates)	-	-	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

CWMD Research and Development – PPA

Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	-
FY 2018 President's Budget	-	-	-
FY 2019 Base Budget	-	-	-
Transfer to CWMD/R&D from DNDO/R&D/DCD for CWMD	-	-	\$15,155
Transfer to CWMD/R&D from DNDO/R&D/NF for CWMD	-	-	\$9,707
Transfer to CWMD/R&D from DNDO/R&D/TRD for CWMD	-	-	\$60,581
Total Transfers	-	-	\$85,443
Total Adjustments-to-Base	-	-	\$85,443
FY 2019 Current Services	-	-	\$85,443
Academic Research Initiative	-	-	(\$3,000)
Exploratory Research	-	-	(\$2,000)
Total, Program Decreases	-	-	(\$5,000)
FY 2019 Request	-	-	\$80,443
FY 2018 TO FY 2019 Change	-	-	\$80,443

CWMD Research and Development – PPA Non Pay Budget Exhibits

Non Pay Summary

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
CWMD Research and Development	-	-	\$80,443	\$80,443
Total	-	-	\$80,443	\$80,443
Discretionary - Appropriation	-	-	\$80,443	\$80,443

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	-	-	\$173	\$173
25.1 Advisory and Assistance Services	-	-	\$12,119	\$12,119
25.3 Other Goods and Services from Federal Sources	-	-	\$14,536	\$14,536
25.5 Research and Development Contracts	-	-	\$44,642	\$44,642
41.0 Grants, Subsidies, and Contributions	-	-	\$8,973	\$8,973
Total - Non Pay Object Classes	-	-	\$80,443	\$80,443

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Advisory and Assistance Services	-	-	\$12,119	\$12,119
Other Goods and Services from Federal Sources	-	-	\$14,536	\$14,536
Research and Development Contracts			\$44,642	\$44,642
Grants, Subsidies, and Contributions	-	-	\$8,973	\$8,973
Additional Non Pay Cost Drivers	-	-	\$173	\$173
Total – Non Pay Cost Drivers	-	-	\$80,443	\$80,443

NON PAY NARRATIVE:

- **Advisory and Assistance Services:** Contractor services in the amount of \$12.1M supporting development, and applied research activities.
- **Other Goods and Services from Federal Sources:** A total of \$14.5M towards Interagency Agreements (IAAs) with Department of Energy National Laboratories or other Federal research centers in support of developmental research activities.
- **Research and Development Contracts:** Contracts in the amount of \$44.6M supporting Advanced Technology Capabilities, Advanced Technology Demonstrations, Exploratory Research, Technology Advancement, and Small Business Innovation Research.
- **Grants, Subsidies, and Contributions:** A total of \$9.0M supporting basic research activities, including the Academic Research Initiative.
- **Additional Non Pay Cost Drivers:** Includes \$0.2K in travel and transportation of persons.

CWMD Research and Development – PPA Research and Development

Technology Readiness Level Exhibit

CWMD Research & Development PPA

CWMD Research and Development programs and activities work closely with supported operational customers to ensure the effective transition of technologies to the field. Technology transition activities include efforts to transfer technologies to the industrial base for development and commercialization of capabilities to counter WMD threats.

Advanced Technology Demonstrations (ATD)

Advanced Technology Demonstration (ATD) projects perform accelerated development, characterization, and demonstration of leading-edge technologies that address critical gaps in detection and forensics capabilities that have matured up to a Technology Readiness Level range of 5-6.

- **Problem:** Analyses and reviews conducted in conjunction with USG partner agencies on radiological and nuclear detection, and forensics capabilities, have resulted in the identification of five grand challenges:
 - Cost effective equipment with sufficient performance to ensure wide spread deployment;
 - Detection of special nuclear material (SNM; i.e. uranium or plutonium), especially when shielded;
 - Enhanced wide area search capabilities in a variety of scenarios, to include urban and highly cluttered environments;
 - Monitoring along challenging threat pathways; and
 - Forensics determination of the origin and history of interdicted materials.
- **Solution:** ATD projects perform accelerated development, characterization, and demonstration of leading-edge technologies that address critical gaps in nuclear detection capabilities. It builds on technology concepts previously demonstrated under ER projects, research conducted by CWMD's interagency partners, or privately funded research, further advancing the promising technologies into the next stage of development and system-level integration. Through the ATD activities, technology concepts are developed into prototype systems called Performance Test Units (PTU), which provide reliable and scalable performance measurements in a challenging and realistic simulated or controlled operational environment. Through this characterization process, sufficient understanding of the technology is obtained to recommend a technology transition path for the PTU to a government acquisition program, commercial system development, or additional basic and applied research.

New ATD projects are initiated approximately yearly based on: 1) prioritized gaps in U.S. R/N detection capabilities; and 2) technological successes from ER projects, the ARI, or other private or public research programs that support the prioritized gaps. Multiple research projects are being monitored for potential transition to an ATD. A brief description of the ongoing and planned ATD projects for each fiscal year are summarized below.

- **Impact:** Through these activities, technology is matured and integrated. Robust data sets are collected which define the performance envelope of the existing technology and are available to support requirements development efforts for future acquisition activities. The culminating Technology Demonstration and Characterization phase is important in that it defines the tangible technological benefits that can be achieved with real-world, integrated systems. Demonstration units are an essential tool in transitioning promising technologies because they are generally the first time operational end users get to interact with a new technology.

Sub-Projects

- *Airborne Radiological Enhanced-sensor System (ARES):* ARES technology is radiation search focused and is enabled by the fusion of radiation detection with other sensing modalities (e.g., multispectral imaging, GPS, altimetry, etc.). Utilizing scintillating materials, innovative packaging, and algorithm improvements, the ARES systems will offer greater detection sensitivity, lower nuisance alarms, and simultaneously provide a greater range of operation. The final report will be completed in FY 2018.
- *Nuclear and Radiological Imaging Platform (NRIP):* The NRIP sub-project leverages recent advancements in the commercial sector as well as prior TRD work. By combining the merits of passive and active technologies, new systems are being developed so that a single system is able to detect radiological and nuclear threats, regardless of the amount of shielding or the complexity of cargo, in primary mode with minimal impact to the flow of commerce. In addition to system performance characterization in a simulated operational environment, these systems will also undergo testing in a controlled, but realistic, operational environment. CWMD, in conjunction with U.S. Customs and Border Protection (CBP), characterized the Passport NRIP system at Conley Container Terminal in South Boston, FY 2017. The results of the characterization will enable CWMD and CBP to explore the possibility of conducting an extended operational demonstration of this technology through FY 2018. The project will conclude with a final report in FY 2019.
- *High-Throughput Integrated Rail Scanner (HIRS):* The planned HIRS sub-project will start with collaborations with CBP to assist in the development of requirements and evaluation of technologies for rail scanning (FY 2018). This work will then inform necessary hardware improvements for the next generation, as well as initial modeling and simulation (FY 2018-2019) which will drive HIRS design. Automated algorithms with material discrimination for detection of SNM in this scanning environment will also be developed and evaluated. It is anticipated that the results from this activity will be leveraged by CBP for rail scanning operations.
- *Forensics Associative Morphology Exercise (FAME):* The details of a nuclear material process history appear to have significant impact on the shape, size, and structure of bulk nuclear material; however, there has not been concerted and comprehensive scientific characterization of these potential signatures. The planned FAME sub-project will investigate and characterize the potentially highly-discriminating signatures of morphology and microstructure of bulk special nuclear material, using a significant cross-section of laboratory methods. Nuclear materials of traceable formation history shall be analyzed with both current and emerging laboratory methodologies to scientifically identify and constrain their ability to discriminate the process history or origin of an interdicted sample of nuclear material, as well as add to libraries of material characteristics for use in signature discovery. FAME will also compare to existing techniques and information databases, where appropriate, to help better assess the impact of morphology and microstructural information when compared to more established signatures.

FY 2019 Planned Key Milestone Events

- NRIP Sub-Project: Complete final report.
- HIRS Sub-Project: Conduct research and development in conjunction with CBP to further mature technology that enables effective and efficient rail screening. Down-select technology for integration into CBP rail solution.
- FAME Sub-Project: Release RFP, award contracts.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$23,672	\$27,254	\$25,324	\$22,410	\$11,065
Obligations	\$23,572	\$21,489	\$22,139	\$22,410	\$11,065

FY 2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system. FY 2015-2017 funding amounts were appropriated to DNDO prior to the transfer of its functions to CWMD.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
ARES		
Data Analysis	FY 2015	FY 2017
Final Report	FY 2017	FY 2018
NRIP		
Passport Characterization Readiness Review	FY 2016	FY 2017
Passport Technology Demonstration and Characterization	FY 2017	FY 2018
Passport Operational Demonstration	FY 2018	FY 2019
Passport Data Analysis	FY 2017	FY 2019
Passport Final Report	FY 2018	FY 2019
HIRS		
Release Solicitation	FY 2019	FY 2019
Award Contracts	FY 2019	FY 2019
FAME		
Release Solicitation	FY 2019	FY 2019
Award Contracts	FY 2019	FY 2019

Type of Research

Developmental

Technology Readiness Level

Advanced Technology Demonstration projects generally matures technology from TRL 5 to 7.

Transition Plans

ATD projects develop demonstration units that may result in several transition outcomes. They lead to the possibility of direct commercialization. They provide the basis for forming Technical Transition Agreements with CWMD for Federal acquisition. They also identify component technologies that require further maturation under the Exploratory Research project.

Exploratory Research (ER) projects explore innovative, high-risk technologies that address gaps in U.S. R/N detection capabilities, provide improvements in performance or reduction in cost of R/N detection capabilities, and enhance nuclear forensics capabilities.

- **Problem:** Recurring analyses conducted by CWMD and results from the joint interagency annual review of the National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States have highlighted a number of long-term technical grand challenges that provide a focus for research activities conducted under ER projects. Further, through across government consensus in framing the Nuclear Defense Research and Development Roadmap (NDRD), several important grand challenges were identified to help inform agencies that enable capabilities through research and development related to detection and nuclear forensics. These grand challenges include:
 - Cost effective equipment with sufficient performance to ensure wide spread deployment (Cost Effective);
 - Detection of special nuclear material (SNM; i.e. uranium or plutonium), especially when shielded (Shielding);
 - Enhanced wide area search capabilities in a variety of scenarios, to include urban and highly cluttered environments (Search);
 - Monitoring along challenging pathways in the architecture (Pathways); and
 - Forensics determination of the origin and history of interdicted materials (Forensics).
- **Solution:** ER projects explore innovative, high-risk, early to later-stage technologies. Specifically, ER projects research technologies and techniques that:
 - Address capability gaps and weaknesses in the framework of R/N detection capabilities;
 - Provide substantial performance improvement and/or cost reduction of R/N detection capabilities; and
 - Improve nuclear forensics capabilities.
- **Impact:** Capabilities developed under ER projects can provide enabling technologies in support of ATDs or directly spur commercial development.

Sub-Projects

- *Materials Research and Supporting Technologies (Materials):* The Materials sub-project has the technical objective of discovering new high performance and/or low cost gamma-ray and neutron sensing materials, significantly improving existing materials or lowering their costs, improving or developing new signal readout methods for these materials, and incorporating these materials into prototypes for test and evaluation. Advances in this project impact most if not all of the other portfolios and Grand Challenges. This project focuses on the core detection materials used in most radiation detectors: scintillators and semiconductors. The project addresses improvements in types of materials ranging from those appropriate for handhelds, backpacks, and personal radiation detectors with very good energy resolution capable of superior isotope and threat identification, to those used in large portal monitors which would benefit from better isotope capabilities and discrimination between threat and non-threat. Project also addresses stability issues in portal plastics, both in terms of understanding the root cause of the issues as well as finding low cost and robust solutions. Links to the Cost Effective grand challenge.

- *Radiation Detection Technology (Radiation)*: The Radiation Sub-Project emphasizes investigating novel approaches to greatly improve the ability to detect, identify, and locate threat materials based on their intrinsic radiological signatures. Research emphasis has been on improved gamma-ray detection approaches, particularly imaging, enabled by new electronics, sensor fusion, and advanced algorithms. Recent efforts are focused on development of technologies to make low operational burden R/N sensors available for a wide variety of law enforcement vehicles. The project is an activity supporting the ***Search*** grand challenge.
- *Shielded Special Nuclear Material (Shielding)*: The Shielding sub-project addresses the critical challenge of being able to detect SNM and other threats even when heavily shielded or masked. ER projects under this sub-project are focused on development of component technologies to include next generation x-ray and neutron radiation sources for homeland security applications, algorithms enabling improved imaging for radiography, and detector materials that can be integrated into large scale systems for screening cargo and conveyances for shielded threats. Also, this sub-project investigates alternative approaches to shielded threat detection that do not rely on the use of ionizing radiation. The project is an activity supporting the ***Shielding*** grand challenge.
- *Advanced Analytics (Analytics)*: The Analytics sub-project has two thrust areas: Algorithms are developed to improve the means and abilities to detect, locate, and identify threat materials. Modeling and simulation tools are developed to aid in the analyses of R/N detection capabilities as they are, and as they could be, which could be used in identification of capability gaps, risk analysis for system threat reviews, or cost-benefit analysis within CWMD's solutions development process. The project is an activity supporting the ***Cost Effective, Search, and Pathways*** grand challenges.
- *Nuclear Forensics (Forensics)*: The Forensics sub-project directly coordinates with technical forensics mission to execute research and development to discover new forensics signatures of R/N material and to also develop the tools enabling comprehensive and timely analytical results. R&D conducted under this sub-project looks to collect signature data to increase our ability to answer questions about the history of interdicted material, develop models to provide predictive associations of that data, and to exploit the validated signatures to answer specific material origin questions.

FY 2019 Planned Key Milestone Events

- Materials:
 - Complete performance modeling and comparison to COTS and develop detailed design for prototype radioisotope identification device (RIID) based on the newly developed, high efficiency, high energy resolution semiconductor gamma detector material thallium bromide.
- Radiation:
 - Complete Proof of Concept Demonstration for project exploring competing approaches for autonomous gain stabilization of gamma-ray spectra. These projects have the potential to enhance the efficacy and reduce down-time of gamma detectors in operational use.
- Shielding:
 - Complete performance modeling and small scale experimentation leading to an evaluation on feasibility for a prototype mobile active interrogation system using neutrons.
- Analytics:
 - Complete Proof of Concept for Nuclear Inspection Node Event Simulator (NINESIM), a modeling tool designed to aid cost-benefit

Countering Weapons of Mass Destruction**Research and Development**

analysis of different CONOPS and detection equipment with the potential to be deployed at radiation detection checkpoints.

- Forensics:
 - Complete a Proof-of-Concept demonstration for learning depth information in nuclear material. Collecting and analyzing this data leads to clues to the material's formation and transport history.
- New Starts:
 - Initiate new R&D activities under the ER project to address the challenging gaps in the GNDA and TNF.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$24,126	\$21,977	\$21,165	\$24,268	\$18,104
Obligations	\$23,847	\$21,331	\$19,884	\$24,268	\$18,104

FY 2015-2017 funding amounts were appropriated to DNDO prior to the transfer of its functions to CWMD.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2019		
Materials: Low Cost, High Performance RadioIsotope Identification Detector (RIID) based on Thallium Bromide Semiconductor	4th QTR FY18	4th QTR FY21
Materials: Scale Up to Full Portal Size of Advanced Spectroscopic Plastics Capable of Enhanced Threat/Non-Threat Discrimination	1st QTR FY18	2nd QTR FY21
Shielding: Next Generation Pulsed X-Ray Sources	4th QTR FY18	3rd QTR FY21
Shielding: High Performance, Compact, Continuous Wave X-ray Sources	4th QTR FY18	4th QTR FY21
Shielding: Mobile Active Interrogation Using Neutrons	4th QTR FY18	4th QTR FY21
Forensics: Predictive Morphological Modeling	1st QTR FY18	1st QTR FY20

Type of Research

Applied

Technology Readiness Level

Levels 2-5

Transition Plans

Successful ER technologies and concepts may transition to support subsequent ATD projects, future acquisitions, or directly spur commercial development. Under the Shielded sub-project, results from activities concluding in FY 2018 could be used to support future acquisitions for rail cargo scanning. Results from activities under the Forensics sub-project will transition to the Technical Nuclear Forensics community.

Academic Research Initiative (ARI)

Academic Research Initiative (ARI) project has two primary objectives: 1) advance fundamental knowledge in the sciences and engineering related to radiological and nuclear threat detection and forensics needed to solve long-term, high-risk challenges; and 2) develop the next generation workforce in the nuclear sciences, engineering, and related fields.

- **Problem:** The ARI addresses elements of the grand challenges (as first described on page 21, and shown again below) through breakthrough and fundamental research. Radiological and nuclear detection and nuclear forensics is multi-disciplinary. Areas traditionally associated with R/N expertise have aging subject matter experts and shrinking funding. Areas not traditionally associated with R/N expertise can provide new perspectives but are not necessarily aware of their potential impact. Analyses and reviews conducted by the USG partner agencies on radiological and nuclear detection and forensics capabilities have resulted in the identification of five grand challenges:
 - Cost effective equipment with sufficient performance to ensure wide spread deployment (Cost Effective);
 - Detection of special nuclear material (SNM; i.e. uranium or plutonium), especially when shielded (Shielding);
 - Enhanced wide area search capabilities in a variety of scenarios, to include urban and highly cluttered environments (Search);
 - Monitoring along challenging radiological & nuclear detection pathways (Pathways);and
 - Forensics determination of the origin and history of interdicted materials (Forensics);
- **Solution:** Provide continued investment in fundamental science, engineering, and related fields to build capability at the university level. Students supported by the project are provided funding to help them in their work toward undergraduate and graduate degrees. ARI projects also reaching out to non-traditional areas to solicit their ideas to solving R/N detection and forensics challenges.
- **Impact:** Since the ARI project was started in 2007, it has awarded over 100 grants to more than 55 academic institutions and sponsored over 160 students. These grants have resulted in over 580 journal publications which have increased the fundamental knowledge in areas such as nuclear engineering, physics, and chemistry, as well as other disciplines not traditionally associated with R/N detection like social sciences, deterrence theory, and applied mathematics.

ARI projects follow established academic practices of peer review and competitive research awards. These practices include conducting an annual program review that enables faculty and student researchers funded by these competitively awarded DHS grants to present their latest finding to both DHS program managers as well as their peers. Presentations follow accepted practices used at scientific conferences: professors, post-doctoral research associates, and students give scheduled talks in topic area sessions; students present posters at forums designed to foster face-to-face interactions with researchers.

Sub Project

- *Materials Science for Nuclear Detection (Materials)* – Research in this area focuses on high-risk, long-term research aimed at developing greatly improved radiation detector materials for gammas and neutrons that are highly sensitive, selective, low-cost, and rugged. This research aims to understand the fundamental properties of radiation sensing materials, such as mechanisms of light production in scintillator materials and charge mobility and lifetimes in semiconductor materials.
- *Analytical Techniques for Nuclear Detection (Analytics)* – This sub-project investigates innovative data processing and analysis techniques that will lead to major performance improvements through state-of-the-art computational methodologies. Current and prior research in this area has included fundamental algorithm development for real-time gamma-ray imaging and radionuclide identification and application of machine learning to facilitate mobile search/detection performance. The research also includes advances in simulation and modeling techniques to provide early understanding of the operational benefits of new threat detection approaches or background suppression.
- *Fundamentals of Nuclear Forensics (Forensics)* – This sub-project develops analytical techniques that can be used to determine the processing history and transit route of pre-detonation nuclear materials. Research emphasis includes identifying ways to improve analytical techniques and methodologies (e.g., speed, accuracy, and precision) for determining the physical, chemical, radiological, or morphological properties of nuclear or other radioactive materials.
- *Science and Engineering for Radiation Threat Sensing (Radiation)* – Research in this area explores radically new approaches to threat detection, eventually leading to sensor or detection system concepts that are highly sensitive to R/N signatures and selective in their ability to distinguish and locate these materials from naturally occurring background radiation. This includes research into new detection system concepts that provide new insights in how threat materials can be detected even in challenging pathways.
- *Science and Engineering of Shielded Threat Detection (Shielding)* – This research area includes investigations to overcome the challenge of detecting shielded SNM, with a focus on component technologies used in non-intrusive inspection or active interrogation approaches for cargo scanning, vehicle scanning, and human-portable scanning applications. Fundamental research in this area addresses a range of studies to augment conventional nonintrusive inspection approaches including: 1) transformational low-power, low-weight, high-yield neutron and gamma-ray producing sources; 2) high-efficiency, fast-recovery, low-cost detectors for active detection; 3) novel active interrogation inspection concepts; and 4) investigations into unique signatures and fundamental data associated with active detection methods such as nuclear resonance fluorescence.

FY 2019 Planned Key Milestone Events

- Release a NOFO announcement to solicit new proposals for research, and award approximately 12 new grants.
- Hold annual ARI Program Review for grantees to present their research to CWMD and interagency audiences.
- Fund research efforts at multiple universities to address long-term, high-risk challenges in R/N Detection and Forensics.
 - Complete feasibility evaluations on developing low cost scintillators and investigations in chalcogenide semiconductors.
 - Complete feasibility evaluations in radiological source tracking approaches in a dynamic background environment.
 - Complete a feasibility evaluation on a neutron detector based on tensioned fluids.
 - Complete a feasibility evaluation on an all-optical x-ray source to help enable monochromatic x-rays.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$10,612	\$11,496	\$11,018	\$11,964	\$8,573
Obligations	\$10,612	\$9,849	\$10,971	\$11,964	\$8,573

FY 2015-2017 funding amounts were appropriated to DNDO prior to the transfer of its functions to CWMD.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2019		
Physics Driven Scintillator Design	4th QTR FY13	4th QTR FY18
Scintillating Conjugated Polymers	4th QTR FY13	4th QTR FY18
GNDA Deterrence Theory	4th QTR FY13	4th QTR FY18
Structure Property Relationships of Metal Actinide Alloys	4th QTR FY13	4th QTR FY18
Low Dose Inspection with Monochromatic Gammas	4th QTR FY13	4th QTR FY18
Low Cost Glass Ceramic Scintillator Materials for Neutron and Gamma Ray Detection	4th QTR FY13	4th QTR FY18
Organic Field Effect Transistor SSPM	4th QTR FY13	4th QTR FY18
Notice of Funding Opportunity for up to 15 new grants	4th QTR FY18	4th QTR FY23

Type of Research

Basic

Technology Readiness Level

Level 1

Transition Plans

ARI funds grants that are low TRL (1-3). These grants often are investigating fundamental concepts and only start to develop applications for the technology. Research executed in ARI grants helps determine the feasibility of the technology to help the mission. Those concepts and technologies

that show feasibility can transition to Exploratory Research for further development, either from additional development in academia or the commercial sector.

Small Business Innovation Research (SBIR)

Small Business Innovation Research (SBIR) enables technological innovation by strengthening the role of small business concerns in Federally funded R&D. SBIR is specifically focused on meeting Federal research and development needs for R/N detection.

- **Problem:** The statutory purpose of the SBIR Program is to stimulate technological innovation by strengthening the role of innovative small business concerns in Federally-funded R&D.
- **Solution:** SBIR projects serve to identify, explore, develop, and demonstrate scientific and technological approaches that address gaps in the larger framework for R/N detection capabilities; significantly improve the performance of R/N detection and nuclear forensics methods, components, and systems; and/or significantly reduce the operational burden of these technologies. SBIR projects transition near-term solutions, supporting identified capability gaps, into commercial products or services.
- **Impact:** SBIR projects stimulates the technological innovation by strengthening the role of innovative small business concerns in Federally funded R&D. The goals include:
 - Stimulate technological innovation.
 - Meet Federal research and development needs.
 - Foster and encourage participation in innovation and entrepreneurship by socially and economically disadvantaged persons.
 - Increase private-sector commercialization of innovations derived from Federal research and development funding.

SBIR initiatives, Phase I efforts are six months long and result in a feasibility evaluation. Phase II efforts are two years long and result in a Proof of Concept Demonstration. The final phase, Phase III, transitions the new technology to a commercial product. SBIR funding covers Phase I and II. Funding for Phase III of a company's project comes from other sources.

Sub-Projects

- *Embedding of Advanced Search Technique for Detect, Locate, and Track for Pedestrian-based Search:* Advancement of search techniques to improve the ability to localize and track a radiation source anomaly.
- *Miniaturization of Support Infrastructure for Non-Intrusive Inspection X-Ray Systems:* Aims to shrink the footprint for support infrastructure necessary to run high energy x-ray sources.
- *Stable Semiconductor Modules as Core Components in Pager Radiation Detectors:* Developing two promising Thallium-based semiconductor radiation detectors with high energy resolution. These detectors should cost much less than high-resolution detectors in current use.
- *Mass/Shielding Anomaly Passive Detector Module:* Develop an innovative system to detect anomalous dense masses in conveyances without

the use of irradiation technologies.

- *Smartphone/Smart device Toolkit for Virtual and Actual Radiation Detection, Identification, and Localization:* Development and demonstration of a user-friendly and straightforward smartphone/smart device toolkit for radiation detection, identification, and localization based on the presence of a simulated or virtual radiological source.
- *Plastic Composite Based Scintillators for Multi-Signature Radiation Detectors:* Demonstration of a detector technology that combines gamma and neutron sensitivity with good efficiency at a reduced cost compared to the current commercial-off-the-shelf (COTS) scintillators.
- *Portable Linear Accelerator (Linac) for Active Interrogation Systems for Radiological Gamma Isotope Source Replacement:* Development and commercialization of a portable accelerator for detection of shielded SNM and replacement of radiological gamma isotope sources currently used for commercial non-medical applications.
- *Unattended Radiation Detection Systems:* Aims to develop a system capable of radiation detection and analysis, capturing relevant contextual information (e.g., video or pictures) from the surrounding environment, and transmitting the all relevant information, but have low-energy requirements to facilitate long periods of operation without direct operator interface.
- *New Starts:* This sub-project is for initiation of new SBIR contracts through solicitation activities.

FY 2019 Planned Key Milestone Events

- *Plastic Composite Based Scintillators for Multi-Signature Radiation Detectors:*
 - Complete SBIR Phase II contract for further development of very low cost composite plastic scintillator materials capable of combined gamma, thermal neutron, and fast neutron detection for handheld and backpack applications.
- *Smartphone/Smart device Toolkit for Virtual and Actual Radiation Detection, Identification, and Localization:*
 - Complete SBIR Phase II contract for further development of smart device toolkits that enable operator R/N training without a radiation source physically present. These training toolkits provide a capability to conduct R/N training at a much lower cost than training requiring the use of radiation sources.
- *Portable Linear Accelerator (Linac) for Active Interrogation Systems for Radiological Gamma Isotope Source Replacement:*
 - Complete SBIR Phase II contract for further development of a compact x-ray radiation source that can be used for isotope source replacement and mobile radiography applications. This source could be a longer term and lower cost solution for medical isotopes while also reducing potential radiological dispersal devices threats. It could also be used for radiography in human portable applications such as on-board ships.
- *Miniaturization of Support Infrastructure for Non-Intrusive Inspection X-Ray Systems:*
 - Complete SBIR Phase III contract for further development of a continuous wave x-ray system with smaller footprint to support potential transition of the system to the commercial market. The availability of such a source will enable high-throughput scanning of cargo and conveyances for active interrogation applications used for shielded threat detection.
- *New Starts:*
 - Initiate up to six new SBIR Phase I contracts under the DHS SBIR solicitation released in FY2018.
 - Initiate up to one new SBIR Phase III contract.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$2,046	\$3,957	\$4,522	\$1,939	\$1,739
Obligations	\$2,045	\$3,957	\$4,723	\$1,939	\$1,739

FY 2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system. Actual amount of R&D set-aside for small business is determined in the year of execution after assessing the appropriations, and comparison of responses to DNDO's annual announcement for proposals to DNDO mission requirements. FY 2015-2017 funding amounts were appropriated to DNDO prior to the transfer of its functions to CWMD.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2019		
Phase II: Plastic Composite Based Scintillators for Multi-Signature Radiation Detectors	4th QTR FY17	4th QTR FY19
Phase II: Smartphone/Smart device Toolkit for Virtual and Actual Radiation Detection, Identification, and Localization	4th QTR FY17	4th QTR FY19
Phase II: Portable Linear Accelerator (Linac) for Active Interrogation Systems for Radiological Gamma Isotope Source Replacement	4th QTR FY17	4th QTR FY19
Phase III: Miniaturization of Support Infrastructure for Non-Intrusive Inspection X-Ray Systems	4th QTR FY17	2nd QTR FY19
Phase I New Start: Phase I contracts resulting from FY 2018 DHS SBIR Solicitation	3rd QTR FY18	1st QTR FY19
Phase II New Start: Phase II contracts resulting from the Phase I contracts awarded under the Unattended Radiation Detection Systems initiated in FY 2017 DHS SBIR Solicitation	3rd QTR FY18	3rd QTR FY20
Phase III New Start: Phase III contract To Be Determined	4 th QTR FY18	2nd QTR FY20

Type of Research

Developmental

Technology Readiness Level

Levels 4-7

Transition Plans

The primary objective of SBIR initiatives, at the whole-of-government level, is for new innovative products to reach the consumer market towards one or more identified end users (i.e. commercialization"). CWMD SBIR initiatives also seeks projects which can meet R&D needs identified by end-users and analysts, as well as the development of components which can be integrated into larger projects like ATDs. Aspects of the technologies developed under SBIR will support and can further augment technologies of the Exploratory Research and Advanced Technology Demonstration projects.

Detection Capability Development Projects:

Detection Capability Development projects incorporate the user requirements of DHS's operational Components into R/N detection systems. It achieves this by coordinating its integrated lifecycle management and systems engineering lifecycle activities with the end-user community and managing the task execution of CWMD SDP.

Recognizing that innovation can originate in a variety of sectors, CWMD has adopted a "commercial first" approach that gives preference for solutions available in the private sector marketplace. Using this approach, CWMD can leverage industry-led innovations and developments, resorting to a Federally-sponsored and managed development and acquisition process when no commercial solution is feasible or private industry chooses not to commercialize a product.

Sub-Projects

- *Wide-Area Search and Identification (WASID)*: WASID is an activity that combines the requirements of the Helium-3 (^3He) Alternative Implementation Backpack Project (HAIBP) with the need for expanding backpack capability to include isotope identification. ^3He is integral to neutron detection, and the national shortage of ^3He requires CWMD to procure an alternative wearable solution for R/N detection. WASID will transition DHS away from ^3He -dependent systems. It will look to transition mature Wearable, Intelligent Nuclear Detection (WIND) technologies to a deployable capability. The WASID activity objective is to field a wearable R/N detector system with expansion capability to perform identification to meet the wide-area search mission.
- *International Rail (IRAIL)*: IRAIL is an activity to identify and detect R/N material entering the United States via freight rail. IRAIL supports the CBP-led Integrated Rail Inspection System (IRIS) Program by leading the radiation detection equipment (RDE) sub-system procurement and test and evaluation efforts. Currently, limited R/N scanning of freight rail cargo exists at rail crossings at U.S. international POEs. Existing NII technology to address these threats is approaching the end of its useful service life; the addition of passive radiation detection equipment will improve R/N threat detection.
- *Maritime Non-Containerized Cargo (MNCC)*: MNCC is an activity with the objective to provide efficient and effective scanning of the most diverse cargo types - break bulk cargo (transported unpackaged in large quantities) and roll-on, roll-off (vehicles, bags, bundles, crates, loose materiel, and containerized liquid) – for R/N material entering the United States at sea POEs. When break bulk cargo is off loaded from ships, CBP Officers scan it for R/N material, often using hand held devices. This capability is not suitable for the high volume of cargo being offloaded at U.S. ports and has been identified as an area for risk reduction. MNCC will conduct analysis to identify materiel, non-materiel, or combined solutions that will reduce the risk of R/N material being offloaded at U.S. ports, and inside break bulk cargo not being detected.
- *Small Vessel Standoff Detection (SVSD)*: SVSD is an activity with the goal of developing and fielding for the USCG and CBP a greater capability to conduct boat-to-boat R/N detection. The activity is also referred to as SVSD Increment 2. For SVSD Increment 1, a radiation detection backpack-based solution, the USCG and CBP vessel's R/N detection stand-off distance and detection frequency is limited. Furthermore, SVSD increment 1 is not integrated with the vessel structure. This physically limits USCG and CBP personnel conducting R/N scanning during routine operations, especially during high seas, inclement weather, and when operating in a hostile environment. SVSD Increment 2 will provide the USCG and CBP increased R/N detection capability, including increased stand-off distance, detection frequency, and integration with the vessel's structure and components.

- *Mobile and Relocatable Radiological and Nuclear Detection (MRRND)*: MRRND is an activity with the following objectives: (1) provide an enhanced capability using mobile systems/surge assets to detect and classify R/N threat sources and weapon components that may be smuggled into the U.S.; (2) procure and deploy more agile, surge capable, relocatable and mobile R/N scanning assets; and (3) create flexible and dynamic detection capabilities that provide an agile, adaptable, and mobile architecture.
- *Radiation Portal Monitor Open Systems Architecture (ROSA)*: ROSA is an activity, which is the follow on to Radiation Portal Monitor Replacement (RPM RP) activity, will explore an open systems architecture model as an option to recapitalize the remainder of the legacy RPM fleet beyond the approximately 200 units planned under RPM RP. ROSA will be modular with a defined a set of hardware and software interfaces that enable assembly of an RPM from a set of commercial-off-the-shelf (COTS) components. An open systems approach will allow for more agile technology insertion and reduced sustainment costs.
- *SIGMA Transition*: The sub-project is a multi-pronged approach to the wide area monitoring and search problem for radiological and nuclear threats. The technology was transitioned to CWMD from the Defense Advanced Research Project Agency (DARPA). Funding supports continued development of a second generation of low cost detectors, algorithms enabling detection and isotope identification in offline mode, algorithms facilitating spatial-temporal tracking of a radiation sources when there are multiple detector encounters, and hardening of the network communications backbone.
- *Advanced Technology Capabilities (ATC)*: Advanced Technology Capabilities (ATC) perform accelerated development, characterization, and demonstration of leading-edge technologies that address critical gaps in detection and forensics capabilities that have matured up to a Technology Readiness Level range above 6. Technologies include;
 - *Radiation Awareness and Interdiction Network (RAIN)*: The RAIN sub-project is intended to develop and characterize technologies for monitoring highway traffic and their on-ramps for vehicles carrying nuclear or other radioactive threat materials. RAIN technologies have integrated networked radiation sensors with vehicle detection and identification systems to allow actionable information on threat-carrying vehicles to be passed to law enforcement. Two technical approaches are continuing to be developed, to include a solution compatible with electronic tolling systems, and a side-of-the-road technology intended for rapid deployment. High interest in the capability has been expressed by the New York Police Department (NYPD), and initial interest by DHS components such as the CBP's Border Patrol. Analysis of early data collection coordinated with NYPD helped generate the required performance and suitability requirements for the RAIN systems. Government characterization of the prototype systems was completed in FY 2017. Planning is now underway for an operational demonstration of the technology with Nassau County of New York in FY 2018.
 - *Enhanced Radiological Nuclear Inspection and Evaluation (ERNIE)*: The ERNIE system is an advanced machine learning (ML) based approach to analyze radiation portal monitor (RPM) scans for greater overall system performance (improved threat detection with reduced nuisance alarm rates). Key features are extracted from RPM scan data in real-time and supplied to ML algorithms to make a determination of the mostly likely class of the cargo: non-emitting, naturally occurring radioactive material, medical, industrial or special nuclear materials. This provides CBP Officers improved information on whether a conveyance should be released or inspected, and if inspected, information to enable the inspection process. A formal operational assessment was completed of ERNIE performance in FY 2016, resulting in a joint decision by CWMD and CBP to deploy the capability in 2018.
 - *Wearable Intelligent Nuclear Detection (WIND) Project*: The ability to interdict a moving threat or localize an emplaced threat during wide area search missions is a major technical challenge. The WIND sub-project will develop and characterize a highly-modular, multi-purpose, and human-portable (e.g., backpack or vest) system that greatly advances the ability to detect and interdict threats

during wide area search missions.

- Mobile Urban Radiation Search (MURS): The goal of the MURS sub-project is to efficiently migrate the knowledge and technology of previous stand-off and long range detection projects into a production-ready, compact, next-generation mobile radiation detection platform. The MURS systems leverages state-of-the-art radiation detection, identification, and localization, fused with contextual sensing such as video, LIDAR, and high resolution GPS.

FY 2019 Planned Key Milestone Events

- WASID: Conduct Operational Assessment.
- ROSA: Develop programmatic approach and artifacts required for program governance.
- IIRAIL: Conduct development activities involving the selection and initial characterization testing of RDE solutions.
- MNCC: Develop programmatic approach and artifacts required for program governance.
- SVSD: Conduct limited pilot and performance testing.
- MRRND: Initiate an AoA.
- SIGMA: Complete an Operational Assessment.
- RAIN: Complete operational demonstration and final report.
- ERNIE: In coordination with CBP, continue deployment of capability to the Radiation Portal Monitor fleet.
- WIND: Perform Characterization Readiness Review in preparation for Technical Demonstration and Characterization.
- MURS: Complete initial pilot and transition eight pre-production MURS units to operators use in the field. Update eight MURS units with real-time 3D reconstruction capability.

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$21,400	\$21,029	\$24,964	\$20,321	\$31,255
Obligations	21,400	\$20,538	\$18,835	\$20,321	\$31,255

FY 2015-2017 funding amounts were appropriated to DNDO prior to the transfer of its functions to CWMD.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2019		
Radiation Portal Monitor Replacement Program (RPM RP) / ROSA	Ongoing	Ongoing
Wide Area Search Identification (WASID)	Ongoing	Ongoing
International Rail (IRAIL)	Ongoing	Ongoing
Maritime Non-Containerized Cargo (MNCC)	Ongoing	Ongoing

Countering Weapons of Mass Destruction

Research and Development

Research & Development Description	Planned Start Date	Planned Completion
Enhanced Radiological Nuclear Inspection and Evaluation (ERNIE)	Ongoing	Ongoing
Small Vessel Standoff Detection (SVSD) Program	Ongoing	Ongoing
SIGMA Transition	Ongoing	Ongoing
Wearable Intelligent Nuclear Detection (WIND)	Ongoing	Ongoing
Mobile Urban Radiation Search (MURS)	Ongoing	Ongoing

Type of Research

Developmental

Technology Readiness Level

5-7

Transition Plans

The detection capabilities will be transitioned to DHS operational component(s) (CBP, USCG, TSA, etc.) after test and evaluation to ensure they meet operational requirements, and after an operational readiness review is conducted with the DHS operational component(s) deploying the capability. Post-implementation review activities are conducted after the initial deployed units have been in operational use for 12-to-18 months to provide the necessary information to determine the degree to which a materiel investment operating in its intended environment has met the needed capability. Throughout the life of the capability, CWMD works collaboratively with the DHS operational components to manage the equipment configuration to ensure it continues to meet its operational requirements; as well as collect and analyze operational performance and maintenance data to maximize performance per maintenance dollar, and inform future procurement requirements.

Technology Advancement Projects

Technology Advancement projects lead activities that advance the USG capability to rapidly, accurately, and credibly characterize and identify the nature, origin, and history of nuclear materials interdicted before a detonation. These techniques allow experts to reach technical conclusions about interdicted material based on known signatures, comparative samples of materials, and modeling of manufacturing processes to support attribution assessments for decision makers. Technology Advancement projects benchmark and advances forensics methodologies to provide results with well-understood uncertainties and develops signatures and data evaluation tools to support attribution assessments. In addressing the pre-detonation materials forensics capability development mission, Technology Advancement projects provide advanced operational capability to the Bulk Special Nuclear Material Analysis Program (BSAP). BSAP is an interagency program coordinated by the National Nuclear Security Administration Office of Nuclear Forensics (Department of Energy (DOE)). It is the program that operates the nuclear forensics analytical capability for interdicted nuclear materials. The FBI, Department of Energy (DOE) Office of Intelligence and Counterintelligence, and DHS are participants in the program. The methods and signatures are provided to operators in the FBI, Department of Defense (DoD), DOE, and intelligence community.

- **Problem:** There is a need to assess, identify, develop, demonstrate, and operationalize scientific and technological approaches that address gaps in the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States FY 2015 – 2019*, and to continuously improve the speed, quality, and confidence of pre-detonation bulk material nuclear forensics methodologies.
- **Solution:** Technology Advancement projects explore innovative, low-risk, later-stage technologies and methodologies. Specifically, the projects develop technologies and methodologies that:
 - Address capability gaps and weaknesses found in the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States FY 2015 - 2019*;
 - Assess current forensics laboratory performance, identifies improvement areas, develops methodologies, and fields solutions to enhance operational nuclear forensics capabilities; and
 - Develop pre-detonation material nuclear forensics signatures to determine material and statistical population characteristics that can uniquely identify linkages with known or predicted material characteristics.
- **Impact:** Capabilities developed under the Technology Advancement projects continuously improve the USG pre-detonation materials and the nuclear forensics operational capability to increase speed, confidence and accuracy of results. In addition, Technology Advancement efforts support development of the next generation of nuclear forensic scientific expertise.

Projects

- *Reference Material Development:* Reference materials serve as the “gold standard” for assessing forensic analysis methods. The Reference Material Development Project prepares certified reference materials and other well-characterized materials to support the Methodology Benchmarking Project, exercises, and operational quality assurance activities. Specific activities include but are not limited to, validating measurement methods and operational laboratory proficiency testing performed through the interagency Bulk Special Nuclear Materials Analysis Program. The National Technical Nuclear Forensics Center (NTNFC) has prioritized the community needs for certified reference materials for nuclear forensics, and the plan extends for the next 20 years due to the limited capacity of the specialized laboratories and personnel.
- *Plutonium Processing Signatures:* The Plutonium Processing Signatures Project is operating a capability to simulate industrial production-scale plutonium materials processing on a much smaller, laboratory scale. The produced materials are analyzed to reveal and confirm discriminating signatures and are also used for creating well-characterized reference materials for methodology validation and signature development. This effort is specifically useful to simulate production processes from which the USG does not have representative samples, but since the processing steps are known, such production materials can be replicated.
- *Uranium Processing Signatures:* The Uranium Processing Signatures Project continues to operate and improve a capability to simulate industrial production-scale uranium materials processing on a much smaller, laboratory scale. The materials are analyzed to reveal and confirm discriminating signatures and are also used for creating well-characterized reference materials for methodology validation and signature development. This effort is specifically useful to simulate production processes from which the USG does not have representative samples, but since the processing steps are known, such production materials can be replicated.
- *Material Characterization:* The Material Characterization Project allows for operational use of validated analytical methods to inform and

support signature development and to provide information to the Nuclear Materials Information Program. As new signatures are developed, materials are characterized to support development and validation of those signatures. This is a continuing effort, coordinated with DOE and the New Methodology Development, New Signature Development, and Data Evaluation Tools Projects.

- *Methodology Benchmarking:* The Methodology Benchmarking Project evaluates and benchmarks laboratory capabilities to perform specific analytical methods. This project identifies (1) the most accurate, precise, and timely methods available and appropriate for operational use, and (2) gaps for which improved methods are needed and that will be developed under the New Methodology Development Project. Improved methods are then transitioned to the operational laboratories through a technology transfer workshop.
- *Data Evaluation Tools:* The Data Evaluation Tools Project develops and demonstrates the next generation of tools for data pattern analysis and methods to assess whether or not measurements from samples can be linked and included or excluded from specific families of signatures.
- *New Methodology Development:* The New Methodology Development Project advances the accuracy, precision, and timeliness of measurement techniques. This project focuses on activities at TRLs 5-7.
- *New Signature Development:* The New Signature Development Project determines material and statistical population characteristics that can uniquely identify linkages with known or predicted material characteristics. This project focuses on activities at TRLs 5-7.

FY 2019 Planned Key Milestone Events

- Produce two certified reference materials for forensic method improvement and quality assurance purposes.
- Fully characterize four nuclear forensic relevant samples to assist in populating the U.S. National Nuclear Forensics Library and to maintain a sharp operational nuclear forensics workforce.
- Operate the laboratory-scale uranium and plutonium processing capabilities to produce uranium and plutonium materials for signature development.
- Complete transition to operational use an improved methodology for characterization of trace elements in plutonium.
- Complete benchmarking study for improving measurements of trace elements in uranium.
- Commence benchmarking study for improving measurements of trace elements in plutonium.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$9,968	\$9,851	\$9,883	\$9,152	\$9,707
Obligations	\$9,934	\$9,673	\$9,397	\$9,152	\$9,707

FY 2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system. FY 2015-2017 funding amounts were appropriated to DNDO prior to the transfer of its functions to CWMD.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2019		
New/Improved Methodology Development	1st QTR	Ongoing
Nuclear Forensic Certified Reference Material Production	1st QTR	Ongoing
Radiological & Nuclear Material Characterizations	1st QTR	Ongoing
Methodology Benchmarking Study	1st QTR	Ongoing
Stable & Radioisotope Mass Separators	1st QTR	Ongoing
Radiological Sealed Source Library	1st QTR	Ongoing
Plutonium and Uranium Signature Development	1st QTR	Ongoing
Data Evaluation Tools	1st QTR	Ongoing

Type of Research

- Developmental: Reference Material Development, Material Characterization, Methodology Benchmarking, Plutonium Processing Signatures, Uranium Processing Signatures
- Applied: New Signature Development, New Methodology Development, Data Evaluation Tools

Technology Readiness Level

Levels 5-7

Transition Plans

Successful Technology Advancement methodologies and concepts transition to operational customers through the Bulk Special Nuclear Material (SNM) Analysis Program.

Department of Homeland Security

Countering Weapons of Mass Destruction

Federal Assistance



Fiscal Year 2019
Congressional Justification

Table of Contents

Federal Assistance1

 Budget Comparison and Adjustments..... 3

 Non Pay Budget Exhibits..... 7

Capability Building - PPA 8

 Budget Comparison and Adjustments..... 8

 Non Pay Budget Exhibits..... 15

Federal Assistance

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Capability Building	-	-	-	-	-	-	-	-	\$64,663	-	-	\$64,663
Total	-	-	-	-	-	-	-	-	\$64,663	-	-	\$64,663
Subtotal Discretionary - Appropriation	-	-	-	-	-	-	-	-	\$64,663	-	-	\$64,663

The Department's Countering Weapons of Mass Destruction Office (CWMD) exists to protect the American people and the homeland from the dangers posed by hostile state and non-state actors who would acquire and use nuclear, chemical, radiological or biological materials in the form of weapons of mass destruction (WMD) to harm Americans or U.S. interests. CWMD does this through its prevention, detection, and forensics mission activities. This mission aligns with Pillar I of the President's National Security Strategy: Protect the American People, the Homeland, and the American Way of Life; Secure U.S. Borders and Territory; Defend Against Weapons of Mass Destruction

CWMD supports DHS and partners' frontline operations, and addresses critical vulnerabilities in preventing, protecting against, responding to, and mitigating nuclear, chemical, radiological, and biological threats and incidents. CWMD intends to align programs and activities designed to identify, develop, evaluate and deliver solutions that detect and prevent the use of WMD threats against American citizens and U.S. interests. CWMD Federal Assistance (FA) aligns operational programs and activities across the WMD threat space and allows for consistent and persistent engagement with Federal, State, local, tribal, and territorial (FSLTT), international partners and DHS components.

Federal Assistance Budget Authority and Obligations

Budget Authority <i>(Dollars in Thousands)</i>	FY 2017	FY 2018	FY 2019
Enacted/Request	-	-	\$64,663
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	-	-	\$64,663
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	-	-	\$64,663
Obligations (Actual/Projections/Estimates)	-	-	\$64,663
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Federal Assistance Summary of Budget Changes

Budget Formulation Activity (Dollars in Thousands)	Positions	FTE	Amount
FY 2017 Enacted	-	-	-
FY 2018 President's Budget	-	-	-
FY 2019 Base Budget	-	-	-
Transfer to CWMD/FA from DNDO/FA/FSLTTS for CWMD	-	-	\$23,384
Transfer to CWMD/FA from DNDO/FA/STC for CWMD	-	-	\$21,135
Transfer to CWMD/FA from OHA/O&S/CBR for CWMD	-	-	\$25,553
Total Transfers	-	-	\$70,072
Total Adjustments-to-Base	-	-	\$70,072
FY 2019 Current Services	-	-	\$70,072
JAC & JACCIS Reduction	-	-	(\$5,409)
Total, Program Decreases	-	-	(\$5,409)
FY 2019 Request	-	-	\$64,663
FY 2018 TO FY 2019 Change	-	-	\$64,663

Federal Assistance Justification of Program Changes

Program Changes (Dollars in Thousands)	FY 2019 President's Budget		
	Positions	FTE	Amount
Program Change 1 - JAC & JACCIS Reduction	-	-	(\$5,409)
Capability Building	-	-	(\$5,409)
Total Program Changes	-	-	(\$5,409)

Program Change 1 – Decrease for Joint Analysis Center (JAC) & Joint Analysis Center Collaborative Information System (JACCIS) Solution

Description

The budget request provides for a reduction of \$5.4M to the former JAC and JACCIS programs.

Justification

The formation of CWMD has allowed for the integration of multiple DHS programs and services. This integration has increased the nation-wide monitoring of nuclear, chemical, radiological, and biological threats and brings together similar functions from the Office of Health Affairs and the Domestic Nuclear Detection Office. The JAC will utilize space at the National Targeting Center and the National Operations Center (NOC) to track radiological/nuclear incidents and events. These efficiencies result in lower funding requirements to accomplish WMD detection, situational awareness, and coordination. Integration of JACCIS functions within other DHS data systems will eliminate “stove piped” approaches to data sharing and increase unity of effort with DHS front-line components and with the FSLTT agencies that CWMD supports.

Performance

This efficiency will result in no degradation of CWMD’s situational awareness and coordination functions. With the leveraging of similar capabilities from the Office of Health Affairs, the resulting CWMD Operations Coordination function will streamline DHS efforts to prevent terrorists and other national security threat actors from using chemical, biological, radiological, and nuclear agents to harm Americans and U.S. interests. This integration and unity of effort will provide better support to DHS front-line components, which are responsible for keeping such dangerous agents from entering the United States. All remaining requirements met by the JACCIS will be closed out in FY 2018.

Federal Assistance Non Pay Budget Exhibits

Non Pay Summary

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Capability Building	-	-	\$64,663	\$64,663
Total	-	-	\$64,663	\$64,663
Discretionary - Appropriation	-	-	\$64,663	\$64,663

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	-	-	\$260	\$260
25.1 Advisory and Assistance Services	-	-	\$8,660	\$8,660
25.2 Other Services from Non-Federal Sources	-	-	\$596	\$596
25.3 Other Goods and Services from Federal Sources	-	-	\$12,044	\$12,044
41.0 Grants, Subsidies, and Contributions	-	-	\$43,103	\$43,103
Total - Non Pay Object Classes	-	-	\$64,663	\$64,663

*Capability Building - PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Capability Building	-	-	-	-	-	-	-	-	\$64,663	-	-	\$64,663
Total	-	-	-	-	-	-	-	-	\$64,663	-	-	\$64,663
Subtotal Discretionary - Appropriation	-	-	-	-	-	-	-	-	\$64,663	-	-	\$64,663

PPA Description

The Capability Building PPA funds programs and activities that provide chemical, biological, radiological, nuclear, and medical support, as well as funding readiness activities, in support of FSLTT and international partners and DHS operating components. CWMD pursues this by establishing, maintaining, and supporting programs and activities to defend against WMD, and combat bio-threats and pandemics.

Program Description & Overview

Readiness: Readiness programs and activities includes \$9.1M to provide training and confidence building for FSLTT and DHS component personnel to support preparedness for chemical, biological, radiological, and nuclear events. CWMD serves to develop policy, plans, and exercises related to biological and chemical defense, infectious diseases, and health security to support the DHS mission. Readiness activities include FSLTT assistance, exercises, and training.

Readiness Program - Training Projects

The training project supports FSLTT stakeholders in developing or enhancing their training capabilities. The project evaluates stakeholder capability and provides data used to assess operational effectiveness. It is responsible for the development, oversight, and administration of the design, delivery, evaluation, and continual improvement of training capabilities of operational components, and other stakeholders to counter WMD threats. The primary objective is to improve operational capabilities at the FSLTT levels through the development of training curricula. The project plans to develop and/or improve curricula in safety, equipment operations, and tactical deployment; maritime and aerial detection; spectroscopy analysis; and special event planning. The training project plans to develop and/or improve training standards and qualifications working with the American National Standards Institute (ANSI) committees in developing uniform training qualification

standards. In addition, the project plans to both develop and deliver training in concert with partner training providers, in order to reach as many stakeholders as possible.

Readiness Program - Exercises

The Exercise Projects seek to validate and enhance capabilities and systems essential to counter threats of terrorism from the use of weapons of mass destruction. This is accomplished by providing a range of support service expertise to FSLTT partners and stakeholders. The Exercise Program regularly updates mission-specific exercise materials, to include a variety of templates, tools, and planning guidance for direct use by CWMD exercise planners and stakeholders and partners. These proven exercise practices are all in accordance with the Homeland Security Exercise and Evaluation Program (HSEEP) methodology and are also applicable for exercise requirements not associated with the HSEEP methodology.

The level of direct support provided for the planning, design, execution, and evaluation of exercises is dependent upon the stakeholders' level of knowledge and experience in conducting the WMD detection mission, as well as the availability of resources to the requesting stakeholder. The majority of support requests received by the Exercise Program are to lead the planning, design, conduct, and evaluation of the exercise. The Exercise Program does, however, frequently support limited requests, such as providing licensed radioactive sources or subject-matter experts for exercise evaluation of specific WMD detection capabilities.

Biological Support: Biological Support programs includes \$25.6M to primarily support CWMD's efforts to safeguard against biological threats. These activities are designed to provide early warning and characterization of a biological events of national significance, and provide local jurisdictions and fielded DHS component personnel with support and guidance needed to effectively address biologic threats. The FA appropriation provides resources that support field operations for the bio-detection solution.

Biological Support Program – Bio-Detection Field Operations

CWMD's bio-detection capability informs FSLTT decision-making about high consequence biological. The program supports the national bio-detection system, coordinates DHS biological defense activities, and supports preparedness for biological and chemical events to help communities build capabilities to prepare, respond, and recover. Field Operations provides subject matter expertise, biological detection capability, and situational awareness to operational SLTT officials and stakeholders.

The program uses cooperative agreements with state and local jurisdictions to operate and maintain bio-detection capabilities to include personnel and supplies for the collection and delivery of detection unit samples to laboratories, maintenance of the detection equipment, some laboratory personnel and coverage of additional resources required as needed for special events in operational jurisdictions. The office collaborates continually with FSLTT partners, to ensure that detection capabilities provide the greatest level of protection possible to the public through multiple layers of defense.

Radiological/Nuclear and Chemical Detection Support: Radiological/Nuclear (R/N), and chemical detection support provides \$ 30.0M that CWMD will use to support FSLTT and international partners in order to reduce the risk of a successful deployment of a weapon of mass destruction and the movement of materials into major metropolitan areas and regions. This strategy utilizes a defense in depth posture that attempts to maximize detection opportunities from the initial entry or assembly point to the intended target area. This support includes equipment procurement, developing and integrating local or regional programs into a national detection structure, guiding the development of concepts of operations (CONOPS), and standard operating procedures. CWMD also provides training and exercise products to ensure weapons or material detection is integrated into day-to-day operations and that FSLTT or international partners and DHS component personnel are proficient in the R/N detection mission area. R/N support also provides national R/N detection complementary assets, in the form of Mobile Deployable Detection Units (MDDU), designed to augment FSLTT stakeholder R/N detection and reporting capabilities. MDDUs may be deployed in support of large-scale public gatherings, in response to intelligence-driven requirements, to augment FSLTT capabilities, and for multiagency training and exercise activities.

Chemical support includes CWMD programs and activities that enhance FSLTT and DHS component ability to effectively address chemical threats. Based on the analysis of the impacts of pilot activities, if there is a determination that there is a functional requirement to enhance detection capabilities, funding in the FA appropriation would provide support for state & local detection capabilities. This capability would enhance the detection posture through a coordinated and integrated concept of operations.

Using the authorities of the Securing the Cities Program, CWMD uses a regional approach to the development of detection capabilities to protect the nation. Although major metropolitan areas will remain the ideal targets for adversaries attempting to employ nuclear or radiological weapons against the United States, adversaries must traverse air, land and/or sea pathways to reach the target area. These pathways may extend hundreds to thousands of miles from the potential target. To defend the likely target areas, CWMD employs a defense in depth posture for countering the threat.

Rad/Nuc and Chemical Support Program - Mobile Detection Deployment Units (MDDU) Deployments

MDDUs are complementary detection assets designed to augment FSLTT stakeholder detection and reporting capabilities. MDDUs may be deployed in support of large-scale public gatherings, in response to intelligence-driven requirements, to augment FSLTT steady-state capabilities, and for multiagency training and exercise activities.

The MDDU Project includes six units that are maintained at various sites across the United States and are outfitted with detection equipment. Requests to deploy a MDDU by FSLTT agencies are evaluated based on an assessment of the event's risk and on the readiness of the region to incorporate the MDDU into their operations.

To address the anticipated increased demand in MDDU support, the program has implemented a more efficient deployment methodology by shipping equipment only instead of deploying a full MDDU package when possible. This package can be accompanied by one subject-matter expert to provide training, operational recommendations and equipment technical support. This agile model will allow the program to support additional requests.

Rad/Nuc and Chemical Support Program – Securing the Cities and Pathways (STC&P)

The Securing the Cities and Pathways program provides resources to the highest risk metropolitan regions that CWMD already works with, and to additional regions based on threat assessments or vulnerabilities. The STC&P program seeks to reduce the risk of a successful deployment of a weapon of mass destruction or the movement of materials into major metropolitan areas and regions of the nation. Support includes assistance in developing and integrating local or regional programs into a national detection structure, guiding the development of CONOPS and standard operating procedures, and providing training and exercise products to ensure detection is integrated into day-to-day activities, and that partners are proficient in the detection mission area.

The FY 2019 request is to support the purchase of equipment and capability for regions where within the country under the expanded scope of the Securing the Cities program. The program will modify its name to the Securing the Cities and Pathways program to emphasize its change in scope.

CWMD recognizes that major metropolitan areas will remain the ideal targets for adversaries attempting to employ nuclear, radiological, or chemical weapons against the United States. However, except in the case where materials are acquired and weapon production occurs within the target area, an adversary must traverse air, land and/or sea pathways to reach the target area. These pathways may extend hundreds to thousands of miles from the potential target. To defend the likely target areas, this expanded scope will allow national assets to employ a defense in depth posture for countering the threat. The STC&P program will continue to emphasize protecting the highest risk cities; however, the program will work with regions to enable state, local, tribal and territorial agencies outside the immediate target area to build capability. In FY 2018, CWMD began to incorporate the urban area implementation model into a strategy that maximizes detection opportunities from the initial entry or assembly point to the intended target area to protect regions within the United States. The intent is to better protect population centers by shifting focus from the adversary's potential targets to threat pathways into and within the United States. This approach pushes the detection capability further from a target area and allows increased opportunities to detect R/N materials or devices.

Programs	Projects	General Description
Readiness	Training	The Training Project supports FSLTT detection mission area stakeholders. Training establishes qualification standards for detection operations, builds curricula to support the standards, enables agencies and their instructors to teach the material, and captures feedback used for process and product improvement.
	Exercises	The Exercises Project supports FSLTT stakeholders in developing and/or enhancing detection plans, policies, procedures, communications, tactics, and operations with other relevant stakeholders. The Exercises Program supports the development, validation, and dissemination of detection-specific exercise templates, guidance, and standards; validates that detection equipment is properly employed and alarm adjudication processes are operated per Federal, state, and local protocols; and ensures notifications are escalated to appropriate U.S. Government (USG) agencies.
Biological Support	Bio-detection Field Operations	CWMD utilizes cooperative agreements that are established with state and local jurisdictions to operate and maintain bio-detection capabilities to include personnel and supplies for the collection and delivery of detection unit samples to laboratories, maintenance of the detection equipment, some laboratory personnel and coverage of additional resources required as needed for special events in operational jurisdictions. These activities are paired with other operational support activities to provide the bio-detection capability.
Rad/Nuc & Chemical Support	MDDU Deployments	MDDUs are complementary detection assets designed to augment FSLTT stakeholder detection and reporting capabilities. MDDUs may be deployed in support of large-scale public gatherings, in response to intelligence-driven requirements, to augment FSLTT steady-state capabilities, and multi-agency training and exercise activities. Each MDDU contains detection equipment housed in a mobile trailer package, capable of being deployed anywhere within the United States and its territories. These detection packages are maintained at various sites across the United States.
	Securing the Cities and Pathways	<p>The Securing the Cities and Pathways program provides resources to the highest risk metropolitan regions that CWMD already works with, and to additional regions based on threat assessments or vulnerabilities. STC&P seeks to reduce the risk of a successful deployment of weapons of mass destruction and the movement of materials into major metropolitan regions and the pathways leading to those areas.</p> <p>Assistance activities provide standardized processes and products to assist FSLTT and international partners with planning, developing, implementing, and sustaining WMD detection programs. Assistance efforts facilitate multi-jurisdictional, multi-disciplinary policy makers, program managers, and operational administrators working together to develop and implement interior and maritime detection activities to expand and enhance the framework of detection capabilities within the United States.</p>

Capability Building – PPA Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	-	-	\$64,663
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	-	-	\$64,663
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	-	-	\$64,663
Obligations (Actual/Projections/Estimates)	-	-	\$64,663
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Capability Building – PPA Summary of Budget Changes

Budget Formulation Activity (Dollars in Thousands)	Positions	FTE	Amount
FY 2017 Enacted	-	-	-
FY 2018 President's Budget	-	-	-
FY 2019 Base Budget	-	-	-
Transfer to CWMD/FA from DNDO/FA/FSLTTS for CWMD	-	-	\$23,384
Transfer to CWMD/FA from DNDO/FA/STC for CWMD	-	-	\$21,135
Transfer to CWMD/FA from OHA/O&S/CBR for CWMD	-	-	\$25,553
Total Transfers	-	-	\$70,072
Total Adjustments-to-Base	-	-	\$70,072
FY 2019 Current Services	-	-	\$70,072
JAC & JACCIS Reduction	-	-	(\$5,409)
Total, Program Decreases	-	-	(\$5,409)
FY 2019 Request	-	-	\$64,663
FY 2018 TO FY 2019 Change	-	-	\$64,663

Capability Building – PPA Non Pay Budget Exhibits

Non Pay Summary

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Capability Building	-	-	\$64,663	\$64,663
Total	-	-	\$64,663	\$64,663
Discretionary - Appropriation	-	-	\$64,663	\$64,663

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	-	-	\$260	\$260
25.1 Advisory and Assistance Services	-	-	\$8,660	\$8,660
25.2 Other Services from Non-Federal Sources	-	-	\$596	\$596
25.3 Other Goods and Services from Federal Sources	-	-	\$12,044	\$12,044
41.0 Grants, Subsidies, and Contributions	-	-	\$43,103	\$43,103
Total - Non Pay Object Classes	-	-	\$64,663	\$64,663

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Advisory and Assistance Services	-	-	\$8,660	\$8,660
Other Goods and Services from Federal Sources	-	-	\$12,044	\$12,044
Grants, Subsidies, and Contributions	-	-	\$43,103	\$43,103
Additional Non Pay Cost Drivers	-	-	\$856	\$856
Total – Non Pay Cost Drivers	-	-	\$64,663	\$64,663

NON PAY NARRATIVE

Advisory and Assistance Services: A total of \$8.7M for contract support, software operations and maintenance, STC&P support contracts, and program management support.

Other Goods and Services from Federal Sources: Interagency Agreements (IAAs) in the amount of \$12M supporting Assistance, Training, Exercises, and Mobile Detection Deployment Units.

Grants, Subsidies, and Contributions: A total of \$43.1M in cooperative agreements to support bio-detection field operations and STC&P Regional initiatives.

Additional Non Pay Cost Drivers: Includes \$856,000 for travel and transportation of persons and other services from non-Federal sources.

Department of Homeland Security

Office of Health Affairs

Budget Overview



Fiscal Year 2019
Congressional Justification

Table of Contents

Office of Health Affairs1

Appropriation Organization Structure.....3

Budget Comparison and Adjustments4

Personnel Compensation and Benefits.....6

Non Pay Budget Exhibits.....7

Supplemental Budget Justification Exhibits8

Office of Health Affairs

Appropriation Organization Structure

Organization Name	Level	Fund Type (* Includes Defense Funding)
Office of Health Affairs	Component	
Operations and Support	Appropriation	
Mission Support	PPA	Discretionary - Appropriation
Chemical and Biological Readiness	PPA	Discretionary - Appropriation
Health and Medical Readiness	PPA	Discretionary - Appropriation
Integrated Operations	PPA	Discretionary - Appropriation

**Office of Health Affairs
Budget Comparison and Adjustments**

Comparison of Budget Authority and Request

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Operations and Support	103	96	\$123,548	103	96	\$111,319	-	-	-	(103)	(96)	(\$111,319)
Total	103	96	\$123,548	103	96	\$111,319	-	-	-	(103)	(96)	(\$111,319)
Subtotal Discretionary - Appropriation	103	96	\$123,548	103	96	\$111,319	-	-	-	(103)	(96)	(\$111,319)

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Office of Health Affairs Budget Authority and Obligations

Budget Authority <i>(Dollars in Thousands)</i>	FY 2017	FY 2018	FY 2019
Enacted/Request	\$123,548	\$111,319	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$1,175	\$2,950	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$124,723	\$114,269	-
Collections – Reimbursable Resources	\$65,315	\$73,445	-
Total Budget Resources	\$190,038	\$187,714	-
Obligations (Actual/Projections/Estimates)	\$187,088	\$187,714	-
Personnel: Positions and FTE			
Enacted/Request Positions	103	103	-
Enacted/Request FTE	96	96	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	103	103	-
FTE (Actual/Estimates/Projections)	96	96	-

Office of Health Affairs Personnel Compensation and Benefits

Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Operations and Support	103	96	\$18,922	\$158.81	103	96	\$20,917	\$179.3	-	-	-	-	(103)	(96)	(\$20,917)	(\$179.3)
Total	103	96	\$18,922	\$158.81	103	96	\$20,917	\$179.3	-	-	-	-	(103)	(96)	(\$20,917)	(\$179.3)
Discretionary - Appropriation	103	96	\$18,922	\$158.81	103	96	\$20,917	\$179.3	-	-	-	-	(103)	(96)	(\$20,917)	(\$179.3)

* The FTE Rate calculation does not include Object Class 11.8-Special Personal Services Payments or 13.0-Benefits for Former Personnel.

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.1 Full-time Permanent	\$10,995	\$12,933	-	(\$12,933)
11.3 Other than Full-Time Permanent	\$79	\$82	-	(\$82)
11.5 Other Personnel Compensation	\$183	\$190	-	(\$190)
11.8 Special Personal Services Payments	\$3,676	\$3,704	-	(\$3,704)
12.1 Civilian Personnel Benefits	\$3,989	\$4,008	-	(\$4,008)
Total - Personnel Compensation and Benefits	\$18,922	\$20,917	-	(\$20,917)
Positions and FTE				
Positions - Civilian	103	103	-	(103)
FTE - Civilian	96	96	-	(96)

Office of Health Affairs Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Operations and Support	\$104,626	\$90,402	-	(\$90,402)
Total	\$104,626	\$90,402	-	(\$90,402)
Discretionary - Appropriation	\$104,626	\$90,402	-	(\$90,402)

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$480	\$512	-	(\$512)
22.0 Transportation of Things	\$11	-	-	-
23.1 Rental Payments to GSA	\$3,849	\$4,176	-	(\$4,176)
24.0 Printing and Reproduction	\$2	\$4	-	(\$4)
25.1 Advisory and Assistance Services	\$26,345	\$22,541	-	(\$22,541)
25.2 Other Services from Non-Federal Sources	\$1,174	\$1,581	-	(\$1,581)
25.3 Other Goods and Services from Federal Sources	\$32,955	\$22,569	-	(\$22,569)
25.4 Operation and Maintenance of Facilities	\$25	\$25	-	(\$25)
25.7 Operation and Maintenance of Equipment	\$3,285	\$3,510	-	(\$3,510)
26.0 Supplies and Materials	\$11,978	\$12,584	-	(\$12,584)
31.0 Equipment	\$22	\$900	-	(\$900)
41.0 Grants, Subsidies, and Contributions	\$24,500	\$22,000	-	(\$22,000)
Total - Non Pay Object Classes	\$104,626	\$90,402	-	(\$90,402)

Office of Health Affairs
Supplemental Budget Justification Exhibits

Working Capital Fund

Appropriation and PPA <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Operations and Support	\$7,992	\$7,925	-
Mission Support	\$7,992	\$7,925	-
Total Working Capital Fund	\$7,992	\$7,925	-

Office of Health Affairs
Status of Congressionally Requested Studies, Reports and Evaluations

Fiscal Year	Due Date	Reference/Citation	Requirement	Status
FY2017	September 2017	FY2017 DHS Appropriations Act (P.L. 115-31) Section 302, and its accompanying Joint Explanatory Statement	Submit a report outlining a comprehensive strategy and project plan for advancing bioterrorism capabilities	Submitted on 8 September 2017

Office of Health Affairs
Authorized/Unauthorized Appropriations

Budget Activity <i>Dollars in Thousands</i>	Last year of Authorization	Authorized Level	Appropriation in Last Year of Authorization	FY 2019 President’s Budget
	Fiscal Year	Amount	Amount	Amount
Operations and Support	N/A	N/A	N/A	Not applicable
Total Direct Authorization/Appropriation	N/A	N/A	N/A	

**Office of Health Affairs
Proposed Legislative Language**

No funds are requested for the Office of Health Affairs in FY 2019.

Office of Health Affairs

Collections - Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>		FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Change		
		Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Defense - Department of Defense	Source	-	-	\$2,044	-	-	\$2,370	-	-	-	-	-	(\$2,370)
Operations and Support	Location	-	-	\$2,044	-	-	\$2,370	-	-	-	-	-	(\$2,370)
Chemical and Biological Readiness	Location	-	-	\$2,044	-	-	\$2,370	-	-	-	-	-	(\$2,370)
Department of Defense - Navy, Marine Corps	Source	-	-	\$246	-	-	\$285	-	-	-	-	-	(\$285)
Operations and Support	Location	-	-	\$246	-	-	\$285	-	-	-	-	-	(\$285)
Chemical and Biological Readiness	Location	-	-	\$246	-	-	\$285	-	-	-	-	-	(\$285)
Department of Homeland Security - Federal Emergency Management Agency	Source	-	-	\$888	-	-	\$900	-	-	-	-	-	(\$900)
Operations and Support	Location	-	-	\$888	-	-	\$900	-	-	-	-	-	(\$900)
Mission Support	Location	-	-	\$888	-	-	\$900	-	-	-	-	-	(\$900)
Department of Homeland Security - Federal Law Enforcement Training Center	Source	-	-	\$92	-	-	\$145	-	-	-	-	-	(\$145)
Operations and Support	Location	-	-	\$92	-	-	\$145	-	-	-	-	-	(\$145)
Mission Support	Location	-	-	\$92	-	-	\$145	-	-	-	-	-	(\$145)
Department of Homeland Security - Transportation Security Administration	Source	-	-	\$153	-	-	\$694	-	-	-	-	-	(\$694)
Operations and Support	Location	-	-	\$153	-	-	\$694	-	-	-	-	-	(\$694)
Mission Support	Location	-	-	\$153	-	-	\$694	-	-	-	-	-	(\$694)
Department of Homeland Security - U.S. Immigration and Customs Enforcement	Source	-	-	\$61,359	-	-	\$67,920	-	-	-	-	-	(\$67,920)
Operations and Support	Location	-	-	\$61,359	-	-	\$67,920	-	-	-	-	-	(\$67,920)
Mission Support	Location	-	-	\$61,359	-	-	\$67,920	-	-	-	-	-	(\$67,920)
Department of Homeland Security - Citizenship and Immigration Services	Source	-	-	-	-	-	\$523	-	-	-	-	-	(\$523)
Operations and Support	Location	-	-	-	-	-	\$523	-	-	-	-	-	(\$523)
Mission Support	Location	-	-	-	-	-	\$523	-	-	-	-	-	(\$523)
Department of Homeland Security - Science and Technology	Source	-	-	\$178	-	-	\$48	-	-	-	-	-	(\$48)
Operations and Support	Location	-	-	\$178	-	-	\$48	-	-	-	-	-	(\$48)

Department of Homeland Security

Office of Health Affairs

Collections <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Change		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Mission Support Location	-	-	\$178	-	-	\$48	-	-	-	-	-	(\$48)
Department of Homeland Security - U.S. Customs and Border Protection Source	-	-	\$355	-	-	\$560	-	-	-	-	-	(\$560)
Operations and Support Location	-	-	\$355	-	-	\$560	-	-	-	-	-	(\$560)
Mission Support Location	-	-	\$355	-	-	\$560	-	-	-	-	-	(\$560)
Total Collections	-	-	\$65,315	-	-	\$73,445	-	-	-	-	-	(\$73,445)

Department of Homeland Security

Office of Health Affairs

Operations and Support



Fiscal Year 2019
Congressional Justification

Table of Contents

<i>Operations and Support</i>	1
Budget Comparison and Adjustments.....	3
Personnel Compensation and Benefits.....	7
Non Pay Budget Exhibits.....	9
<i>Mission Support – PPA</i>	10
Budget Comparison and Adjustments.....	10
Personnel Compensation and Benefits.....	14
Non Pay Budget Exhibits.....	16
<i>Chemical and Biological Readiness - PPA</i>	18
Budget Comparison and Adjustments.....	18
Personnel Compensation and Benefits.....	22
Non Pay Budget Exhibits.....	24
<i>Health and Medical Readiness - PPA</i>	26
Budget Comparison and Adjustments.....	26
Personnel Compensation and Benefits.....	29
Non Pay Budget Exhibits.....	31
<i>Integrated Operations – PPA</i>	33
Budget Comparison and Adjustments.....	33
Personnel Compensation and Benefits.....	35
Non Pay Budget Exhibits.....	37

Operations and Support

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Mission Support	103	96	\$24,698	103	96	\$28,419	-	-	-	(103)	(96)	(\$28,419)
Chemical and Biological Readiness	-	-	\$82,689	-	-	\$77,380	-	-	-	-	-	(\$77,380)
Health and Medical Readiness	-	-	\$4,352	-	-	\$4,120	-	-	-	-	-	(\$4,120)
Integrated Operations	-	-	\$11,809	-	-	\$1,400	-	-	-	-	-	(\$1,400)
Total	103	96	\$123,548	103	96	\$111,319	-	-	-	(103)	(96)	(\$111,319)
Subtotal Discretionary - Appropriation	103	96	\$123,548	103	96	\$111,319	-	-	-	(103)	(96)	(\$111,319)

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Operations and Support Budget Authority and Obligations

Budget Authority <i>(Dollars in Thousands)</i>	FY 2017	FY 2018	FY 2019
Enacted/Request	\$123,548	\$111,319	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$1,175	\$2,950	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$124,723	\$114,269	-
Collections – Reimbursable Resources	\$65,315	\$73,445	-
Total Budget Resources	\$190,038	\$187,714	-
Obligations (Actual/Projections/Estimates)	\$187,088	\$187,714	-
Personnel: Positions and FTE			
Enacted/Request Positions	103	103	-
Enacted/Request FTE	96	96	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	103	103	-
FTE (Actual/Estimates/Projections)	96	96	-

Operations and Support Collections – Reimbursable Resoucrees

Collections <i>(Dollars in Thousands)</i>		FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
		Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Defense - Department of Defense	Source	-	-	\$2,044	-	-	\$2,370	-	-	-
Department of Defense - Navy, Marine Corps	Source	-	-	\$246	-	-	\$285	-	-	-
Department of Homeland Security - Federal Emergency Management Agency	Source	-	-	\$888	-	-	\$900	-	-	-
Department of Homeland Security - Federal Law Enforcement Training Center	Source	-	-	\$92	-	-	\$145	-	-	-
Department of Homeland Security - Transportation Security Administration	Source	-	-	\$153	-	-	\$694	-	-	-
Department of Homeland Security - U.S. Immigration and Customs Enforcement	Source	-	-	\$61,359	-	-	\$67,920	-	-	-
Department of Homeland Security - Citizenship and Immigration Services	Source	-	-	-	-	-	\$523	-	-	-
Department of Homeland Security - Science and Technology	Source	-	-	\$178	-	-	\$48	-	-	-
Department of Homeland Security - U.S. Customs and Border Protection	Source	-	-	\$355	-	-	\$560	-	-	-
Total Collections		-	-	\$65,315	-	-	\$73,445	-	-	-

Operations and Support Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	103	96	\$123,548
FY 2018 President's Budget	103	96	\$111,319
FY 2019 Base Budget	103	96	\$111,319
Technical Adjustment	(3)	(3)	-
Transfer to CWMD/FA from OHA/O&S/CBR for CWMD	-	-	(\$25,553)
Transfer to CWMD/O&S/CO&S from OHA/O&S/CBR for CWMD	-	-	(\$51,827)
Transfer to CWMD/O&S/CO&S from OHA/O&S/HMR for CWMD	-	-	(\$672)
Transfer to CWMD/O&S/CO&S from OHA/O&S/IO for CWMD	-	-	(\$1,400)
Transfer to CWMD/O&S/MS from OHA/O&S/MS for CWMD	(79)	(73)	(\$22,652)
Transfer to MGMT/CHCO from OHA/O&S/HMR for WHS	-	-	(\$3,448)
Transfer to MGMT/CHCO from OHA/O&S/MS for WHS	(21)	(20)	(\$5,767)
Total Transfers	(100)	(93)	(\$111,319)
Total Adjustments-to-Base	(103)	(96)	(\$111,319)
FY 2019 Current Services	-	-	-
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	(103)	(96)	(\$111,319)

Operations and Support Personnel Compensation and Benefits Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Mission Support	103	96	\$16,080	\$158.77	103	96	\$18,333	\$179.09	-	-	-	-	(103)	(96)	(\$18,333)	(\$179.09)
Chemical and Biological Readiness	-	-	\$1,617	-	-	-	\$1,129	-	-	-	-	-	-	-	(\$1,129)	-
Health and Medical Readiness	-	-	\$380	-	-	-	\$527	-	-	-	-	-	-	-	(\$527)	-
Integrated Operations	-	-	\$845	-	-	-	\$928	-	-	-	-	-	-	-	(\$928)	-
Total	103	96	\$18,922	\$158.81	103	96	\$20,917	\$179.3	-	-	-	-	(103)	(96)	(\$20,917)	(\$179.3)
Discretionary - Appropriation	103	96	\$18,922	\$158.81	103	96	\$20,917	\$179.3	-	-	-	-	(103)	(96)	(\$20,917)	(\$179.3)

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.1 Full-time Permanent	\$10,995	\$12,933	-	(\$12,933)
11.3 Other than Full-Time Permanent	\$79	\$82	-	(\$82)
11.5 Other Personnel Compensation	\$183	\$190	-	(\$190)
11.8 Special Personal Services Payments	\$3,676	\$3,704	-	(\$3,704)
12.1 Civilian Personnel Benefits	\$3,989	\$4,008	-	(\$4,008)
Total - Personnel Compensation and Benefits	\$18,922	\$20,917	-	(\$20,917)
Positions and FTE				
Positions - Civilian	103	103	-	(103)
FTE - Civilian	96	96	-	(96)

*Object class data reported in this table may differ from MAX A-11 due to adjusted Prior Year (PY) totals reported at a later date than the MAX A-11 PY lock date.

Operations and Support

Permanent Positions by Grade – Appropriation

Grades and Salary Range <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
Total, SES	5	5	-	-5
Total, EX	1	1	-	-1
GS-15	33	33	-	-33
GS-14	30	30	-	-30
GS-13	14	14	-	-14
GS-12	6	6	-	-6
GS-11	6	6	-	-6
GS-9	1	1	-	-1
Other Graded Positions	7	7	-	-7
Total Permanent Positions	103	103	-	-103
Total Perm. Employment (Filled Positions) EOY	103	103	-	-103
Position Locations				
Headquarters	103	103	-	-103
Averages				
Average Personnel Costs, ES Positions	191,220	195,235	-	-195,235
Average Personnel Costs, GS Positions	124,869	127,491	-	-127,491
Average Grade, GS Positions	14	14	-	-14

Operations and Support Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Mission Support	\$8,618	\$10,086	-	(\$10,086)
Chemical and Biological Readiness	\$81,072	\$76,251	-	(\$76,251)
Health and Medical Readiness	\$3,972	\$3,593	-	(\$3,593)
Integrated Operations	\$10,964	\$472	-	(\$472)
Total	\$104,626	\$90,402	-	(\$90,402)
Discretionary - Appropriation	\$104,626	\$90,402	-	(\$90,402)

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$480	\$512	-	(\$512)
22.0 Transportation of Things	\$11	-	-	-
23.1 Rental Payments to GSA	\$3,849	\$4,176	-	(\$4,176)
24.0 Printing and Reproduction	\$2	\$4	-	(\$4)
25.1 Advisory and Assistance Services	\$26,345	\$22,541	-	(\$22,541)
25.2 Other Services from Non-Federal Sources	\$1,174	\$1,581	-	(\$1,581)
25.3 Other Goods and Services from Federal Sources	\$32,955	\$22,569	-	(\$22,569)
25.4 Operation and Maintenance of Facilities	\$25	\$25	-	(\$25)
25.7 Operation and Maintenance of Equipment	\$3,285	\$3,510	-	(\$3,510)
26.0 Supplies and Materials	\$11,978	\$12,584	-	(\$12,584)
31.0 Equipment	\$22	\$900	-	(\$900)
41.0 Grants, Subsidies, and Contributions	\$24,500	\$22,000	-	(\$22,000)
Total - Non Pay Object Classes	\$104,626	\$90,402	-	(\$90,402)

*Object class data reported in this table may differ from MAX A-11 due to adjusted Prior Year (PY) totals reported at a later date than the MAX A-11 PY lock date.

*Mission Support – PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Mission Support	103	96	\$24,698	103	96	\$28,419	-	-	-	(103)	(96)	(\$28,419)
Total	103	96	\$24,698	103	96	\$28,419	-	-	-	(103)	(96)	(\$28,419)
Subtotal Discretionary - Appropriation	103	96	\$24,698	103	96	\$28,419	-	-	-	(103)	(96)	(\$28,419)

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Mission Support PPA Budget Authority and Obligations

Budget Authority <i>(Dollars in Thousands)</i>	FY 2017	FY 2018	FY 2019
Enacted/Request	\$24,698	\$28,419	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$24,698	\$28,419	-
Collections – Reimbursable Resources	\$63,025	\$70,790	-
Total Budget Resources	\$87,723	\$99,209	-
Obligations (Actual/Projections/Estimates)	\$87,723	\$99,209	-
Personnel: Positions and FTE			
Enacted/Request Positions	103	103	-
Enacted/Request FTE	96	96	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	103	103	-
FTE (Actual/Estimates/Projections)	96	96	-

Mission Support – PPA Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>		FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
		Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Homeland Security - Federal Emergency Management Agency	Source	-	-	\$888	-	-	\$900	-	-	-
Department of Homeland Security - Federal Law Enforcement Training Center	Source	-	-	\$92	-	-	\$145	-	-	-
Department of Homeland Security - Transportation Security Administration	Source	-	-	\$153	-	-	\$694	-	-	-
Department of Homeland Security - U.S. Immigration and Customs Enforcement	Source	-	-	\$61,359	-	-	\$67,920	-	-	-
Department of Homeland Security - Citizenship and Immigration Services	Source	-	-	-	-	-	\$523	-	-	-
Department of Homeland Security - Science and Technology	Source	-	-	\$178	-	-	\$48	-	-	-
Department of Homeland Security - U.S. Customs and Border Protection	Source	-	-	\$355	-	-	\$560	-	-	-
Total Collections		-	-	\$63,025	-	-	\$70,790	-	-	-

Mission Support – PPA

Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	103	96	\$24,698
FY 2018 President's Budget	103	96	\$28,419
FY 2019 Base Budget	103	96	\$28,419
Technical Adjustment	(3)	(3)	-
Transfer to CWMD/O&S/MS from OHA/O&S/MS for CWMD	(79)	(73)	(\$22,652)
Transfer to MGMT/CHCO from OHA/O&S/MS for WHS	(21)	(20)	(\$5,767)
Total Transfers	(100)	(93)	(\$28,419)
Total Adjustments-to-Base	(103)	(96)	(\$28,419)
FY 2019 Current Services	-	-	-
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	(103)	(96)	(\$28,419)

Mission Support – PPA

Personnel Compensation and Benefits

Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Mission Support	103	96	\$16,080	\$158.77	103	96	\$18,333	\$179.09	-	-	-	-	(103)	(96)	(\$18,333)	(\$179.09)
Total	103	96	\$16,080	\$158.77	103	96	\$18,333	\$179.09	-	-	-	-	(103)	(96)	(\$18,333)	(\$179.09)
Discretionary - Appropriation	103	96	\$16,080	\$158.77	103	96	\$18,333	\$179.09	-	-	-	-	(103)	(96)	(\$18,333)	(\$179.09)

* Rate calculation does not include object classes 11.8 or 13.0

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.1 Full-time Permanent	\$10,995	\$12,933	-	(\$12,933)
11.3 Other than Full-Time Permanent	\$79	\$82	-	(\$82)
11.5 Other Personnel Compensation	\$183	\$190	-	(\$190)
11.8 Special Personal Services Payments	\$838	\$1,140	-	(\$1,140)
12.1 Civilian Personnel Benefits	\$3,985	\$3,988	-	(\$3,988)
Total - Personnel Compensation and Benefits	\$16,080	\$18,333	-	(\$18,333)
Positions and FTE				
Positions - Civilian	103	103	-	(103)
FTE - Civilian	96	96	-	(96)

*Object class data reported in this table may differ from MAX A-11 due to adjusted Prior Year (PY) totals reported at a later date than the MAX A-11 PY lock date.

Pay Cost Drivers

Leading Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate
Personnel Compensation & Benefits	96	\$15,242	\$159	96	\$17,193	\$179	0	0	0	-96	(\$17,193)	-
OGC Support		\$459	-		\$478	-		0	0		(\$478)	-
PHSO Management		\$172	-		\$179	-		0	0		(\$179)	-
Detail Support		\$207	-		\$483	-		0	0		(\$483)	-
Total – Pay Cost Drivers	96	\$16,080	\$159	96	\$18,333	\$179	0	0	0	-96	(\$18,333)	-

*The pay rate calculation does not include object classes 11.8 or 13.

NARRATIVE EXPLANATION OF CHANGES

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Mission Support PPA Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Mission Support	\$8,618	\$10,086	-	(\$10,086)
Total	\$8,618	\$10,086	-	(\$10,086)
Discretionary - Appropriation	\$8,618	\$10,086	-	(\$10,086)

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$125	\$98	-	(\$98)
22.0 Transportation of Things	\$4	-	-	-
23.1 Rental Payments to GSA	\$3,849	\$4,176	-	(\$4,176)
24.0 Printing and Reproduction	\$2	\$4	-	(\$4)
25.1 Advisory and Assistance Services	\$485	\$1,170	-	(\$1,170)
25.2 Other Services from Non-Federal Sources	\$101	\$324	-	(\$324)
25.3 Other Goods and Services from Federal Sources	\$647	\$832	-	(\$832)
25.4 Operation and Maintenance of Facilities	\$25	\$25	-	(\$25)
25.7 Operation and Maintenance of Equipment	\$3,285	\$3,360	-	(\$3,360)
26.0 Supplies and Materials	\$95	\$97	-	(\$97)
Total - Non Pay Object Classes	\$8,618	\$10,086	-	(\$10,086)

*Object class data reported in this table may differ from MAX A-11 due to adjusted Prior Year (PY) totals reported at a later date than the MAX A-11 PY lock date.

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Rent	\$3,400	\$4,176	-	(\$4,176)
IT Contributions	\$2,180	\$2,119	-	(\$2,119)
Financial System Support	\$1,243	\$1,241	-	(\$1,241)
Front Office Support	\$485	\$1,170	-	(\$1,170)
Expenses	\$890	\$916	-	(\$916)
Working Capital Fund (WCF)	\$420	\$463	-	(\$463)
Total – Non Pay Cost Drivers	\$8,618	\$10,086	-	(\$10,086)

NON PAY NARRATIVE

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

*Chemical and Biological Readiness - PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Chemical and Biological Readiness	-	-	\$82,689	-	-	\$77,380	-	-	-	-	-	(\$77,380)
Total	-	-	\$82,689	-	-	\$77,380	-	-	-	-	-	(\$77,380)
Subtotal Discretionary - Appropriation	-	-	\$82,689	-	-	\$77,380	-	-	-	-	-	(\$77,380)

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Chemical and Biological Readiness – PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$82,689	\$77,380	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$26	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$82,715	\$77,380	-
Collections – Reimbursable Resources	\$2,290	\$2,655	-
Total Budget Resources	\$85,005	\$80,035	-
Obligations (Actual/Projections/Estimates)	\$85,005	\$80,035	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Chemical and Biological Readiness – PPA Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Defense - Department of Defense Source	-	-	\$2,044	-	-	\$2,370	-	-	-
Department of Defense - Navy, Marine Corps Source	-	-	\$246	-	-	\$285	-	-	-
Total Collections	-	-	\$2,290	-	-	\$2,655	-	-	-

Chemical and Biological Readiness – PPA

Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$82,689
FY 2018 President's Budget	-	-	\$77,380
FY 2019 Base Budget	-	-	\$77,380
Transfer to CWMD/FA from OHA/O&S/CBR for CWMD	-	-	(\$25,553)
Transfer to CWMD/O&S/CO&S from OHA/O&S/CBR for CWMD	-	-	(\$51,827)
Total Transfers	-	-	(\$77,380)
Total Adjustments-to-Base	-	-	(\$77,380)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$77,380)

Chemical and Biological Readiness – PPA Personnel Compensation and Benefits

Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Chemical and Biological Readiness	-	-	\$1,617	-	-	-	\$1,129	-	-	-	-	-	-	-	(\$1,129)	-
Total	-	-	\$1,617	-	-	-	\$1,129	-	-	-	-	-	-	-	(\$1,129)	-
Discretionary - Appropriation	-	-	\$1,617	-	-	-	\$1,129	-	-	-	-	-	-	-	(\$1,129)	-

* The FTE Rate calculation does not include Object Class 11.8-Special Personal Services Payments or 13.0-Benefits for Former Personnel.

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.8 Special Personal Services Payments	\$1,613	\$1,129	-	(\$1,129)
12.1 Civilian Personnel Benefits	\$4	-	-	-
Total - Personnel Compensation and Benefits	\$1,617	\$1,129	-	(\$1,129)
Positions and FTE				
Positions - Civilian	-	-	-	-

*Object class data reported in this table may differ from MAX A-11 due to adjusted Prior Year (PY) totals reported at a later date than the MAX A-11 PY lock date.

Pay Cost Drivers

Leading Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate
PHSO Costs	-	\$1,617	-	-	\$1,129	-	-	-	-	-	-	-
Total Pay Cost Drivers	-	\$1,617	-	-	\$1,129	-	-	-	-	-	-	-

NARRATIVE EXPLANATION OF CHANGES

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Chemical and Biological Readiness – PPA Non Pay Budget Exhibits

Non Pay Summary

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Chemical and Biological Readiness	\$81,072	\$76,251	-	(\$76,251)
Total	\$81,072	\$76,251	-	(\$76,251)
Discretionary - Appropriation	\$81,072	\$76,251	-	(\$76,251)

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$159	\$249	-	(\$249)
22.0 Transportation of Things	\$7	-	-	-
25.1 Advisory and Assistance Services	\$20,235	\$20,422	-	(\$20,422)
25.2 Other Services from Non-Federal Sources	\$10	\$475	-	(\$475)
25.3 Other Goods and Services from Federal Sources	\$26,794	\$20,315	-	(\$20,315)
26.0 Supplies and Materials	\$11,867	\$11,890	-	(\$11,890)
31.0 Equipment	-	\$900	-	(\$900)
41.0 Grants, Subsidies, and Contributions	\$22,000	\$22,000	-	(\$22,000)
Total - Non Pay Object Classes	\$81,072	\$76,251	-	(\$76,251)

*Object class data reported in this table may differ from MAX A-11 due to adjusted Prior Year (PY) totals reported at a later date than the MAX A-11 PY lock date.

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Biodetection Field Operations	\$58,797	\$56,650		(\$56,650)
Biodetection National Operations Support	\$14,602	\$11,585		(\$11,585)
Chem/Bio Situational Awareness - Operations & Support	\$2,986	\$4,095		(\$4,095)
Biodetection Technology Enhancements	\$1,142	\$2,805		(\$2,805)
Chemical Defense	\$ 402	\$816		(\$816)
BioWatch Tech Refresh	\$1,000	\$0		\$0
Food Ag Animal Readiness	\$0	\$300		(\$300)
Technical Adjustment OHA Rent	\$1,085	\$0		\$0
Other Costs	\$1,058	\$0		\$0
Total Non Pay Cost Drivers	\$ 81,072	\$76,251	--	(\$76,251)

NON PAY NARRATIVE

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Health and Medical Readiness - PPA**Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Health and Medical Readiness	-	-	\$4,352	-	-	\$4,120	-	-	-	-	-	(\$4,120)
Total	-	-	\$4,352	-	-	\$4,120	-	-	-	-	-	(\$4,120)
Subtotal Discretionary - Appropriation	-	-	\$4,352	-	-	\$4,120	-	-	-	-	-	(\$4,120)

As a result of the establishment of the Department's Countering Weapons of Mass Destruction (CWMD) Office in FY 2018, base funds for the Office of Health Affairs are being requested in CWMD and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO) in FY2019. CWMD will maintain the authorities and resources to coordinate with the medical first responder community and stakeholders at all levels of government to prepare for, respond to, and recover from mass casualty incidents and health consequences of terrorism and disasters. CWMD will provide oversight for DHS operational Emergency Medical Services (EMS) activities, including emergency care services provided for people in DHS care and custody and will provide DHS radiation health and safety expertise in support of headquarters and component radiation safety programs.

OCHCO will advise DHS leadership about workforce health security issues, guide DHS policies to keep its workforce safe and provide oversight for DHS health and medical activities, , and management of the Department's stockpile of medical countermeasures for DHS frontline workers to protect against biological and radiological threats.

Health and Medical Readiness– PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$4,352	\$4,120	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$655	\$400	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$5,007	\$4,520	-
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	\$5,007	\$4,520	-
Obligations (Actual/Projections/Estimates)	\$4,607	\$4,520	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Health and Medical Readiness– PPA

Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$4,352
FY 2018 President's Budget	-	-	\$4,120
FY 2019 Base Budget	-	-	\$4,120
Transfer to CWMD/O&S/CO&S from OHA/O&S/HMR for CWMD	-	-	(\$672)
Transfer to MGMT/CHCO from OHA/O&S/HMR for WHS	-	-	(\$3,448)
Total Transfers	-	-	(\$4,120)
Total Adjustments-to-Base	-	-	(\$4,120)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$4,120)

Health and Medical Readiness PPA Personnel Compensation and Benefits

Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Health and Medical Readiness	-	-	\$380	-	-	-	\$527	-	-	-	-	-	-	-	(\$527)	-
Total	-	-	\$380	-	-	-	\$527	-	-	-	-	-	-	-	(\$527)	-
Discretionary - Appropriation	-	-	\$380	-	-	-	\$527	-	-	-	-	-	-	-	(\$527)	-

* The FTE Rate calculation does not include Object Class 11.8-Special Personal Services Payments or 13.0-Benefits for Former Personnel.

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.8 Special Personal Services Payments	\$380	\$527	-	(\$527)
Total - Personnel Compensation and Benefits	\$380	\$527	-	(\$527)
Positions and FTE				
Positions - Civilian	-	-	-	-

*Object class data reported in this table may differ from MAX A-11 due to adjusted Prior Year (PY) totals reported at a later date than the MAX A-11 PY lock date.

Pay Cost Drivers*Dollars in Thousands*

Leading Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate
PHSO Costs	-	\$380	-	-	\$527	-	-	-	-	-	(\$527)	-
Total – Pay Cost Drivers	-	\$380	-	-	\$527	-	-	-	-		(\$527)	-

NARRATIVE EXPLANATION OF CHANGES

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Health and Medical Readiness– PPA Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Health and Medical Readiness	\$3,972	\$3,593	-	(\$3,593)
Total	\$3,972	\$3,593	-	(\$3,593)
Discretionary - Appropriation	\$3,972	\$3,593	-	(\$3,593)

* \$655k of FY 16 funds were carried over to FY 17.

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$136	\$137	-	(\$137)
25.1 Advisory and Assistance Services	\$1,109	\$643	-	(\$643)
25.2 Other Services from Non-Federal Sources	\$737	\$737	-	(\$737)
25.3 Other Goods and Services from Federal Sources	\$1,974	\$1,337	-	(\$1,337)
25.7 Operation and Maintenance of Equipment	-	\$150	-	(\$150)
26.0 Supplies and Materials	\$8	\$589	-	(\$589)
31.0 Equipment	\$8	-	-	-
Total - Non Pay Object Classes	\$3,972	\$3,593	-	(\$3,593)

*Object class data reported in this table may differ from MAX A-11 due to adjusted Prior Year (PY) totals reported at a later date than the MAX A-11 PY lock date.

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Occupational Health	\$1,348	\$1,188	-	(\$1,188)
Medical Countermeasures	\$1,470	\$1,416	-	(\$1,416)
Medical Readiness	\$859	\$818	-	(\$818)
DHS Veterinary Support	\$295	\$ 171	-	(\$ 171)
Total – Non Pay Cost Drivers	\$3,972	\$3,593	\$-	(\$3,593)

NON PAY NARRATIVE

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

*Integrated Operations – PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Integrated Operations	-	-	\$11,809	-	-	\$1,400	-	-	-	-	-	(\$1,400)
Total	-	-	\$11,809	-	-	\$1,400	-	-	-	-	-	(\$1,400)
Subtotal Discretionary - Appropriation	-	-	\$11,809	-	-	\$1,400	-	-	-	-	-	(\$1,400)

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Integrated Operations – PPA Budget Authority and Obligations

Budget Authority <i>(Dollars in Thousands)</i>	FY 2017	FY 2018	FY 2019
Enacted/Request	\$11,809	\$1,400	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$494	\$2,550	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$12,303	\$3,950	-
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	\$12,303	\$3,950	-
Obligations (Actual/Projections/Estimates)	\$9,753	\$3,950	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Integrated Operations – PPA Summary of Budget Changes

Budget Formulation Activity (Dollars in Thousands)	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$11,809
FY 2018 President's Budget	-	-	\$1,400
FY 2019 Base Budget	-	-	\$1,400
Transfer to CWMD/O&S/CO&S from OHA/O&S/IO for CWMD	-	-	(\$1,400)
Total Transfers	-	-	(\$1,400)
Total Adjustments-to-Base	-	-	(\$1,400)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$1,400)

Integrated Operations – PPA Personnel Compensation and Benefits Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Integrated Operations	-	-	\$845	-	-	-	\$928	-	-	-	-	-	-	-	(\$928)	-
Total	-	-	\$845	-	-	-	\$928	-	-	-	-	-	-	-	(\$928)	-
Discretionary - Appropriation	-	-	\$845	-	-	-	\$928	-	-	-	-	-	-	-	(\$928)	-

* The FTE Rate calculation does not include Object Class 11.8-Special Personal Services Payments or 13.0-Benefits for Former Personnel.

Pay by Object Class

Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.8 Special Personal Services Payments	\$845	\$908	-	(\$908)
12.1 Civilian Personnel Benefits	-	\$20	-	(\$20)
Total - Personnel Compensation and Benefits	\$845	\$928	-	(\$928)
Positions and FTE				
Positions - Civilian	-	-	-	-

*Object class data reported in this table may differ from MAX A-11 due to adjusted Prior Year (PY) totals reported at a later date than the MAX A-11 PY lock date.

Pay Cost Drivers

Leading Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate
PHSO Costs	-	\$845	-	-	\$928			-	-	-	(\$928)	-
Total – Pay Cost Drivers	-	\$845	-	-	\$928			-	-	-	(\$928)	-

NARRATIVE EXPLANATION OF CHANGES

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Integrated Operations – PPA Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Integrated Operations	\$10,964	\$472	-	(\$472)
Total	\$10,964	\$472	-	(\$472)
Discretionary - Appropriation	\$10,964	\$472	-	(\$472)

* \$38k + \$456k of FY 16 funds were carried over to FY 17.

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$60	\$28	-	(\$28)
25.1 Advisory and Assistance Services	\$4,516	\$306	-	(\$306)
25.2 Other Services from Non-Federal Sources	\$326	\$45	-	(\$45)
25.3 Other Goods and Services from Federal Sources	\$3,540	\$85	-	(\$85)
26.0 Supplies and Materials	\$8	\$8	-	(\$8)
31.0 Equipment	\$14	-	-	-
41.0 Grants, Subsidies, and Contributions	\$2,500	-	-	-
Total - Non Pay Object Classes	\$10,964	\$472	-	(\$472)

*Object class data reported in this table may differ from MAX A-11 due to adjusted Prior Year (PY) totals reported at a later date than the MAX A-11 PY lock date.

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
National Biosurveillance Integration Center (NBIC)	\$9,655	-	-	-
Integrated Consortium of Laboratory Networks (ICLN)	\$755	-	-	-
Exercises Training, Ops Plans and Policy	\$216	\$217	-	(\$217)
Intelligence, Information Sharing, and Situational Awareness	\$338	\$241	-	(\$241)
Operations Center Support and Response Operations	-	\$14	-	(\$14)
Total – Non Pay Cost Drivers	\$10,964	\$472	-	(\$472)

NON PAY NARRATIVE

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD) and the Management Directorate's Office of the Chief Human Capital Officer (OCHCO), no funds are being requested in OHA for the Fiscal Year (FY) 2019 President's Budget. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD and the Management Directorate.

Department of Homeland Security

Domestic Nuclear Detection Office

Budget Overview



Fiscal Year 2019
Congressional Justification

Table of Contents

Domestic Nuclear Detection Office1

Appropriation Organization Structure.....3

Budget Comparison and Adjustments4

Personnel Compensation and Benefits.....6

Non Pay Budget Exhibits.....7

Supplemental Budget Justification Exhibits8

Domestic Nuclear Detection Office

Appropriation Organization Structure

Organization Name	Level	Fund Type (* Includes Defense Funding)
Domestic Nuclear Detection Office	Component	
Operations and Support	Appropriation	
Mission Support	PPA	Discretionary - Appropriation
Procurement, Construction, and Improvements	Appropriation	
Large Scale Detection Systems	PPA,Investment	Discretionary - Appropriation
Human Portable Rad/Nuc Systems	PPA,Investment	Discretionary - Appropriation
Research and Development	Appropriation	
Architecture Planning and Analysis	PPA	Discretionary - Appropriation
Transformational Research and Development	PPA	Discretionary - Appropriation
Detection Capability Development	PPA	Discretionary - Appropriation
Detection Capability Assessments	PPA	Discretionary - Appropriation
Nuclear Forensics	PPA	Discretionary - Appropriation
Federal Assistance	Appropriation	
Federal, State, Local, Territorial, and Tribal Support	PPA	Discretionary - Appropriation
Securing the Cities	PPA	Discretionary - Appropriation

Domestic Nuclear Detection Office Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Operations and Support	146	146	\$50,042	158	144	\$54,664	-	-	-	(158)	(144)	(\$54,664)
Procurement, Construction, and Improvements	-	-	\$101,053	-	-	\$87,096	-	-	-	-	-	(\$87,096)
Research and Development	-	-	\$155,061	-	-	\$144,161	-	-	-	-	-	(\$144,161)
Federal Assistance	-	-	\$46,328	-	-	\$44,519	-	-	-	-	-	(\$44,519)
Total	146	146	\$352,484	158	144	\$330,440	-	-	-	(158)	(144)	(\$330,440)
Subtotal Discretionary - Appropriation	146	146	\$352,484	158	144	\$330,440	-	-	-	(158)	(144)	(\$330,440)

Since its establishment in 2005, the Domestic Nuclear Detection Office (DNDO) has led the development of the Global Nuclear Detection Architecture (GNDA), implemented its domestic portion, and spearheaded the integration of United States Government technical nuclear forensics capabilities. With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD), no funds are included in the Fiscal Year (FY) 2019 President's Budget for DNDO. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD.

Domestic Nuclear Detection Office Budget Authority and Obligations

Budget Authority <i>(Dollars in Thousands)</i>	FY 2017	FY 2018	FY 2019
Enacted/Request	\$352,484	\$330,440	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$56,675	\$55,742	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$409,159	\$386,182	-
Collections – Reimbursable Resources	\$6,544	-	-
Total Budget Resources	\$415,703	\$386,182	-
Obligations (Actual/Projections/Estimates)	\$347,448	\$386,178	-
Personnel: Positions and FTE			
Enacted/Request Positions	146	158	-
Enacted/Request FTE	146	144	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	146	158	-
FTE (Actual/Estimates/Projections)	146	144	-

Domestic Nuclear Detection Office Personnel Compensation and Benefits

Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Operations and Support	146	146	\$26,249	\$158.45	158	144	\$25,129	\$174.51	-	-	-	-	(158)	(144)	(\$25,129)	(\$174.51)
Total	146	146	\$26,249	\$158.45	158	144	\$25,129	\$174.51	-	-	-	-	(158)	(144)	(\$25,129)	(\$174.51)
Discretionary - Appropriation	146	146	\$26,249	\$158.45	158	144	\$25,129	\$174.51	-	-	-	-	(158)	(144)	(\$25,129)	(\$174.51)

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.1 Full-time Permanent	\$17,552	\$19,090	-	(\$19,090)
11.5 Other Personnel Compensation	\$315	\$250	-	(\$250)
11.8 Special Personal Services Payments	\$3,116	-	-	-
12.1 Civilian Personnel Benefits	\$5,266	\$5,789	-	(\$5,789)
Total - Personnel Compensation and Benefits	\$26,249	\$25,129	-	(\$25,129)
Positions and FTE				
Positions - Civilian	146	158	-	(158)
FTE - Civilian	146	144	-	(144)

Domestic Nuclear Detection Office Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Operations and Support	\$23,793	\$29,535	-	(\$29,535)
Procurement, Construction, and Improvements	\$101,053	\$87,096	-	(\$87,096)
Research and Development	\$155,061	\$144,161	-	(\$144,161)
Federal Assistance	\$46,328	\$44,519	-	(\$44,519)
Total	\$326,235	\$305,311	-	(\$305,311)
Discretionary - Appropriation	\$326,235	\$305,311	-	(\$305,311)

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$1,371	\$1,351	-	(\$1,351)
23.1 Rental Payments to GSA	\$5,185	\$5,875	-	(\$5,875)
24.0 Printing and Reproduction	-	\$23	-	(\$23)
25.1 Advisory and Assistance Services	\$63,988	\$66,233	-	(\$66,233)
25.2 Other Services from Non-Federal Sources	\$1,338	\$855	-	(\$855)
25.3 Other Goods and Services from Federal Sources	\$85,688	\$78,513	-	(\$78,513)
25.5 Research and Development Contracts	\$49,785	\$48,389	-	(\$48,389)
25.7 Operation and Maintenance of Equipment	\$622	\$370	-	(\$370)
26.0 Supplies and Materials	\$7,362	\$157	-	(\$157)
31.0 Equipment	\$81,518	\$73,755	-	(\$73,755)
41.0 Grants, Subsidies, and Contributions	\$29,378	\$29,790	-	(\$29,790)
Total - Non Pay Object Classes	\$326,235	\$305,311	-	(\$305,311)

**Domestic Nuclear Detection Office
Supplemental Budget Justification Exhibits**

Working Capital Fund

Appropriation and PPA <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Operations and Support	\$10,125	\$10,920	-
Mission Support	\$10,125	\$10,920	-
Total Working Capital Fund	\$10,125	\$10,920	-

Domestic Nuclear Detection Office Status of Congressionally Requested Studies, Reports and Evaluations

Information regarding DNDO's Status of Congressionally Requested Studies, Reports, and Evaluations will be incorporated into the CWMD Overview.

Domestic Nuclear Detection Office Proposed Legislative Language

Proposed legislative language will be provided in the CWMD Overview.

Domestic Nuclear Detection Office Collections - Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>		FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Change		
		Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Homeland Security - Transportation Security Administration	Source	-	-	\$50	-	-	-	-	-	-	-	-	-
Federal Assistance	Location	-	-	\$50	-	-	-	-	-	-	-	-	-
Securing the Cities	Location	-	-	\$50	-	-	-	-	-	-	-	-	-
Department of Homeland Security - U.S. Customs and Border Protection	Source	-	-	\$5,949	-	-	-	-	-	-	-	-	-
Procurement, Construction, and Improvements	Location	-	-	\$5,949	-	-	-	-	-	-	-	-	-
Large Scale Detection Systems	Location	-	-	\$5,949	-	-	-	-	-	-	-	-	-
Department of State - Department of State	Source	-	-	\$62	-	-	-	-	-	-	-	-	-
Research and Development	Location	-	-	\$62	-	-	-	-	-	-	-	-	-
Architecture Planning and Analysis	Location	-	-	\$62	-	-	-	-	-	-	-	-	-
Office of Director of National Intelligence	Source	-	-	\$483	-	-	-	-	-	-	-	-	-
Operations and Support	Location	-	-	\$483	-	-	-	-	-	-	-	-	-
Mission Support	Location	-	-	\$483	-	-	-	-	-	-	-	-	-
Total Collections		-	-	\$6,544	-	-	-	-	-	-	-	-	-

Department of Homeland Security

Domestic Nuclear Detection Office

Operations and Support



Fiscal Year 2019
Congressional Justification

Table of Contents

Operations and Support1

 Budget Comparison and Adjustments..... 3

 Personnel Compensation and Benefits..... 7

 Non Pay Budget Exhibits..... 9

Mission Support – PPA..... 10

 Budget Comparison and Adjustments..... 10

 Personnel Compensation and Benefits..... 14

 Non Pay Budget Exhibits..... 16

Operations and Support

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Mission Support	146	146	\$50,042	158	144	\$54,664	-	-	-	(158)	(144)	(\$54,664)
Total	146	146	\$50,042	158	144	\$54,664	-	-	-	(158)	(144)	(\$54,664)
Subtotal Discretionary - Appropriation	146	146	\$50,042	158	144	\$54,664	-	-	-	(158)	(144)	(\$54,664)

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD), no funds are included in the Fiscal Year (FY) 2019 President's Budget for the Domestic Nuclear Detection Office (DNDO). Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD.

Operations and Support Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$50,042	\$54,664	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$50,042	\$54,664	-
Collections – Reimbursable Resources	\$483	-	-
Total Budget Resources	\$50,525	\$54,664	-
Obligations (Actual/Projections/Estimates)	\$48,840	\$54,664	-
Personnel: Positions and FTE			
Enacted/Request Positions	146	158	-
Enacted/Request FTE	146	144	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	146	158	-
FTE (Actual/Estimates/Projections)	146	144	-

Operations and Support
Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Office of Director of National Intelligence Source	-	-	\$483	-	-	-	-	-	-
Total Collections	-	-	\$483	-	-	-	-	-	-

Operations and Support Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	146	146	\$50,042
FY 2018 President's Budget	158	144	\$54,664
FY 2019 Base Budget	158	144	\$54,664
Transfer to CWMD/O&S/MS from DNDO/O&S/MS for CWMD	(158)	(144)	(\$54,664)
Total Transfers	(158)	(144)	(\$54,664)
Total Adjustments-to-Base	(158)	(144)	(\$54,664)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	(158)	(144)	(\$54,664)

Operations and Support Personnel Compensation and Benefits Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Mission Support	146	146	\$26,249	\$158.45	158	144	\$25,129	\$174.51	-	-	-	-	(158)	(144)	(\$25,129)	(\$174.51)
Total	146	146	\$26,249	\$158.45	158	144	\$25,129	\$174.51	-	-	-	-	(158)	(144)	(\$25,129)	(\$174.51)
Discretionary - Appropriation	146	146	\$26,249	\$158.45	158	144	\$25,129	\$174.51	-	-	-	-	(158)	(144)	(\$25,129)	(\$174.51)

* The FTE Rate calculation does not include Object Class 11.8-Special Personal Services Payments or 13.0-Benefits for Former Personnel.

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.1 Full-time Permanent	\$17,552	\$19,090	-	(\$19,090)
11.5 Other Personnel Compensation	\$315	\$250	-	(\$250)
11.8 Special Personal Services Payments	\$3,116	-	-	-
12.1 Civilian Personnel Benefits	\$5,266	\$5,789	-	(\$5,789)
Total - Personnel Compensation and Benefits	\$26,249	\$25,129	-	(\$25,129)
Positions and FTE				
Positions - Civilian	146	158	-	(158)
FTE - Civilian	146	144	-	(144)

*FY18 contains a point-in-time reference to Non Pay Object Class 25.3-Other Goods and Services from Federal Sources in the amount of \$11.3M which includes \$3.2M that should have been coded as Pay Object Class 11.8-Special Personal Services Payments (for Detailee costs).

Operations and Support

Permanent Positions by Grade – Appropriation

Grades and Salary Range <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
Total, SES	8	9	-	-9
Total, EX	1	1	-	-1
GS-15	61	58	-	-58
GS-14	34	47	-	-47
GS-13	24	30	-	-30
GS-12	8	5	-	-5
GS-11	6	7	-	-7
GS-9	3	-	-	-
GS-3	1	1	-	-1
Total Permanent Positions	146	158	-	-158
Unfilled Positions EOY	9	-	-	-
Total Perm. Employment (Filled Positions) EOY	137	158	-	-158
Position Locations				
Headquarters	146	158	-	-158
Averages				
Average Personnel Costs, ES Positions	182,082	188,686	-	-188,686
Average Personnel Costs, GS Positions	130,145	128,092	-	-128,092
Average Grade, GS Positions	15	14	-	-14

Operations and Support Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Mission Support	\$23,793	\$29,535	-	(\$29,535)
Total	\$23,793	\$29,535	-	(\$29,535)
Discretionary - Appropriation	\$23,793	\$29,535	-	(\$29,535)

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$162	\$106	-	(\$106)
23.1 Rental Payments to GSA	\$5,185	\$5,875	-	(\$5,875)
24.0 Printing and Reproduction	-	\$23	-	(\$23)
25.1 Advisory and Assistance Services	\$8,100	\$11,288	-	(\$11,288)
25.2 Other Services from Non-Federal Sources	\$163	\$166	-	(\$166)
25.3 Other Goods and Services from Federal Sources	\$8,931	\$11,328	-	(\$11,328)
25.7 Operation and Maintenance of Equipment	\$622	\$370	-	(\$370)
26.0 Supplies and Materials	\$400	\$147	-	(\$147)
31.0 Equipment	\$230	\$232	-	(\$232)
Total - Non Pay Object Classes	\$23,793	\$29,535	-	(\$29,535)

*Mission Support – PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Mission Support	146	146	\$50,042	158	144	\$54,664	-	-	-	(158)	(144)	(\$54,664)
Total	146	146	\$50,042	158	144	\$54,664	-	-	-	(158)	(144)	(\$54,664)
Subtotal Discretionary - Appropriation	146	146	\$50,042	158	144	\$54,664	-	-	-	(158)	(144)	(\$54,664)

With the transfer of its functions to CWMD, no funds are included in the FY 2019 President's Budget for DNDO. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD.

Mission Support – PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$50,042	\$54,664	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	-	-	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$50,042	\$54,664	-
Collections – Reimbursable Resources	\$483	-	-
Total Budget Resources	\$50,525	\$54,664	-
Obligations (Actual/Projections/Estimates)	\$48,840	\$54,664	-
Personnel: Positions and FTE			
Enacted/Request Positions	146	158	-
Enacted/Request FTE	146	144	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	146	158	-
FTE (Actual/Estimates/Projections)	146	144	-

Mission Support – PPA
Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Office of Director of National Intelligence Source	-	-	\$483	-	-	-	-	-	-
Total Collections	-	-	\$483	-	-	-	-	-	-

Mission Support – PPA Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	146	146	\$50,042
FY 2018 President's Budget	158	144	\$54,664
FY 2019 Base Budget	158	144	\$54,664
Transfer to CWMD/O&S/MS from DNDO/O&S/MS for CWMD	(158)	(144)	(\$54,664)
Total Transfers	(158)	(144)	(\$54,664)
Total Adjustments-to-Base	(158)	(144)	(\$54,664)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	(158)	(144)	(\$54,664)

Mission Support – PPA Personnel Compensation and Benefits

Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted				FY 2018 President's Budget				FY 2019 President's Budget				FY 2018 to FY 2019 Total			
	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate	Pos.	FTE	Amount	Rate
Mission Support	146	146	\$26,249	\$158.45	158	144	\$25,129	\$174.51	-	-	-	-	(158)	(144)	(\$25,129)	(\$174.51)
Total	146	146	\$26,249	\$158.45	158	144	\$25,129	\$174.51	-	-	-	-	(158)	(144)	(\$25,129)	(\$174.51)
Discretionary - Appropriation	146	146	\$26,249	\$158.45	158	144	\$25,129	\$174.51	-	-	-	-	(158)	(144)	(\$25,129)	(\$174.51)

* The FTE Rate calculation does not include Object Class 11.8-Special Personal Services Payments or 13.0-Benefits for Former Personnel.

Pay by Object Class

Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
11.1 Full-time Permanent	\$17,552	\$19,090	-	(\$19,090)
11.5 Other Personnel Compensation	\$315	\$250	-	(\$250)
11.8 Special Personal Services Payments	\$3,116	-	-	-
12.1 Civilian Personnel Benefits	\$5,266	\$5,789	-	(\$5,789)
Total - Personnel Compensation and Benefits	\$26,249	\$25,129	-	(\$25,129)
Positions and FTE				
Positions - Civilian	146	158	-	(158)
FTE - Civilian	146	144	-	(144)

*FY18 contains a point-in-time reference to Non Pay Object Class 25.3-Other Goods and Services from Federal Sources in the amount of \$11.3M which includes \$3.2M that should have been coded as Pay Object Class 11.8-Special Personal Services Payments (for Detailee costs).

Pay Cost Drivers

Leading Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate	FTE	Amount	Rate
Personnel Compensation and Benefits	146	\$26,249	\$158.45	144	\$25,129	\$174.51				(144)	(\$25,129)	(\$174.51)
Total - Pay Cost Drivers	146	\$26,249	\$158.45	144	\$25,129	\$174.51				(144)	(\$25,129)	(\$174.51)

**Mission Support – PPA
Non Pay Budget Exhibits**

Non Pay Summary

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Mission Support	\$23,793	\$29,535	-	(\$29,535)
Total	\$23,793	\$29,535	-	(\$29,535)
Discretionary - Appropriation	\$23,793	\$29,535	-	(\$29,535)

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$162	\$106	-	(\$106)
23.1 Rental Payments to GSA	\$5,185	\$5,875	-	(\$5,875)
24.0 Printing and Reproduction	-	\$23	-	(\$23)
25.1 Advisory and Assistance Services	\$8,100	\$11,288	-	(\$11,288)
25.2 Other Services from Non-Federal Sources	\$163	\$166	-	(\$166)
25.3 Other Goods and Services from Federal Sources	\$8,931	\$11,328	-	(\$11,328)
25.7 Operation and Maintenance of Equipment	\$622	\$370	-	(\$370)
26.0 Supplies and Materials	\$400	\$147	-	(\$147)
31.0 Equipment	\$230	\$232	-	(\$232)
Total - Non Pay Object Classes	\$23,793	\$29,535	-	(\$29,535)

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Advisory and Assistance Services	\$8,100	\$11,288		(\$11,288)
GSA Rent	\$5,185	\$5,875		(\$5,875)
Other Good & Services from Federal Sources	\$8,931	\$11,328		(\$11,328)
Other Costs	\$1,577	\$1,044		(\$1,044)
Total – Non Pay Cost Drivers	\$23,793	\$29,535		(\$29,535)

Department of Homeland Security

Domestic Nuclear Detection Office

Procurement, Construction, and Improvements



Fiscal Year 2019
Congressional Justification

Table of Contents

Procurement, Construction, and Improvements1

 Budget Comparison and Adjustments 3

 Non Pay Budget Exhibits..... 7

 Capital Investments Exhibits 8

Large Scale Detection Systems – Investment..... 9

 Capital Investments Exhibits 9

Human Portable Rad/Nuc Systems – Investment..... 24

 Capital Investments Exhibits 24

Procurement, Construction, and Improvements
Budget Comparison and Adjustments
Comparison of Budget Authority and Request

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Large Scale Detection Systems	\$53,709	\$62,524	-	(\$62,524)
Human Portable Rad/Nuc Systems	\$47,344	\$24,572	-	(\$24,572)
Total	\$101,053	\$87,096	-	(\$87,096)
Discretionary - Appropriation	\$101,053	\$87,096	-	(\$87,096)

With the transfer of the functions of the Domestic Nuclear Detection Office (DNDO) to the Countering Weapons of Mass Destruction Office (CWMD), no funds are included in the FY 2019 President's Budget for DNDO's Procurement, Construction, and Improvements (PC&I) appropriation. Funding for the programs previously supported through this appropriation and its Programs, Projects, and Activities (PPAs) are discussed in the FY 2019 Congressional Justifications for CWMD.

DNDO's PC&I appropriation provides resources necessary for the planning, operational development, engineering, purchase, and deployment of assets that help the Department of Homeland Security (DHS) and its partners to prevent, protect against, respond to, and mitigate nuclear, chemical, radiological, and biological threats and incidents. The appropriation includes the following PPAs:

- Large Scale Detection Systems:** This PPA provides funding to acquire and deploy fixed and mobile large scale Radiation Detection Equipment (RDE) to support DHS operational end-users and address the full scope of Radiological/Nuclear (R/N) detection requirements. The PPA includes the procurement and/or deployment of RDE systems at land border crossings, seaports, international airports (including international preclearance sites), and international mail and express consignment courier facilities, and provides the scientific and technical expertise to design, acquire, and deploy these systems. DNDO coordinates with operational partners to refine and prioritize equipment requirements.
- Human Portable Radiation/Nuclear Detection Systems (HPRDS):** This PPA includes resources to acquire and deploy human portable RDE that can be carried, worn, or easily moved by a user to support DHS operational end-users and address Global Nuclear Detection Architecture (GNDA) requirements. These devices play a critical role in the layered defenses of the United States against radiological or nuclear terrorist attacks. The portfolio consists of personal radiation detectors (PRD), handheld radioisotope identification devices (RIID), human portable tripwire (HPT) devices, linear radiation monitors (LRM), radiation detection backpacks, and handheld radiation monitors (HRM). These systems are used to detect, localize, and/or identify radiological material. Most are relatively lightweight, easy to use, and of sufficiently low cost for widespread deployment.

Procurement, Construction, and Improvements Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$101,053	\$87,096	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$19,167	\$19,363	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$120,220	\$106,459	-
Collections – Reimbursable Resources	\$5,949	-	-
Total Budget Resources	\$126,169	\$106,459	-
Obligations (Actual/Projections/Estimates)	\$73,340	\$106,459	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Procurement, Construction, and Improvements
Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Homeland Security - US Customs and Border Protection Source	-	-	\$5,949	-	-	-	-	-	-
Total Collections	-	-	\$5,949	-	-	-	-	-	-

Procurement, Construction, and Improvements
Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$101,053
FY 2018 President's Budget	-	-	\$87,096
FY 2019 Base Budget	-	-	\$88,063
Transfer to CWMD from DNDO for HPRNS	-	-	(\$13,167)
Transfer to CWMD from DNDO for Large Scale Detection Systems	-	-	(\$74,896)
Total Transfers	-	-	(\$88,063)
Total Adjustments-to-Base	-	-	(\$88,063)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$87,096)

Procurement, Construction, and Improvements

Non Pay Budget Exhibits

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
25.1 Advisory and Assistance Services	\$6,410	\$6,319	-	(\$6,319)
25.3 Other Goods and Services from Federal Sources	\$6,438	\$7,300	-	(\$7,300)
26.0 Supplies and Materials	\$6,962	-	-	-
31.0 Equipment	\$81,243	\$73,477	-	(\$73,477)
Total - Non Pay Object Classes	\$101,053	\$87,096	-	(\$87,096)

Procurement, Construction, and Improvements
Capital Investments Exhibits

Capital Investments

Investment <i>(Dollars in Thousands)</i>	Unique Item Identifier	Acquisition Level	Procurement/ Construction	IT/Non-IT	MAOL	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Large Scale Detection Systems	024-000005961	2	Procurement	Non-IT	Yes	\$53,709	\$62,524	-
Human Portable Rad/Nuc Systems	-	3	Procurement	Non-IT	No	\$47,344	\$24,572	-

*Large Scale Detection Systems – Investment***Capital Investments Exhibits****Procurement/Acquisition Programs**

Investment <i>(Dollars in Thousands)</i>	Unique Item Identifier	Acquisition Level	Procurement/ Construction	IT/Non-IT	MAOL	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Large Scale Detection Systems	024-000005961	2	Procurement	Non-IT	Yes	\$53,709	\$62,524	-

With the transfer of the functions of DNDO to CWMD, no funds are included in the FY 2019 President's Budget for DNDO's Large Scale Detection Systems PPA. Funding for the programs previously supported through this PPA are discussed in CWMD's FY 2019 PC&I Congressional Justification (CJ).

The Large Scale Detection Systems PPA previously included resources to acquire and deploy fixed and mobile large scale RDE to support DHS operational end-users and address GNDA requirements. This PPA included the procurement and/or deployment of RDE systems at land border crossings, seaports, international airports (including international preclearance sites), and international mail and express consignment courier facilities and provides the scientific and technical expertise to design, acquire, and deploy these systems. The following table provides descriptions for the programs within this PPA.

Program	Level of Effort	General Description
Radiation Portal Monitor Program	See CWMD CJ for planned activities	RPMP is at full operating capacity and has the objective to maintain scanning coverage at previously deployed sites. Major activities include: Decommission low-use/no-use RPMs and reconfigure sites as required; deploy new RPMs and redeploy previously decommissioned and refurbished RPMs as necessary to address required level of scanning capability at sites; deploy additional large-scale systems at ports of entry (POEs) or between POEs in the vicinity of the border; deploy improvements to fielded systems; and conduct test and evaluation of improvements.
RPM Replacement Program	See CWMD CJ for planned activities	RPM RP is a program with the objective to acquire and deploy enhanced RPMs to begin to recapitalize the current fleet of fixed RPMs.
On Dock Rail Program	Complete	ODR is a program to provide more efficient scanning to detect and classify R/N threat sources in intermodal cargo containers transferred directly from ship to rail car.
International Rail Program	See CWMD CJ for planned activities	IRAIL is a program to detect and identify nuclear or other radioactive materials out of regulatory control entering the United States via freight rail.

Large Scale Detection Systems PPA Summary

Large Scale Detection Systems Investment (Dollars in Thousands)	Unique Item Identifier	Acquisition Level	Procurement/ Construction	IT / Non IT	MAOL	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Radiation Portal Monitor Program	N/A	Post FOC	Procurement	Non-IT	No	\$42,800	\$33,773	-
Radiation Portal Monitor Replacement Program	024-000005961	Level 2	Procurement	Non-IT	Yes	\$7,509	\$26,751	-
On-Dock Rail	N/A	Level 3	Procurement	Non-IT	No	\$3,400	\$1,000	-
International Rail	N/A	Level 3	Procurement	Non-IT	No	-	\$1,000	-
TOTAL						\$53,709	\$62,524	-

Radiation Portal Monitor (RPM) Program**Investment Description**

RPMs are used at U.S. land and sea Ports of Entry (POEs) by U.S. Customs and Border Protection (CBP) to scan cargo and conveyances in order to prevent the smuggling of R/N threats or threat materials into the United States, while facilitating the flow of legitimate trade and commerce.

The RPM Program is at full operating capacity and is in sustainment, and supports CBP's efforts to maintain scanning coverage at previously completed POEs and meet the requirements of the *Security and Accountability For Every (SAFE) Port Act of 2006*. RPMs are used at U.S. land and sea POEs by CBP to scan cargo and conveyances in order to prevent the smuggling of R/N threats or threat materials into the United States, while facilitating the flow of legitimate trade and commerce.

Justification

No funds are included in the FY 2019 President's Budget because of DNDO's transition to CWMD.

FY 2017 Key Milestone Events

- Initiated 99 RPM installs and 164 decommissions.
- Completed 103 RPM installs and 178 decommissions*.
- Began operation of trans-pacific conveyor-based RPM system at Port of Los Angeles/Long Beach, CA.
- Conducted system optimization, testing and analysis of spectroscopic RPMs at the Port of Savannah, GA for future deployment.
- Began initial operations of spectroscopic RPMs at the Port of Savannah, GA.
- Conducted remote operations single lane and multi-lane pilots at the Port of Savannah, GA.

FY 2018 Planned Key Milestone Events

- Initiate 71 RPM installs and 23 decommissions.
- Initiate deployment of remote operations equipment and software updates at selected POEs (e.g., Enhanced Radiological Nuclear Inspection and Evaluation (ERNIE)).

FY 2019 Planned Key Milestone Events

- Funds budgeted in CWMD for future execution.

* Due to the number of variables affecting completion dates of RPM installs and decommissions, DNDO reports RPM installs and decommissions initiated each fiscal year instead of those completed each FY, beginning FY 2018.

Overall Investment Funding

	Prior Years	FY 2017	FY 2018	FY 2019
Operations and Support		-	-	-
Procurement, Construction, and Improvements		\$42,800	\$33,773	-
Research and Development		-	-	-
Project Funding	\$787,951	\$42,800	\$33,773	-
Obligations	\$787,951	\$41,762	\$33,773	
Expenditures*		\$39,688	\$440	

*Reliable expenditure data prior to FY17 is not currently available owing to the deployment of a new financial management solution.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-X-00060	Pacific Northwest National Lab	IAA	3/15	3/15	3/20	N/A	\$75,100
HSHQDC-16-PA001	General Service Administration	RWA	5/16	6/16	9/18	N/A	\$2,176
HSHQDC-16-PA009	General Service Administration	RWA	9/16	9/16	12/18	N/A	\$301
HSHQDC-17-IPA006	CBP Border Security Deployment Program (BSDP)	IAA	5/17	5/17	5/22	N/A	\$3,200
HSHQDC-17-IPA008	CBP Data Analysis Center – Threat Evaluation Reduction (DAC-TER)	RWA	6/17	6/17	6/22	N/A	\$911
To be assigned at time of award	General Service Administration	RWA	TBD	TBD	TBD	N/A	\$383K
HSHQDC-15-00108	CBP Office of Technology Innovation and Acquisition (OTIA)	IAA	6/15	6/15	12/16	N/A	\$773
HSHQDC-17-PA001	General Service Administration	RWA	1/17	1/17	9/18	N/A	\$6,551

Significant Changes to Investment since Prior Year Enacted

None.

Domestic Nuclear Detection Office
Investment Schedule

Procurement, Construction, and Improvements

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
Initiate 99 RPM installs and 164 decommissions			1QTR/FY17	
Complete 103 RPM installs and 178 decommissions				4QTR/FY17
Achieve Trans Pacific system Go-Live				1QTR/FY17
Deploy spectroscopic RPMs at Port of Savannah, GA			1QTR/FY17	4QTR/FY17
Begin initial operations of spectroscopic RPMs at the Port of Savannah, GA.				4QTR/FY17
Conduct remote operations multi-lane pilot at Savannah, GA			2QTR/FY17	4QTR/FY17
Initiate deployment of remote operations equipment at selected POEs.				4QTR/FY17
	FY 2018			
Initiate 71 RPM installs and 23 decommissions			1QTR/FY18	4QTR/FY18
Continue deployment of remote operations equipment at selected POEs			1QTR/FY18	4QTR/FY18
Deployment of software updates at selected POEs			1QTR/FY18	4QTR/FY18

Radiation Portal Monitor Replacement Program**Investment Description**

RPMs are used at U.S. land and sea POEs by CBP to scan cargo and conveyances in order to prevent the smuggling of R/N threats or threat materials into the United States, while facilitating the flow of legitimate trade and commerce. The RPM Replacement Program (RPM RP) addresses issues to monitor the state of health of existing deployments, increasing reliability and availability, and improving maintainability while also addressing emerging needs.

Justification

No funds are included in the FY 2019 President's Budget because of DNDO's transition to CWMD.

FY 2017 Key Milestone Events

- Hosted an Industry Day for potential bidders on the RPM RP procurement.
- Successfully achieved acquisition milestones for solution identification.
- Completed setup of modeling tools and infrastructure to support a vendor collection event to assess solution performance against defined threat matrix.
- Released the Final RFP to initiate the procurement.
- Completed an initial evaluation of proposals and selected the proposals to proceed with the next round of testing.
- Commenced characterization and environmental test campaigns.
- Commenced Preliminary Security Test and Evaluation (Cyber and network assessment).
- Completed characterization test of systems capabilities to operate in differing environmental conditions.

FY 2018 Planned Key Milestone Events

- Complete environmental testing.
- Complete a comparative assessment of candidate systems against a defined threat matrix.
- Conduct second down select of vendor's systems proposed to meet the requirements of the acquisition.
- Conduct final review of proposals and will award up to three Indefinite Delivery Indefinite Quantity (IDIQ) contracts for RPM integration and test articles.
- Obtain approval to initiate Low Rate Initial Production (LRIP).
- Commence stream of commerce and integration testing to assess performance in operational conditions and integration with CBP systems.

FY 2019 Planned Key Milestone Events

- Funds budgeted in CWMD for future execution.

Overall Investment Funding

	Prior Years	FY 2017	FY 2018	FY 2019
Operations and Support		-	-	-
Procurement, Construction, and Improvements		\$7,509	\$26,751	-
Research and Development		-	-	-
Project Funding	\$10,022	\$7,509	\$26,751	-
Obligations	\$10,022	\$7,327	\$26,751	
Expenditures*		\$3,544	\$3,377	

*Reliable expenditure data prior to FY17 is not currently available owing to the deployment of a new financial management solution.

Domestic Nuclear Detection Office**Procurement, Construction, and Improvements****Contract Information (Current/Execution Year, Budget Year)**

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDN-16-X-00049	Defense Threat Reduction Agency	IAA	8/16	8/16	3/18		\$1,300
HSHQDC-15-X-00092	Los Alamos National Lab	IAA	8/16	8/16	3/18		\$300
HSHQDC-15-X-00096	Oak Ridge National Lab	IAA	8/16	8/16	3/18		\$1,635
HSHQDC-15-X-00136	Sandia National Lab	IAA	8/16	8/16	3/18		\$765
HSHQDN-16-X-00027	Brookhaven National Lab	IAA	3/17	3/17	3/18		\$300
HSHQDC-13-C-00005	Johns Hopkins University Applied Physics Laboratory	Cost Plus Fixed Fee (CPFF)	5/16	5/16	3/18		\$685
HSHQDC-15-X-00096	Oak Ridge National Lab	IAA	2/14	1/15	12/18		\$1,635
HSHQDN-16-X-00006	Idaho National Lab	IAA	4/16	4/16	4/19		\$119
HSHQDC-15-X-00098	Savannah River National Lab	IAA	6/15	7/15	6/18		\$250
HSHQDC-15-X-00092	Los Alamos National Lab	IAA	8/16	8/16	3/18		\$300
HSHQDN-16-X-00007	Los Alamos National Lab	IAA	8/16	8/16	3/18		\$700
HSHQDN-16-X-00049	Defense Threat Reduction Agency/White Sands Missile Range	IAA	5/17	5/17	3/18		\$1,236
HSHQDN-16-X-00049 8/16-8/19	Defense Threat Reduction Agency (DTRA)	IAA	5/17	5/17	3/18		\$550
HSHQDC-13-C-00005	Johns Hopkins University Applied Physics Laboratory	CPFF	5/17	5/17	3/18		\$435
HSHQDN-16-X-00049	Defense Threat Reduction Agency	IAA	8/16	8/16	3/18		\$1,300

Significant Changes to Investment since Prior Year Enacted

None.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
Received ADE-2A and -2B approvals			2QTR/FY17	3QTR/FY17
Hosted an Industry Day for potential bidders on the RPM RP procurement				1QTR/FY17
Completed setup of models and infrastructure to support STRs				2QTR/FY17
Released Final RFP				2QTR/FY17
Completed initial evaluation of proposals/conducted Downselect 1				3QTR/FY17
Commenced characterization and environmental test campaigns			3QTR/FY17	1QTR/FY18
Commenced Preliminary Security Test and Evaluation (cyber and network assessment)			4QTR/FY17	4QTR/FY17
Completed characterization testing				4QTR/FY17
	FY 2018			
Complete comparative assessment of candidate systems				1QTR/FY18
Complete Environmental Testing				1QTR/FY18
Conduct Downselect 2				2QTR/FY18
Obtain ADE-2C approval to initiate Low Rate Initial Production (LRIP)				3QTR/FY18
Award up to 3 contracts for RPM integration and test articles				3QTR/FY18
Commence Stream of Commerce and Integration Testing			4QTR/FY18	

Domestic Nuclear Detection Office
On-Dock Rail (ODR) Program

Procurement, Construction, and Improvements

Investment Description

The ODR Program is a program intended to provide increased scanning and detecting efficiencies while screening for R/N material entering the United States at sea POEs via cargo containers.

Justification

No funds are included in the FY 2019 President's Budget because of DNDO's transition to CWMD.

FY 2017 Key Milestone Events

- Completed reviews associated with developing a programmatic approach for the ODR program.
- Began construction of ODR at Port of Tacoma.
- Conducted ODR Performance Testing.

FY 2018 Planned Key Milestone Events

- Complete deployment at Port of Tacoma.
- Conduct Operational Assessment at Port of Tacoma.
- Begin the Post-Implementation Review for Straddle Carrier Portal (SCP) at Port of Tacoma.
- Begin SCP fabrication, site design, and construction at Maher Terminal.

FY 2019 Planned Key Milestone Events

- Funds budgeted in CWMD for future execution.

Overall Investment Funding

	Prior Years	FY 2017	FY 2018	FY 2019
Operations and Support		-	-	-
Procurement, Construction, and Improvements		\$3,400	\$1,000	-
Research and Development		\$3,250	-	-
Project Funding	\$40,150	\$6,650	\$1,000	-
Obligations	\$40,150	\$6,650	\$1,000	
Expenditures*		\$1,505	-	

*Reliable expenditure data prior to FY17 is not currently available owing to the deployment of a new financial management solution.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-X-00131	Pacific Northwest National Lab	IAA		7/15	7/18		\$725
HSHQDC-13-C-00005	JHU-Applied Physics Lab	IAA	11/12	11/12	11/17		\$1,489
HSHQDC-11-X-00104	Savannah River National Lab	IAA		2/11	12/16		\$800
HSHQDC-16-X-00063	Savannah River National Lab	IAA		3/16	9/21		\$2,840
HSHQDC-15-X-00060	Pacific Northwest National Lab	IAA		3/15	3/20		\$1,940
HSHQDC-15-X-00098	Savannah River National Lab	IAA		7/15	8/18		\$1,150
HSHQDC-15-X-00098	Savannah River National Lab	IAA	7/15	7/15	8/18		\$250
HSHQDC-13-C-00005	JHU-Applied Physics Lab	Existing IAA	11/12	11/12	11/17		\$350
HSHQDN-16-X-00047	Pacific Northwest National Lab	Existing IAA	8/16	8/16	8/21		\$750
HSHQDN-16-X-00047	Pacific Northwest National Lab	Existing IAA	8/16	8/16	8/21		\$300
HSHQDC-16-X-00063	Savannah River National Lab	Existing IAA	3/16	3/16	9/21		\$1,350
To be determined at time of award	Sandia National Lab	New IAA	6/17	6/17	12/22		\$400

Significant Changes to Investment since Prior Year Enacted

None.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
Completed Governance approval for the Analyze Select Phase of the project			1QTR/FY17	1QTR/FY17
Construction at Port of Tacoma			3QTR/FY17	1QTR/FY18
Conduct ODR Performance Testing (PT) Milestone (MS)-4 and MS-5			1QTR/FY17	1QTR/FY17
Deployment at Port of Tacoma			3QTR/FY17	2QTR/FY18
	FY 2018			
Conduct Operational Assessment at Port of Tacoma			1QTR/FY18	2QTR/FY18
Begin SCP fabrication, site design and construction at Maher Terminal			2QTR/FY18	2QTR/FY18

International Rail (IRAIL) Program**Investment Description**

The International Rail program will analyze options, develop a programmatic approach, and generate requirements for solutions to detect and categorize nuclear or other radioactive materials out of regulatory control entering the United States via freight rail cargo through the active POEs identified in the Trade Act of 2002 (P.L. 107-210).

Justification

No funds are included in the FY 2019 President's Budget because of DNDO's transition to CWMD.

FY 2017 Key Milestone Events

- Conducted market research with the release of a request for information (RFI) (R&D-funded).
- Analyzed RFI results and develop draft market research report (R&D-funded).

FY 2018 Planned Key Milestone Events

- Establish test objectives for Integrated Rail Inspection System (IRIS).
- Release RFP.
- Award IDIQ contract to procure first delivery order (1 Integrated RDE/Non-Intrusive Inspection (NII) unit for test).

FY 2019 Planned Key Milestone Events

- Funds budgeted in CWMD Office for future execution.

Overall Investment Funding

	Prior Years	FY 2017	FY 2018	FY 2019
Operations and Support		-	-	-
Procurement, Construction, and Improvements		-	\$1,000	-
Research and Development		\$3,850	\$3,357	-
Project Funding	\$11,684	\$3,850	\$4,357	-
Obligations	\$11,684	\$3,850	\$4,357	
Expenditures*		\$848	-	

*Reliable expenditure data prior to FY17 is not currently available owing to the deployment of a new financial management solution.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
To be determined at the time of contract award	CBP	IAA	5/18	5/18	12/23		TBD
HSHQDN-16-X-00007	Los Alamos National Lab	IAA	6/16	6/16	3/18		\$80
HSHQDC-15-C-B0031	Rapiscan	CPFF	6/15	6/16	2/18		\$226

Significant Changes to Investment since Prior Year Enacted

None.

Domestic Nuclear Detection Office
Investment Schedule

Procurement, Construction, and Improvements

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
Conduct market research with RFI release			2QTR/FY17	3QTR/FY17
Support development of RFP and test plans			3QTR/FY17	4QTR/FY17
	FY 2018			
Release RFP			2QTR/FY18	2QTR/FY18
Procure first unit(s) for test and evaluation			4QTR/FY18	4QTR/FY18

Human Portable Rad/Nuc Systems – Investment**Capital Investments Exhibits****Procurement/Acquisition Programs**

Investment <i>(Dollars in Thousands)</i>	Unique Item Identifier	Acquisition Level	Procurement/ Construction	IT/Non-IT	MAOL	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Human Portable Rad/Nuc Systems	-	3	Procurement	Non-IT	No	\$47,344	\$24,572	-

With the transfer of the functions of DNDO to CWMD, no funds are included in the FY 2019 President's Budget for DNDO's Human Portable Rad/Nuc Systems PPA. Funding for the programs previously supported through this PPA are discussed in CWMD's FY 2019 Operations and Support CJ.

The Human Portable Rad/Nuc Systems PPA includes resources to acquire and deploy human portable RDE that can be carried, worn, or easily moved by a user to support DHS operational end-users. These devices play a critical role in the layered defenses of the United States against radiological or nuclear terrorist attacks. The portfolio consists of PRDs, handheld RIIDs, HPTs, and radiation detection backpacks. These systems are used to detect, localize, and/or identify radiological material. Most are relatively lightweight, easy to use, and of sufficiently low cost for widespread deployment.

Legacy handheld RDE, particularly Basic Handheld RIIDs and PRDs used by CBP, the U.S. Coast Guard (USCG), and the Transportation Security Administration (TSA) have reached or exceeded their expected service life and are in need of immediate replacement. The following table provides descriptions for the programs within the Human Portable Rad/Nuc Systems PPA.

Domestic Nuclear Detection Office**Procurement, Construction, and Improvements**

Project	Level of Effort	General Description
Basic Handheld (BHH) RIID	See CWMD CJ for planned activities	The BHH RIID program is a program aimed at acquiring and deploying devices used for search, detection, localization, and identification of R/N materials, primarily in a secondary screening role.
Advanced Handheld (AHH) RIID	See CWMD CJ for planned activities	The AHH RIID program is a program aimed at acquiring and deploying devices often used as the final arbiter in situations where superior capability for R/N detection and identification is required; they are also used in laboratory settings as reference detectors.
Personal Radiation Detectors (PRD)	See CWMD CJ for planned activities	The PRD program is a program aimed at acquiring and deploying pager-size devices used to detect R/N materials. PRDs are routinely worn by operators for detection and personal protection.
Human Portable Tripwire (HPT)	See CWMD CJ for planned activities	The HPT program is a program aimed at acquiring and deploying small/wearable systems that provide next-generation capabilities to detect, identify, communicate, and adjudicate R/N threats.
Backpacks	See CWMD CJ for planned activities	The Radiation Detection Backpack program is a program aimed at acquiring and deploying backpack detectors used in situations where a wide-area R/N detection capability is necessary.

Human Portable Rad/Nuc Detection Systems PPA Summary

Human Portable Rad/Nuc Systems Investments <i>(Dollars in Thousands)</i>	Unique Item Identifier	Acquisition Level	Procurement/ Construction	IT / Non IT	MAOL	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget
Advanced Handheld RIIDs		Level 3	Procurement	Non-IT	No	\$5,496	-	-
Basic Handheld RIIDs	024-000005960	Level 3	Procurement	Non-IT	Yes	\$12,180	\$12,562	-
PRD	024-000005959	Level 3	Procurement	Non-IT	Yes	\$8,056	\$7,404	-
HPT	024-000005958	Level 3	Procurement	Non-IT	Yes	\$19,825	-	-
Backpack Systems	N/A	Level 3	Procurement	Non-IT	No		\$4,606	-
Other	N/A	N/A	Procurement	Non-IT	No	\$1,787	-	-
TOTAL						\$47,344	\$24,572	-

Basic Handheld (BHH) Radioisotope Identification Device (RIID)**Investment Description**

Basic Handheld RIIDs are used for search, detection, localization, and identification of radionuclide composition of R/N materials, and for quick and accurate measurement of dose rate and count rate. These devices are also used to support secondary screening and small-area searches.

Justification

No funds are included in the FY 2019 President's Budget because of DNDO's transition to CWMD.

FY 2017 Key Milestone Events

- Began to recapitalize Mobile Detection Deployment Units (MDDU) fleet by procuring devices.
- Continued device deliveries to CBP.

FY 2018 Planned Key Milestone Events

- Begin to recapitalize USCG fleet by procuring devices.
- Continue device deliveries for CBP and MDDU.

FY 2019 Planned Key Milestone Events

- Funds budgeted in CWMD for future execution.

Overall Investment Funding

	Prior Years	FY 2017	FY 2018	FY 2019
Operations and Support		-	-	-
Procurement, Construction, and Improvements		\$12,180	\$12,562	-
Research and Development		-	-	-
Project Funding	\$198,297	\$12,180	\$12,562	-
Obligations	\$198,297	\$5,833	\$12,562	
Expenditures*		\$607	-	

*Reliable expenditure data prior to FY17 is not currently available owing to the deployment of a new financial management solution.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-D-00018	Smiths Detection	IDIQ	6/16	6/16	1/18		\$143,000
HSHQDC-16-C-00023	Smiths Detection	IDIQ	9/16	9/16			\$1,289

Significant Changes to Investment since Prior Year Enacted

Basic Handheld device deliveries were halted in FY 2017 while regression testing was performed to resolve a technical issue. Delivery schedule shifted to FY 2018. Shipment of systems that address the technical issue resumed December 2017. FY 2016 and FY 2017 funds shifted from Basic Handheld to Human Portable Tripwire to buy full operating capability (FOC) requirement quantities ahead of schedule due to positive early deployment results with HPTs. HPT funding in FY 2018 shifted to Basic Handheld.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
Deliveries for MDDU			4QTR/FY17	4QTR /FY18
Deliveries for USCG			4QTR/FY17	4QTR /FY18
Continue deliveries to CBP			1QTR/FY17	4QTR/FY18
	FY 2018			
Begin deliveries for USCG			3QTR/FY18	1QTR/FY19

Investment Description

Advanced Handheld RIIDs are often used as the final arbiter when illicit trafficking is suspected due to their superior capability for R/N detection and identification. They are also used in laboratory settings as reference detectors.

Justification

No funds are included in the FY 2019 President's Budget because of DNDO's transition to CWMD.

FY 2017 Key Milestone Events

- Continue delivery of devices to CBP and USCG.

FY 2018 Planned Key Milestone Events

- Complete delivery of devices.
- Reach full operating capability for all Components.

FY 2019 Planned Key Milestone Events

- Funds budgeted in CWMD for future execution.

Overall Investment Funding

	Prior Years*	FY 2017	FY 2018	FY 2019
Operations and Support		-	-	-
Procurement, Construction, and Improvements		\$5,496	-	-
Research and Development		-	-	-
Project Funding	\$196,452	\$5,496	-	-
Obligations	\$196,452	\$5,496	-	
Expenditures**		\$5,383	-	

*Prior to FY 2017, all HPRDS were tracked as a consolidated portfolio and not as separate projects. The Prior Years "Project Funding" and "Obligations" reflect the respective values for the total portfolio and not the individual project.

**Reliable expenditure data prior to FY17 is not currently available owing to the deployment of a new financial management solution.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-12-D-00080	AMETEK	IDIQ	9/12	9/12	9/17		\$14,044

Investment Schedule

None.

Personal Radiation Detector (PRD)**Investment Description**

PRDs are pager-size devices used to detect R/N materials. The PRDs are typically clipped to a uniform or a belt. PRDs detect both gamma (general purpose) and gamma/neutron (maritime environment) R/N sources. They automatically monitor the environment and alert the user if R/N material is detected.

Justification

No funds are included in the FY 2019 President's Budget because of DNDO's transition to CWMD.

FY 2017 Key Milestone Events

- Released PRD Strategic Sourcing RFP.
- Conducted PRD test and evaluation.
- Awarded strategic sourcing contracts to vendors (accomplished one year early).

FY 2018 Planned Key Milestone Events

- Deploy limited quantities PRDs with CBP end users to assess operational suitability during limited user evaluation.
- Procure and deliver PRDs for DHS Components.

FY 2019 Planned Key Milestone Events

- Funds budgeted in CWMD for future execution.

Overall Investment Funding

	Prior Years*	FY 2017	FY 2018	FY 2019
Operations and Support				
Procurement, Construction, and Improvements		\$8,056	\$7,404	-
Research and Development				
Project Funding	\$203,715	\$8,056	\$7,404	-
Obligations	\$203,715	\$8,056	\$7,404	
Expenditures**		\$3,543	-	

*Prior to FY 2017, all HPRDS were tracked as a consolidated portfolio and not as separate projects. The Prior Years "Project Funding" and "Obligations" reflect the respective values for the total portfolio and not the individual project.

**Reliable expenditure data prior to FY17 is not currently available owing to the deployment of a new financial management solution.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-13-A-00027	Laurus Systems, Inc	BPA	5/13	5/13	5/18		\$1,000
HSHQDC-13-A-00043	William F Hawk	BPA	9/13	9/13	9/18		\$9,900
HSHQDN-16-F-00007	Sensor Technology Engineering	GSA Schedule	9/16	9/16	3/18		\$3,943
HSHQDN-17-D-00001	Polimaster, Inc.	IDIQ	9/17	9/17	9/22		\$90,000
HSHQDN-17-D-00002	Thermo-Fisher	IDIQ9	9/17	9/17	9/22		\$90,000

Significant Changes to Investment since Prior Year Enacted

None.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
Release RFP				2QTR/FY17
Conduct test & evaluation			3QTR/FY17	4QTR/FY17
Award strategic sourcing contract(s)			4QTR/FY17	4QTR/FY17
	FY 2018			
Release RFP			2QTR/FY18	4QTR/FY18

Human Portable Tripwire (HPT)**Investment Description**

HPT devices are small/wearable systems that provide next-generation capabilities to detect, identify, communicate, and adjudicate R/N threats. HPTs also function as personal protective equipment to warn operators of potential exposure to harmful levels of radiation. HPTs are able to identify and locate the source of radiation and allow personnel to take appropriate action. The technology includes communication features that allow the user to easily seek additional technical assistance from experts if needed.

Justification

No funds are included in the FY 2019 President's Budget because of DNDO's transition to CWMD.

FY 2017 Key Milestone Events

- Continued deliveries of HPT devices to CBP, USCG and TSA.
- Conducted post-implementation review for CBP and TSA.

FY 2018 Planned Key Milestone Events

- Continue deliveries of HPT devices to CBP, USCG and TSA.
- Conduct Post-Implementation Review for USBP, CBP, TSA, and MDDU.

FY 2019 Planned Key Milestone Events

- Funds budgeted in CWMD for future execution

Overall Investment Funding

	Prior Years	FY 2017	FY 2018	FY 2019
Operations and Support				
Procurement, Construction, and Improvements		\$19,825	-	-
Research and Development				
Project Funding	\$216,385	\$19,825	-	-
Obligations	\$216,385	\$19,825	-	
Expenditures**		\$9,334	-	

*Prior to FY 2017, all HPRDS were tracked as a consolidated portfolio and not as separate projects. The Prior Years "Project Funding" and "Obligations" reflect the respective values for the total portfolio and not the individual project.

***Reliable expenditure data prior to FY17 is not currently available owing to the deployment of a new financial management solution.*

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSHQDC-15-D-00019	FLIR Detection	IDIQ	9/15	9/15	9/20		\$40,000

Significant Changes to Investment since Prior Year Enacted

FY 2016 and FY 2017 funds shifted from Basic Handheld to Human Portable Tripwire to buy full operating capacity requirement quantities ahead of schedule. In FY 2018, Human Portable Tripwire funding shifted to Basic Handheld Investment Schedule.

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
HPT device deliveries for USBP and USCG			3Q/FY16	
Post-Implementation Review for CBP/TSA			4Q/FY17	4Q/FY17
	FY 2018			
HPT device deliveries for USBP and USCG				4QTR/FY18
Post-Implementation Review for USBP/CBP/TSA/MDDU			1QTR/FY18	1QTR/FY18

Backpack Program

Investment Description

Backpack radiation detection systems are used when a wide-area detection capability is necessary, potentially in covert operations, and are used to quickly detect and locate a radiation threat in public or maritime environments such as aircraft, medium- to large-sized vessels, open-air events, parking lots, and stadiums. Backpack systems provide the capability to detect both gamma and neutron radiation. A backpack system is also being used for Small Vessel Standoff Detection (SVSD) requirements for boat-to-boat scanning capability. Current backpack systems use Helium-3 (^3He) for neutron radiation detection.

Justification

No funds are included in the FY 2019 President's Budget because of DNDO's transition to CWMD.

Domestic Nuclear Detection Office**Procurement, Construction, and Improvements****FY 2017 Planned Key Milestone Events**

- No ³He backpack devices procured.

FY 2018 Planned Key Milestone Events

- Procure ³He-alternative, wearable R/N detectors for TSA & MDDU.

FY 2019 Planned Key Milestone Events

- Funds budgeted in CWMD for future execution.

	Prior Years*	FY 2017	FY 2018	FY 2019
Operations and Support				
Procurement, Construction, and Improvements		-	\$4,606	-
Research and Development				
Project Funding	\$200,992	-	\$4,606	-
Obligations	\$200,992	-	\$4,606	
Expenditures**				

*Prior to FY 2017, all HPRDS were tracked as a consolidated portfolio and not as separate projects. The Prior Years "Project Funding" and "Obligations" reflect the respective values for the total portfolio and not the individual project.

**Reliable expenditure data prior to FY17 is not currently available owing to the deployment of a new financial management solution.

Contract Information (Current/Execution Year, Budget Year)

Contract Number	Contractor	Type	Award Date (mo/yr)	Start Date (mo/yr)	End Date (mo/yr)	EVM in Contract	Total Value
HSQDC-14-D-00007	Sensor Technology Engineering	IDIQ	9/11	9/11	9/16		\$7,300

Investment Schedule

Description	Design Work		Project Work	
	Initiated	Completed	Initiated	Completed
	FY 2017			
	FY 2018			
Procure ³ He-alternative, wearable R/N detectors for TSA and MDDU			2Q/FY18	4Q/FY18

Department of Homeland Security

Domestic Nuclear Detection Office

Research and Development



Fiscal Year 2019
Congressional Justification

Table of Contents

<i>Research and Development</i>	1
Budget Comparison and Adjustments.....	3
Non Pay Budget Exhibits.....	7
<i>Architecture Planning and Analysis – PPA</i>	8
Budget Comparison and Adjustments.....	8
Non Pay Budget Exhibits.....	12
Technology Readiness Level Exhibit	14
<i>Transformational Research and Development - PPA</i>	18
Budget Comparison and Adjustments.....	18
Non Pay Budget Exhibits.....	21
Technology Readiness Level Exhibit	23
<i>Detection Capability Development - PPA</i>	45
Budget Comparison and Adjustments.....	45
Non Pay Budget Exhibits.....	48
Technology Readiness Level Exhibit	51
<i>Detection Capability Assessments –PPA</i>	55
Budget Comparison and Adjustments.....	55
Non Pay Budget Exhibits.....	58
Technology Readiness Level Exhibit	59
<i>Nuclear Forensics –PPA</i>	66
Budget Comparison and Adjustments.....	66
Non Pay Budget Exhibits.....	69
Technology Readiness Level Exhibit	71

Research and Development

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Architecture Planning and Analysis	-	-	\$15,072	-	-	\$15,937	-	-	-	-	-	(\$15,937)
Transformational Research and Development	-	-	\$62,028	-	-	\$60,581	-	-	-	-	-	(\$60,581)
Detection Capability Development	-	-	\$19,851	-	-	\$15,155	-	-	-	-	-	(\$15,155)
Detection Capability Assessments	-	-	\$39,272	-	-	\$34,127	-	-	-	-	-	(\$34,127)
Nuclear Forensics	-	-	\$18,838	-	-	\$18,361	-	-	-	-	-	(\$18,361)
Total	-	-	\$155,061	-	-	\$144,161	-	-	-	-	-	(\$144,161)
Subtotal Discretionary - Appropriation	-	-	\$155,061	-	-	\$144,161	-	-	-	-	-	(\$144,161)

With the transfer of the functions of the Domestic Nuclear Detection Office (DNDO) to the Countering Weapons of Mass Destruction Office (CWMD), no funds are included in the FY 2019 President's Budget for DNDO's Research and Development (R&D) appropriation. Funding for the programs previously supported through this appropriation and its Programs, Projects, and Activities (PPAs) are discussed in CWMD's FY 2019 R&D and Operations and Support (O&S) Congressional Justifications (CJ).

DNDO leads the U.S. Government (USG) in development of an architecture to detect radiological and nuclear (R/N) threats and its implementation, as well as coordination and stewardship of USG technical nuclear forensics efforts. DNDO's R&D appropriation funds fundamental knowledge discovery, basic and applied research, technology and systems development leading to product acquisition, test and evaluation, and associated costs in support of the following PPAs:

Research and Development Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$155,061	\$144,161	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$26,634	\$15,367	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$181,695	\$159,528	-
Collections – Reimbursable Resources	\$62	-	-
Total Budget Resources	\$181,757	\$159,528	-
Obligations (Actual/Projections/Estimates)	\$148,773	\$159,528	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Research and Development
Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of State - Department of State Source	-	-	\$62	-	-	-	-	-	-
Total Collections	-	-	\$62	-	-	-	-	-	-

Research and Development Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$155,061
FY 2018 President's Budget	-	-	\$144,161
FY 2019 Base Budget	-	-	\$144,161
Transfer to CWMD/O&S/C&OS from DNDO/R&D/APA for CWMD	-	-	(\$15,937)
Transfer to CWMD/O&S/C&OS from DNDO/R&D/DCA for CWMD	-	-	(\$34,127)
Transfer to CWMD/O&S/C&OS from DNDO/R&D/NF for CWMD	-	-	(\$8,654)
Transfer to CWMD/R&D from DNDO/R&D/DCD for CWMD	-	-	(\$15,155)
Transfer to CWMD/R&D from DNDO/R&D/NF for CWMD	-	-	(\$9,707)
Transfer to CWMD/R&D from DNDO/R&D/TRD for CWMD	-	-	(\$60,581)
Total Transfers	-	-	(\$144,161)
Total Adjustments-to-Base	-	-	(\$144,161)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$144,161)

Research and Development Non Pay Budget Exhibits

Non Pay Summary

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Architecture Planning and Analysis	\$15,072	\$15,937	-	(\$15,937)
Transformational Research and Development	\$62,028	\$60,581	-	(\$60,581)
Detection Capability Development	\$19,851	\$15,155	-	(\$15,155)
Detection Capability Assessments	\$39,272	\$34,127	-	(\$34,127)
Nuclear Forensics	\$18,838	\$18,361	-	(\$18,361)
Total	\$155,061	\$144,161	-	(\$144,161)
Discretionary - Appropriation	\$155,061	\$144,161	-	(\$144,161)

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$984	\$1,003	-	(\$1,003)
25.1 Advisory and Assistance Services	\$40,370	\$38,192	-	(\$38,192)
25.2 Other Services from Non-Federal Sources	\$775	\$116	-	(\$116)
25.3 Other Goods and Services from Federal Sources	\$51,599	\$44,265	-	(\$44,265)
25.5 Research and Development Contracts	\$49,785	\$48,389	-	(\$48,389)
26.0 Supplies and Materials	-	\$10	-	(\$10)
31.0 Equipment	\$45	\$46	-	(\$46)
41.0 Grants, Subsidies, and Contributions	\$11,503	\$12,140	-	(\$12,140)
Total - Non Pay Object Classes	\$155,061	\$144,161	-	(\$144,161)

*Architecture Planning and Analysis – PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Architecture Planning and Analysis	-	-	\$15,072	-	-	\$15,937	-	-	-	-	-	(\$15,937)
Total	-	-	\$15,072	-	-	\$15,937	-	-	-	-	-	(\$15,937)
Subtotal Discretionary - Appropriation	-	-	\$15,072	-	-	\$15,937	-	-	-	-	-	(\$15,937)

With the transfer of the functions of DNDO to CWMD, no funds are included in the FY 2019 President's Budget for DNDO's Architecture Planning and Analysis PPA. Funding for the programs previously supported through this PPA are discussed in CWMD's FY 2019 O&S CJ.

The APA PPA coordinates the development of enhanced radiological and nuclear (R/N) detection capabilities and the implementation of capabilities within the United States. Its objective is to improve the capability to understand, anticipate, and mitigate the risk of nuclear terrorism. These efforts enable the Department of Homeland Security (DHS) to determine and address gaps and vulnerabilities in existing R/N detection capabilities. This is accomplished through a continuous process of stakeholder engagement involving the operational Components of the Department; other Federal agencies; and state, local, territorial, and tribal (SLTT) partners to formulate and adjust program plans and investment options, on an annual basis, that addresses the threat of nuclear terrorism across the Nation's homeland security enterprise.

Architecture Planning and Analysis – PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$15,072	\$15,937	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$2,244	\$2,546	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$17,316	\$18,483	-
Collections – Reimbursable Resources	\$62	-	-
Total Budget Resources	\$17,378	\$18,483	-
Obligations (Actual/Projections/Estimates)	\$14,315	\$18,483	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Architecture Planning and Analysis – PPA
Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of State - Department of State Source	-	-	\$62	-	-	-	-	-	-
Total Collections	-	-	\$62	-	-	-	-	-	-

Architecture Planning and Analysis – PPA

Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$15,072
FY 2018 President's Budget	-	-	\$15,937
FY 2019 Base Budget	-	-	\$15,937
Transfer to CWMD/O&S/C&OS from DNDO/R&D/APA for CWMD	-	-	(\$15,937)
Total Transfers	-	-	(\$15,937)
Total Adjustments-to-Base	-	-	(\$15,937)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$15,937)

Architecture Planning and Analysis – PPA

Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Architecture Planning and Analysis	\$15,072	\$15,937	-	(\$15,937)
Total	\$15,072	\$15,937	-	(\$15,937)
Discretionary - Appropriation	\$15,072	\$15,937	-	(\$15,937)

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$301	\$340	-	(\$340)
25.1 Advisory and Assistance Services	\$10,400	\$11,956	-	(\$11,956)
25.2 Other Services from Non-Federal Sources	\$558	\$116	-	(\$116)
25.3 Other Goods and Services from Federal Sources	\$3,768	\$3,469	-	(\$3,469)
26.0 Supplies and Materials	-	\$10	-	(\$10)
31.0 Equipment	\$45	\$46	-	(\$46)
Total - Non Pay Object Classes	\$15,072	\$15,937	-	(\$15,937)

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Analysis	\$8,803	\$8,479		(\$8,479)
Solutions Management Program	\$3,406	\$2,924		(\$2,924)
Planning and Reporting	\$830	\$2,318		(\$2,318)
International Program	\$2,033	\$2,216		(\$2,216)
Total – Non Pay Cost Drivers	\$15,072	\$15,937		(\$15,937)

NARRATIVE EXPLANATION OF CHANGES:

- **Analysis:** The Analysis Project evaluates the Nation's ability to detect nuclear or other radioactive materials out of regulatory control to enable the USG to plan a more effective and efficient R/N detection capability in order to manage national security risk and make R/N terrorism prohibitively difficult. This includes formal efforts to: define the threat; identify vulnerabilities; and evaluate consequences and the subsequent risk of R/N terrorism. Deliberate planning, modeling, and analysis of the R/N detection capabilities directly contribute to effective programming and budgeting decisions which contribute to making nuclear terrorism prohibitively difficult for our adversaries. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **Solutions Management:** The Solutions Management Project collaborates with stakeholders, partners, and end-users to develop material and non-material solutions to reduce the risk from R/N threats. This effort is focused on gaps and vulnerabilities, operating environments, modes of transportation, and/or specific threats. Prior to the beginning of FY 2019, Solutions Development legacy Interior projects were transferred to the Planning and Reporting Program. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **Planning and Reporting:** The Planning and Reporting Project coordinates engagement with DNDO's DHS and interagency partners for strategic and implementation planning for R/N detection capabilities, summarizing the accomplishments through reporting, and promoting interagency dialogue and engagement. This project supports fulfillment of DNDO's mandate to coordinate an enhanced R/N detection capability by facilitating the development of strategic, implementation, and operational concepts and plans for nuclear detection programs, activities, and capabilities. This project also coordinates and manages performance measure development and reporting, and collaborates with DHS Components to create and deliver congressionally mandated reports. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **International:** The International Project works closely with the USG interagency, international organizations, and foreign partners to develop and deliver workshops and training courses on nuclear detection architecture best practices and planning and implementation tools. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.

Architecture Planning and Analysis – PPA Research and Development

Technology Readiness Level Exhibit

DNDO Architecture, Planning, and Analysis Program

The DNDO Architecture, Planning, and Analysis Program coordinates the development of enhanced radiological and nuclear (R/N) detection capability and the implementation of capabilities within the United States.

- **Problem:** The R/N detection mission requires the coordinated efforts of multiple agencies across domains (i.e., land, air, maritime) and agencies (within and outside DHS) to be effective. Without a coordinating organization to analyze capability gaps, determine technical and non-technical requirements, and coordinate between U.S. agencies and, in some cases, international partners, this can never be achieved. Lack of coordination in the R/N mission space would result in increased risk to the Homeland of R/N terrorism and related threats.
- **Solution:** Provide the full spectrum of threat analysis, mission and capabilities based analysis, and requirements development to feed DNDO and DHS R&D, procurement, and other capability improvement efforts. Influence foreign partner countries and international organizations to advance global R/N detection capabilities and promote integration with domestic efforts. Provide planning capabilities to further coordinate actions and to represent R/N detection capability equities in related Department and USG plans. Draft, coordinate, and deliver reports to congressional and other external stakeholders.
- **Impact:** These efforts enable DHS to determine, address, and communicate gaps and vulnerabilities in existing R/N detection capabilities. This is accomplished through a continuous process of stakeholder engagement with other Federal agencies, operational DHS Components, and SLTT partners to formulate and adjust plans and investment options, on a regular basis, that address the threat of nuclear terrorism across the Nation's homeland security enterprise.

Architecture, Planning, and Analysis projects advance the capability to understand, anticipate, and reduce the threat of nuclear terrorism. Each of the following contributes to the development of strategies and plans for preventing R/N terrorism.

Sub-Projects

- *Planning and Reporting:* The Planning and Reporting Project coordinates engagement with DNDO's DHS and interagency partners for strategic and implementation planning for R/N detection capabilities, summarizing the accomplishments through reporting, and promoting interagency dialogue and engagement. This project supports fulfillment of DNDO's mandate to coordinate an enhanced R/N detection capability by facilitating the development of strategic, implementation, and operational concepts and plans for nuclear detection programs, activities, and capabilities. Through this project, DNDO coordinates and integrates the roles, responsibilities, and collective goals and objectives of the interagency R/N detection community, conducts strategic and operational planning, and ensures that DHS R/N prevention activities are integrated into DHS policies, strategies, and plans. This project also coordinates and manages performance measure development and reporting,

collaborates with DHS Components to create and deliver congressionally mandated reports such as the *GNDA Joint Interagency Review* and the DHS GNDA Strategic Plan of Investments.

- *Analysis:* The Analysis Project evaluates the Nation's ability to detect nuclear or other radioactive materials out of regulatory control to enable the USG plan a more effective and efficient R/N detection capability in order to manage national security risk and make R/N terrorism prohibitively difficult. This includes formal efforts to: define the threat; identify vulnerabilities; and evaluate consequences and the subsequent risk of R/N terrorism. Through these efforts, the Analysis Project is able to characterize, communicate, and advise on risk-related issues in support of the DNDO, DHS, and USG policy making, planning processes, investment decisions, and stakeholder assessment needs. The Analysis Project is responsible for conducting periodic, in-depth analysis of the R/N detection capabilities to inform strategic, budgetary, and operational decisions across the Federal Government. Strategic planning and risk assessments provide the status of current detection capabilities while assessing and prioritizing proposed architectural enhancements. Deliberate planning, modeling, and analysis of the R/N detection capabilities directly contribute to effective programming and budgeting decisions which contribute to making nuclear terrorism prohibitively difficult for our adversaries.
- *Solutions Management:* The Solutions Management Project collaborates with stakeholders, partners, and end-users to develop material and non-material solutions to reduce the risk from R/N threats. This effort is focused on gaps and vulnerabilities, operating environments, modes of transportation, and/or specific threats. As a first step in the SDP, the program leverages the outputs of Capabilities Based Assessments (CBA) and other analyses to identify R/N detection capability gaps. Furthermore, SDP engages stakeholders, operators, and others to capture requirements and develop necessary program documentation. This systematic approach is designed to reduce technical and programmatic risk of new material and non-material solutions that enter the development process.
- *International:* The International Project leads USG efforts to influence foreign countries through the development of guidance and best practice documents and associated awareness level courses with international organizations and initiatives, including the International Atomic Energy Agency (IAEA), the Global Initiative to Combat Nuclear Terrorism (GICNT), the International Law Enforcement Academy (ILEA), and the Nuclear Forensics International Technical Working Group (ITWG), and by working directly with bilateral partners. These efforts, which focus on the foundational elements of an architecture or nuclear forensics capability, such as strategy development / planning, risk, legal / regulatory, intelligence, the role of law enforcement, technical best practices, etc., are an agreed upon USG focus area and serve as a foundation for R/N detection capability coordination. Engagements guide future USG implementation efforts led by the Departments of State, Energy, and Defense. DNDO outreach efforts focus extensively on multilateral engagement opportunities. Leveraging existing USG footprints when and where possible helps capitalize on limited resources of like-minded partners to help serve as force multipliers in guiding and/or influencing a greater number of partners in their implementation efforts of national-level nuclear detection architectures. In select cases, DNDO works bilaterally with partners to jointly develop and/or enhance DNDO core competencies; i.e. architecture strategy development, detection and forensics-related R&D efforts, testing and evaluation, etc. Focusing on the up-front strategy / policy development of a national-level architecture (e.g. through establishment of guidance-level documents and supplementary awareness courses) sets the stage for more effective implementation of USG assistance programs to follow. DNDO efforts also focus on promoting the importance of detection within a country's interior and the role interior law enforcement plays in building a layered defense.

FY 2017 Key Milestone Events (Prior Year)

- Planning and Reporting: Led, published, and delivered the GNDA Joint Annual Interagency Review to Congress.

- Analysis: Revised the SDP Stage 0 process to ensure inclusion of operational component input in identifying, characterizing, and developing solutions to address R/N detection gaps.
- Analysis: Developed classified and unclassified nuclear detection capability Common Operating Picture (COP) to include global and U.S. data.
- Analysis: Completed a Systems Threat Review to analyze existing detection systems in air cargo pathways at international last points of departure (LPODs) and air ports of entry (APOEs) to identify how those systems could be leveraged during surge operations to detect R/N threats.
- Solutions Management: Delivered 15 Threat and Hazard Identification Assessment (THIRA) R/N technical assistance workshops to assist state and local stakeholders in evaluation of current R/N detection capability gaps.
- Solutions Management: Deployed the Capabilities Development Framework (CDF) mapping tool for state and local strategic planning use, including supporting THIRA and State Preparedness Report (SPR) processes.
- Solutions Management: Completed international rail commerce stream pathway analysis in order to develop risk reduction solution(s) recommendation.
- International: Conducted two ILEA R/N Smuggling and Detection Courses, one IAEA Nuclear Security Detection Architecture (NSDA) Awareness course, one IAEA Threat and Risk course.
- International: Conducted nuclear detection analysis on 30 countries to support development of the DNDO COP.

FY 2018 Planned Key Milestone Events (Year of Execution)

- Planning and Reporting: Lead, publish, and deliver to Congress as required the GNDA Joint Annual Interagency Review.
- Planning and Reporting: Lead development of the DHS R/N Terrorism Prevention Strategy.
- Planning and Reporting: Lead development of the DHS Inbound and Domestic R/N Threat Plan.
- Analysis: Implement classified and unclassified nuclear detection capability COP.
- Analysis: Conduct Systems Threat Reviews (STRs) for Radiation Portal Monitor replacement Program (RPM-RP) Phase II, SIGMA, Maritime Non-Containerized Cargo (MNCC), On-Dock Rail.
- Solutions Management: Conduct a MNCC AoA.
- International: Conduct multiple R/N smuggling and detection courses.

FY 2019 Planned Key Milestone Events (Budget Year)

- No longer to be represented as an R&D activity; funds budgeted in CWMD's O&S appropriation for future execution as an operational activity.

Delayed Milestones

- N/A

Overall Project Funding

Domestic Nuclear Detection Office**Research and Development**

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$17,000	\$15,578	\$17,276	\$17,577	
Obligations	\$16,010	\$15,578	\$14,454	\$17,577	

FY 2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
GNDA Analysis: Completed development of the Urban Area Nuclear Detection Architecture Template for the GNDA	1st QTR	2nd QTR
GNDA Analysis: Developed a high-level architecture description of the impact of the U.S. Third Coast on the GNDA	2nd QTR	3rd QTR
GNDA Analysis: Conducted capability gap (Stage 0) outreach with the USCG, as part of a biennial review of current and future capability needs analysis	1st QTR	4th QTR
GNDA Solutions Management: Conducted analysis of operational alternatives to reduce identified IGA vulnerabilities	1st QTR	4th QTR
GNDA Solutions Management: Characterized the interior layer by improving the CDF assessment flexibility and placing the CDF on a web-enabled platform to improve nationwide stakeholder access to the tool	1st QTR	4th QTR
International: Co-chaired the IAEA's International Coordination Meeting to discuss good practices and challenges in developing a nuclear security detection architecture (NSDA).	1st QTR	4th QTR
FY 2018		
Planning and Reporting: Lead development of the DHS R/N Terrorism Prevention Strategy.	1st QTR	4th QTR
Planning and Reporting: Lead development of the DHS Inbound and Domestic R/N Threat Plan.	1st QTR	4th QTR
Analysis: Conduct CBA on the International Commercial Air Cargo (ICAC) threat vector	1st QTR	3rd QTR
Solutions Management: Finalize detailed international rail commerce stream analysis to identify unaccounted risk mitigation activities and support potential improvements in the pathway	1st QTR	4th QTR
Solutions Management: Conduct an AoA to assess materiel and non-materiel solutions to reduce R/N smuggling risk in the MNCC pathway and finalize CONOPS and ORD	1st QTR	4th QTR
International: Conduct two iterations of the RN Smuggling and Detection Awareness course in Bangkok, Thailand, two iterations of the RN Smuggling and Detection Awareness course in Budapest, Hungary, and one iteration of the RN Smuggling Detection Awareness course in partnership with ILEA Gaborone	1st QTR	4th QTR

Type of Research

Not Applicable

Technology Readiness Level

Not Applicable

Transition Plans

Not Applicable

Transformational Research and Development - PPA**Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Transformational Research and Development	-	-	\$62,028	-	-	\$60,581	-	-	-	-	-	(\$60,581)
Total	-	-	\$62,028	-	-	\$60,581	-	-	-	-	-	(\$60,581)
Subtotal Discretionary - Appropriation	-	-	\$62,028	-	-	\$60,581	-	-	-	-	-	(\$60,581)

With the transfer of the functions of DNDO to CWMD, no funds are included in the FY 2019 President's Budget for DNDO's Transformational R&D (TRD) PPA. Funding for the programs previously supported through this PPA are discussed in CWMD's FY 2019 R&D CJ.

DNDO's TRD identifies, explores, develops, and demonstrates scientific and technological approaches to improve performance and address gaps in R/N detection and forensics capabilities; and/or significantly reduce the operational burden of these technologies. DNDO works closely with partners to transition technologies from research to the field, including transfer of technologies to the commercial sector for development and commercialization.

DNDO has formalized its technology transition and transfer methodology, which describes the relationship among its PPAs as technologies progress from research, development to deployment. Projects in the TRD PPA historically had technology readiness levels (TRL) of one through seven. Going forward, the TRD account will generally manage technology development through TRL level six within CWMD. As appropriate, technology development at TRL level 6 and higher will be managed in other accounts. Deployment and support of material solutions will continue to be managed in the Procurement, Construction, and Improvements and in the Operations Support appropriations.

R&D investments aligned with goals and priorities outlined in the *DNDO Transformational and Applied Research Roadmap and Implementation Strategy, Fiscal Years 2016 – 2021*, are issued as competitive awards open to researchers from all sectors: government laboratories, academia, and private industry. The transformational research efforts leverage the qualities and advantages of all three sectors to develop capability. Teaming is encouraged across the sectors. TRD is carried out within four major programs: Advanced Technology Demonstration (ATD); Exploratory Research (ER); Academic Research Initiative (ARI); and the Small Business Innovation Research (SBIR) program. Each program is described in detail on the following pages along with the corresponding projects (ATD, SBIR) and research areas (ARI, ER).

Transformational Research and Development – PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$62,028	\$60,581	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$6,335	\$4,528	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$68,363	\$65,109	-
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	\$68,363	\$65,109	-
Obligations (Actual/Projections/Estimates)	\$51,387	\$65,109	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Transformational Research and Development – PPA

Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$62,028
FY 2018 President's Budget	-	-	\$60,581
FY 2019 Base Budget	-	-	\$60,581
Transfer to CWMD/R&D from DNDO/R&D/TRD for CWMD	-	-	(\$60,581)
Total Transfers	-	-	(\$60,581)
Total Adjustments-to-Base	-	-	(\$60,581)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$60,581)

Transformational Research and Development – PPA Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Transformational Research and Development	\$62,028	\$60,581	-	(\$60,581)
Total	\$62,028	\$60,581	-	(\$60,581)
Discretionary - Appropriation	\$62,028	\$60,581	-	(\$60,581)

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$146	\$150	-	(\$150)
25.1 Advisory and Assistance Services	\$1,821	\$2,371	-	(\$2,371)
25.5 Research and Development Contracts	\$49,493	\$46,570	-	(\$46,570)
41.0 Grants, Subsidies, and Contributions	\$10,568	\$11,490	-	(\$11,490)
Total - Non Pay Object Classes	\$62,028	\$60,581	-	(\$60,581)

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Academic Research Initiative	\$11,018	\$11,964	-	(\$11,964)
Exploratory Research	\$21,165	\$24,268	-	(\$24,268)
Advanced Technology Demonstration	\$25,324	\$22,410	-	(\$22,410)
Small Business Innovation Research*	\$4,522	\$1,939	-	(\$1,939)
Total – Non Pay Cost Drivers	\$62,028	\$60,581	-	(\$60,581)

*Small Business Innovation Research (SBIR) funding shown only reflects Transformational Research and Development funding. Actual amount of R&D set aside for small business is determined in the year of execution after assessing the appropriations, and comparison of responses to DNDO's annual announcement for proposals to DNDO mission requirements.

NARRATIVE EXPLANATION OF CHANGES

- **Academic Research Initiative:** The Academic Research Initiative (ARI) program has two primary objectives: 1) Advance fundamental knowledge in the sciences and engineering related to radiological and nuclear threat detection and forensics needed to solve long-term, high-risk challenges; and 2) Develop the next generation workforce in the nuclear sciences, engineering, and related fields. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **Exploratory Research:** The Exploratory Research (ER) program explores innovative, high-risk technologies that address gaps in U.S. R/N detection capabilities, provide improvements in performance or reduction in cost of R/N detection capabilities, and enhance nuclear forensics capabilities. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **Advanced Technology Demonstrations:** The Advanced Technology Demonstration program performs accelerated development, characterization, and demonstration of leading-edge technologies that address critical gaps in nuclear detection and forensics capabilities. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.

Transformational Research and Development – PPA Research and Development

Technology Readiness Level Exhibit

Advanced Technology Demonstrations (ATD)

The Advanced Technology Demonstration (ATD) program performs accelerated development, characterization, and demonstration of leading-edge technologies that address critical gaps in nuclear detection and forensics capabilities.

- **Problem:** Analyses and reviews conducted by DNDO in conjunction with USG partner agencies on radiological and nuclear detection and forensics capabilities have resulted in the identification of five grand challenges:
 - Cost effective equipment with sufficient performance to ensure wide spread deployment;
 - Detection of special nuclear material (SNM), i.e. uranium or plutonium, especially when shielded;
 - Enhanced wide area search capabilities in a variety of scenarios, to include urban and highly cluttered environments;
 - Monitoring along challenging threat pathways; and
 - Forensics determination of the origin and history of interdicted materials.
- **Solution:** The ATD program performs accelerated development, characterization, and demonstration of leading-edge technologies that address critical gaps in nuclear detection capabilities. It builds on technology concepts previously demonstrated under the ER program, research conducted by DNDO's interagency partners, or privately funded research, further advancing the promising technologies into the next stage of development and system-level integration. Through the ATD program, technology concepts are developed into prototype systems called Performance Test Units (PTU), which provide reliable and scalable performance measurements in a challenging and realistic simulated or controlled operational environment. Through this characterization process, sufficient understanding of the technology is obtained to recommend a technology transition path for the PTU to a government acquisition program, commercial system development, or additional basic and applied research.

New ATD projects are initiated approximately yearly based on: 1) prioritized gaps in U.S. R/N detection capabilities; and 2) technological successes from the ER program, the ARI, or other private or public research programs that support the prioritized gaps. Multiple research projects are being monitored for potential transition to an ATD.

- **Impact:** Through this program, technology is matured and integrated. Robust data sets are collected which define the performance envelope of the existing technology and are available to support requirements development efforts for future acquisition programs. The culminating Technology Demonstration and Characterization phase is important in that it defines the tangible technological benefits that can be achieved with real-world, integrated systems. Demonstration units are an essential tool in transitioning promising technologies because they are generally the first time operational end users get to interact with a new technology.

Sub-Projects

- *Airborne Radiological Enhanced-sensor System (ARES) Project*: ARES technology is radiation search focused and is enabled by the fusion of radiation detection with other sensing modalities (e.g., multispectral imaging, GPS, altimetry, etc.). Utilizing scintillating materials, innovative packaging, and algorithm improvements, the ARES systems will offer greater detection sensitivity, lower nuisance alarms, and simultaneously provide a greater range of operation. The final report will be completed in FY 2018.
- *Nuclear and Radiological Imaging Platform (NRIP)*: The NRIP sub-project leverages recent advancements in the commercial sector as well as prior TRD work. By combining the merits of passive and active technologies, new systems are being developed so that a single system is able to detect radiological and nuclear threats, regardless of the amount of shielding or the complexity of cargo, in primary mode with minimal impact to the flow of commerce. In addition to system performance characterization in a simulated operational environment, these systems will also undergo testing in a controlled, but realistic, operational environment. DNDO, in conjunction with U.S. Customs and Border Protection (CBP), will characterize the Passport NRIP system at Conley Container Terminal in South Boston, in late FY 2017. Pending results of the characterization, DNDO and CBP shall explore the possibility of conducting an extended operational demonstration of this technology through FY 2018.
- *Radiation Awareness and Interdiction Network (RAIN)*: The RAIN sub-project is intended to develop and characterize technologies for monitoring highway traffic and their on-ramps for vehicles carrying nuclear or other radioactive threat materials. RAIN technologies have integrated networked radiation sensors with vehicle detection and identification systems to allow actionable information on threat-carrying vehicles to be passed to law enforcement. Two technical approaches are continuing to be developed, to include a gantry-based over-the-road solution compatible with COTS all-electronic tolling systems, and a side-of-the-road technology intended for rapid deployment. High interest in the capability has been expressed by the New York Police Department (NYPD), and initial interest by DHS agencies such as the CBP's Border Patrol. Analysis of early data collection coordinated with NYPD helped generate the required performance and suitability requirements for the RAIN systems. Government characterization of the prototype systems was completed in FY 2017. Planning is now underway for an operational demonstration of the technology with Nassau County of New York in FY 2018.
- *Enhanced Radiological Nuclear Inspection and Evaluation (ERNIE)*: The ERNIE system is an advanced machine learning (ML) based approach to analyze radiation portal monitor (RPM) scans for greater overall system performance (improved threat detection with reduced nuisance alarm rates). Key features are extracted from RPM scan data in real-time and supplied to ML algorithms to make a determination of the mostly likely class of the cargo: non-emitting, naturally occurring radioactive material, medical, industrial or special nuclear materials. This provides CBP Officers improved information on whether a conveyance should be released or inspected, and if inspected, information to enable the inspection process. A formal operational assessment was completed of ERNIE performance in FY 2016, resulting in a joint decision by DNDO and CBP to deploy the capability in 2018. The outcome of the assessment supported DNDO's first technology transition agreement of a research effort from development activities to integration and deployment activities. The first planned deployment is to the Virginia International Gateway in FY 2018, along with up to four other sites.
- *Wearable Intelligent Nuclear Detection (WIND) Project*: The ability to interdict a moving threat or localize an emplaced threat during wide area search missions is a major technical challenge. The WIND sub-project will develop and characterize a highly-modular, multi-purpose, and human-portable (e.g., backpack or vest) system that greatly advances the ability to detect and interdict threats during wide area search missions. The technical approach will merge two major sources of information to develop the design specifications. The first approach will utilize threat analysis to compare several critical design options, including the enhanced sensitivity of state-of-the-art radiation

anomaly detection algorithms. The second approach will survey end users to gather initial requirements and then will proceed to spiral development, getting end user input along the way to develop a balanced and flexible system. A number of advanced capabilities will be fully characterized, to include spectral anomaly detection, spatial mapping/tracking, sophisticated background subtraction, and sensor fusion. In FY 2016, DNDO issued a solicitation for the proposed research and development, and four awardees were selected across two topic areas. In FY 2017, each device design underwent a review according to the performance assessment methods described above. In FY 2018, each of the four awardees will assemble a performance test unit to undergo a Characterization Readiness Review in preparation for demonstration and characterization for technology transition potential in FY 2019.

- *Mobile Urban Radiation Search (MURS)*: The goal of the MURS sub-project is to efficiently migrate the knowledge and technology of previous Transformational R&D stand-off and long range detection projects into a production-ready, compact, next-generation mobile radiation detection platform. The MURS systems leverages state-of-the-art radiation detection, identification, and localization, fused with contextual sensing such as video, LIDAR, and high resolution GPS. Technology development began in FY 2015 with demonstration of the first spiral prototype in FY 2017. The project will continue in FY 2018 with the development and deployment of eight MURS prototypes to disparate operating environments. The deployments will be used to garner end-user input on design, performance, integration, and utility, such that additional development can be directed ahead of formal product acquisition.
- *High-Throughput Integrated Rail Scanner (HIRS)*: The planned HIRS sub-project will start with collaborations with CBP to assist in the development of requirements and evaluation of technologies for rail scanning (FY 2018). This work will then inform necessary hardware improvements for the next generation, as well as initial modeling and simulation (FY 2018-2019) which will drive HIRS design. Automated algorithms with material discrimination for detection of SNM in this scanning environment will also be developed and evaluated. It is anticipated that the results from this program will be leveraged by CBP for future rail scanning operations.
- *SIGMA Transition*: SIGMA is a multi-pronged approach to the wide area monitoring and search problem for radiological and nuclear threats. The technology is being transitioned to DNDO from the Defense Advanced Research Project Agency (DARPA) with shared funding in FY 2018. The guiding DARPA program tenets have been (1) foster commercial availability of inexpensive, wearable detectors far superior to available spectroscopic personal radiation detectors (SPRDs); (2) incorporate cutting edge, USG-funded detection algorithms; and (3) link the detectors via smartphone to a cloud network and provide system-level monitoring in addition to local read-out. In transitioning the technology, DNDO is taking the opportunity to evaluate how various SIGMA technologies will become effective tools in the larger framework of R/N detection capabilities. SIGMA technology provides the first example of low-latency monitoring of thousands of dispersed spectroscopic radiation detectors. Developmental DNDO technologies such as RAIN, MURS, and WIND will be considered for compatibility within this network. DNDO funding supports continued development of a second generation of low cost detectors, algorithms enabling detection and isotope identification in offline mode, algorithms facilitating spatial-temporal tracking of a radiation sources when there are multiple detector encounters, and hardening of the network communications backbone. The sub-project also supports development of an operational transition pathway to include facilitating deployment of the technology as determined by DNDO. DNDO is planning and scoping a pilot for pathway-specific monitoring, particularly covering known smuggling routes in the Caribbean and Southeastern United States.

FY 2017 Key Milestone Events (Prior Year)

- ARES Sub-Project: Continued data analysis and replay to populate analysis products for final report (due FY 2018).
- NRIP Sub-Project: Commenced Technology Demonstration and Characterization of Passport NRIP system at Conley Terminal.
- RAIN Sub-Project: Conducted government characterization of RAIN performance test units that successfully complete a characterization readiness review. Worked with stakeholders to plan and execute an operational demonstration of the systems around New York City.
- ERNIE Sub-Project: Completed Operational Assessment report.
- WIND Sub-Project: Completed Spiral development event to provide end-user feedback on initial vendor designs. Validated the interface control document to demonstrate interoperability among multiple hardware and algorithm vendors and validate open-architecture development framework.
- MURS Sub-Project: Integrated MURS system into a Federal Bureau of Investigations (FBI) vehicle to further operational development. Participated in FBI deployments for the Presidential Inauguration, State of the Union Address, and 4th of July to refine the operational usability of the developmental technologies.
- HIRS Sub-Project: Initiate project planning and the derivation of the R&D requirements for next generation rail cargo scanning using non-intrusive inspection (NII) technologies, enabling increased penetration and high throughput without impeding rail operations.

FY 2018 Planned Key Milestone Events (Year of Execution)

- ARES: Complete final characterization report.
- NRIP Sub-Project: Potential operational pilot with CBP at Conley Terminal and data analysis.
- RAIN Sub-Project: Operational demonstration of RAIN system potentially screening west bound traffic in Nassau County, NY.
- ERNIE Sub-Project: Initial phased deployment in conjunction with CBP.
- MURS Sub-Project: Deploy eight MURS systems to Federal partners for rapid prototyping and commercialization. Prototyping efforts shall inform mobile system requirements for broader future deployment.
- WIND Sub-Project: Complete supporting system threat review (STR) to evaluate effectiveness of proposed vendor designs in detecting threats. Complete critical design reviews with WIND vendors. Finalize analysis and characterization plans to evaluate prototype performance during Technical Demonstration and Characterization in FY 2019.
- HIRS Sub-Project: Release Broad Agency Announcement.
- SIGMA Sub-Project: Transition SIGMA from DARPA to DNDO. Develop SIGMA pilot plan for DHS/DNDO. Begin SIGMA pilot.

FY 2019 Planned Key Milestone Events (Budget Year)

- Funds budgeted in CWMD's R&D appropriation for future execution.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$23,672	\$27,254	\$25,324	\$22,410	-
Obligations	\$23,572	\$21,489	\$22,139	\$22,410	-

FY 2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
ARES		
Data Analysis	FY 2015	FY 2017
Final Report	FY 2017	FY 2018
NRIP		
Passport Characterization Readiness Review	FY 2016	FY 2017
Passport Technology Demonstration and Characterization	FY 2017	FY 2018
Passport Operational Demonstration	FY 2018	FY 2019
Passport Data Analysis	FY 2017	FY 2019
Passport Final Report	FY 2018	FY 2019
RAIN		
Technology Demonstration and Characterization	FY 2016	FY 2017
Operational Demonstration	FY 2018	FY 2019
Final Report	FY 2017	FY 2019
ERNIE		
Operational Assessment Report	FY 2016	FY 2017
Phased Deployment with CBP/ Technology Transition	FY 2016	FY 2018
WIND		
Spiral Development	FY 2016	FY 2017
Interface Control Document	FY 2017	FY 2017
Systems Threat Review	FY 2017	FY 2018
Critical Design Review	FY 2018	FY 2018
Characterization Readiness Review	FY 2018	FY 2019
Technology Demonstration and Characterization	FY 2018	FY 2019
MURS		
Operational Demonstrations	FY 2016	FY 2017
Critical Design Review	FY 2015	FY 2017
Develop Eight MURS Units	FY 2017	FY 2018
Operational Pilots	FY 2018	FY 2019
HIRS		

Domestic Nuclear Detection Office**Research and Development**

Research & Development Description	Planned Start Date	Planned Completion
SIGMA		
Transition SIGMA to DNDO	FY 2018	FY 2018
Develop DNDO Pilot Plan	FY 2018	FY 2019
Conduct SIGMA Pilot	FY 2018	FY 2020

Type of Research

Developmental

Technology Readiness Level

The Advanced Technology Demonstration program generally matures technology from TRL 5 to 7.

Transition Plans

The ATD project develops demonstration units that may result in several transition outcomes. They lead to the possibility of direct commercialization. They provide the basis for forming Technical Transition Agreements with DNDO for Federal acquisition. They also identify component technologies that require further maturation under the Exploratory Research project.

The Exploratory Research (ER) program explores innovative, high-risk technologies that address gaps in U.S. R/N detection capabilities, provide improvements in performance or reduction in cost of R/N detection capabilities, and enhance nuclear forensics capabilities.

- **Problem:** Recurring analyses conducted by DNDO and results from the joint interagency annual review of the National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States have highlighted a number of long-term technical grand challenges that provide a focus for research activities conducted under the ER program. Further, through across government consensus in framing the Nuclear Defense Research and Development Roadmap (NDRD), several important grand challenges were identified to help inform agencies that enable capabilities through research and development related to detection and nuclear forensics. These grand challenges include:
 - Cost effective equipment with sufficient performance to ensure wide spread deployment (Cost Effective)
 - Detection of special nuclear material (SNM; i.e. uranium or plutonium, especially when shielded) (Shielding)
 - Enhanced wide area search capabilities in a variety of scenarios, to include urban and highly cluttered environments (Search)
 - Monitoring along challenging pathways in the architecture (Pathways)
 - Forensics determination of the origin and history of interdicted materials (Forensics)
- **Solution:** The ER program explores innovative, high-risk, early to later-stage technologies. Specifically, the ER program researches technologies and techniques that:
 - Address capability gaps and weaknesses in the framework of R/N detection capabilities;
 - Provide substantial performance improvement and/or cost reduction of R/N detection capabilities; and
 - Improve nuclear forensics capabilities.
- **Impact:** Capabilities developed under the ER program can provide enabling technologies in support of the ATD program or directly spur commercial development.

Sub-Projects

- *Materials Research and Supporting Technologies (Materials):* The Materials sub-project has the technical objective of discovering new high performance and/or low cost gamma-ray and neutron sensing materials, significantly improving existing materials or lowering their costs, improving or developing new signal readout methods for these materials, and incorporating these materials into prototypes for test and evaluation. Advances in this project impact most if not all of the other portfolios and Grand Challenges. This project focuses on the core detection materials used in most radiation detectors: scintillators and semiconductors. The project addresses improvements in types of materials ranging from those appropriate for handhelds, backpacks, and personal radiation detectors with very good energy resolution capable of superior isotope and threat identification, to those used in large portal monitors which would benefit from better isotope capabilities and discrimination between threat and non-threat. Project also addresses stability issues in portal plastics, both in terms of understanding the root cause of the issues as well as finding low cost and robust solutions. Links to the Cost Effective grand challenge.

- *Radiation Detection Technology (Radiation)*: The Radiation sub-project emphasizes investigating novel approaches to greatly improve the ability to detect, identify, and locate threat materials based on their intrinsic radiological signatures. Research emphasis has been on improved gamma-ray detection approaches, particularly imaging, enabled by new electronics, sensor fusion, and advanced algorithms. Recent efforts are focused on development of technologies to make low operational burden R/N sensors available for a wide variety of law enforcement vehicles. Links to the Search grand challenge.
- *Shielded Special Nuclear Material (Shielding)*: The Shielding sub-project addresses the critical challenge of being able to detect SNM and other threats even when heavily shielded or masked. ER projects under this Sub-Project are focused on development of component technologies to include next generation x-ray and neutron radiation sources for homeland security applications, algorithms enabling improved imaging for radiography, and detector materials that can be integrated into large scale systems for screening cargo and conveyances for shielded threats. Also investigates alternative approaches to shielded threat detection that do not rely on the use of ionizing radiation. Links to the Shielding grand challenge.
- *Advanced Analytics (Analytics)*: The Analytics Sub-Project has two thrust areas: (1) algorithms are developed to improve the means and abilities to detect, locate, and identify threat materials, and (2) modeling and simulation tools are developed to aid in the analyses of R/N detection capabilities. They are used in the identification of capability gaps, risk assessments, and cost-benefit analyses.
- *Nuclear Forensics (Forensics)*: The Forensics Sub-Project directly coordinates with DNDO's NTNFC mission to execute research and development to discover new forensics signatures of R/N material and to also develop the tools enabling comprehensive and timely analytical results. R&D conducted under this sub-project looks to collect signature data to increase our ability to answer questions about the history of interdicted material, develop models to provide predictive associations of that data, and to exploit the validated signatures to answer specific material origin questions.

FY 2017 Key Milestone Events (Prior Years)

- Materials:
 - Initiated one new R&D activity to investigate defect formation and mechanisms of plastic scintillators in the short and long-term upon exposure to environmental conditions such as varying temperature and moisture.
 - Discovered and documented root cause of plastic degradation in portal plastics due to long term exposure to environmental conditions such as varying temperature and moisture, and found alternate non-degrading formulation solutions for the plastics.
 - A prototype Handheld Radiation Isotope Identification Detector (RIID) based on a newly developed, high energy resolution material (Strontium Iodide) with advanced isotope identification algorithms was delivered to DNDO for inclusion in future tests.
 - Three different new higher performance, lower cost, material technologies integrated into sub-modules have been supplied to Active Interrogation (AI) and radiography system integrators for test and evaluation. These materials were out-growths of an Active Interrogation Materials (AIM) workshop several years ago which included both materials experts and AI system integrators.
- Radiation:
 - Completed baseline study of personal and mobile detection assets used for current monitoring mission, and provided assessment critical areas for performance improvement.
 - Initiated one new R&D activity to develop a machine learning algorithm to predict and proactively mitigate maintenance issues arising within the currently deployed radiation portal monitor (RPM) fleet.

- Initiated one new R&D activity exploring approaches to make low operational burden R/N sensors available for a wide variety of law enforcement vehicles. This effort will integrate proven computer vision algorithms for real-time tracking of pedestrians and vehicles.
- Shielding:
 - Completed Proof-of-Concept demonstration for a human-portable neutron source suitable for mobile scanning applications.
- Analytics:
 - Initiated two new R&D activities to investigate application of big data analytic techniques to seek indicators of proliferation, loss of control, or imminent loss of control of R/N materials that may be more effective in material interdiction than current material pathway analysis.
 - Initiated one new R&D activity to develop a modeling capability to anticipate where adversaries will deviate from normal travel routes to avoid ports of entry into the United States, and to estimate the probability of encounter over broad geographic regions.
 - Completed Proof of Concept for the Exploratory Research project titled “Monte Carlo Neutron Particle (MCNP) Physical Interoperability and Validation (PMIV).” MCNP is a statistical tool used throughout the R/N scientific community for modeling R/N systems and effects.
 - Completed two Feasibility Evaluation Reviews for two projects exploring competing approaches for autonomous gain stabilization of gamma-ray spectra. These projects have the potential to enhance the efficacy and reduce down-time of gamma detectors in operational use.
- Forensics:
 - Initiated two new R&D activities investigating development of production techniques for nuclear forensics reference materials.
 - Completed Proof-of-Concept demonstration for image analysis software that will help enable consistent and defensible nuclear material analysis of morphology.

FY 2018 Planned Key Milestone Events (Year of Execution)

- Materials:
 - Initiate and conduct feasibility evaluation of two new R&D activities for increasing the size of low cost, spectroscopic plastic materials for radiation portal monitors that will enable improved performance over currently deployed systems to support effective isotope and threat identification and discrimination between threat and non-threat.
 - Initiate up to three new R&D activities leading to demonstrations in a simulated operational environment of a prototype RIID based on the newly developed, high efficiency, high energy resolution semiconductor gamma detector material thallium bromide. This material would provide a low cost and operationally effective alternative to the commercial off-the-shelf cadmium zinc telluride and high-purity germanium detector material.
- Radiation:
 - Initiate and conduct feasibility evaluation of one new R&D activity exploring approaches to make low operational burden R/N sensors available for a wide variety of law enforcement vehicles. This approach will fuse radiation data with contextual sensors and computer vision algorithms to continuously identify, track, and classify objects in the scene into categories useful for radiation propagation modeling.

- Shielding:
 - Initiate and conduct feasibility evaluation of one new R&D activity aimed at developing the next generation pulsed x-ray source suitable for true active interrogation applications and high throughput for shielded threat detection. Effort is working toward high pulse rate and better pulse flexibility (energy, intensity, and timing), in a comparable size and cost to existing commercial x-ray sources.
 - Initiate and conduct feasibility evaluation of two new R&D activities for development of a continuous output x-ray source that will enable high-throughput scanning for active interrogation for shielded threat detection.
 - Initiate up to three new R&D activities leading to demonstration of a prototype mobile active interrogation system using neutrons in a simulated operational environment.
 - Complete Proof of Concept demonstration for a series of enabling technologies to support rail cargo inspection to include fast detectors and a radiation source specifically designed to dramatically improve R/N detection in rail cargo.
 - Complete a Proof of Concept demonstration for development of a platform-agnostic algorithm that provides optimized detection of nuclear-threat anomalies in radiographic images across the entire fleet of current and planned Non-Intrusive Inspection (NII) radiography imaging systems, regardless of manufacturing.
- Analytics:
 - Initiate and conduct feasibility evaluation of one new R&D activity to conduct general research in how to use and extend a currently existing agent-based, physical security simulation package for the purpose of studying the probability of encounter for illegal, non-port-of-entry border crossings into the United States.
- Forensics:
 - Initiate and conduct feasibility evaluation of one new R&D activity for development of models to help predict morphological signatures of uranium and plutonium materials that can be used to link measured data on morphology with the process it was made from.
 - Continue evaluating the performance of a DNDO-developed image analysis software as implemented by Technical Nuclear Forensics experts and enable their input in the development of the tool. This will result in development of a validated software tool to enable signature discovery, which has been reviewed and adapted to support a cross-section of Nuclear Forensics experts.
 - Complete a Proof-of-Concept demonstration of a method for analyzing depth information in nuclear materials.
 - Complete a Proof-of-Concept demonstration of a method which will help enable better analysis of nuclear materials

FY 2019 Planned Key Milestone Events (Budget Year)

- Funds budgeted in CWMD's R&D appropriation for future execution.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$24,126	\$21,977	\$21,165	\$24,268	
Obligations	\$23,847	\$21,331	\$19,884	\$24,268	

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
Materials: Study of Plastic Scintillator Degradation Mechanisms	4th QTR	1st QTR FY20
Radiation: Radiation Portal Monitor Predictive Maintenance	4th QTR	2nd QTR FY20
Radiation: Low Operational Burden R/N Detection for Law Enforcement Vehicles	4th QTR	3rd QTR FY20
Analytics: Big Data Analytics for Indicators of R/N Trafficking	4th QTR	4th QTR FY20
Analytics: Probability of Encounter Modeling	4th QTR	1st QTR FY19
Forensics: Production Techniques for Nuclear Forensics Reference Materials	4th QTR	3rd QTR FY20
FY 2018		
Materials: Low Cost, High Performance RadioIsotope Identification Detector (RIID) based on Thallium Bromide Semiconductor	4th QTR	4th QTR FY21
Materials: Scale Up to Full Portal Size of Advanced Spectroscopic Plastics Capable of Enhanced Threat/Non-Threat Discrimination	1st QTR	2nd QTR FY21
Shielding: Next Generation Pulsed X-Ray Sources	4th QTR	3rd QTR FY21
Shielding: High Performance, Compact, Continuous Wave X-ray Sources	4th QTR	4th QTR FY21
Shielding: Mobile Active Interrogation Using Neutrons	4th QTR	4th QTR FY21
Forensics: Predictive Morphological Modeling	1st QTR	1st QTR FY20

Type of Research

Applied

Technology Readiness Level

Levels 2-5

Transition Plans

Successful ER technologies and concepts may transition to support subsequent ATD projects, future acquisitions, or directly spur commercial development. Under the Shielded sub-project, results from activities concluding in FY 2018 could be used to support future acquisitions for rail cargo scanning. Results from activities under the Forensics sub-project will transition to the Technical Nuclear Forensics community.

The Academic Research Initiative (ARI) program has two primary objectives: 1) advance fundamental knowledge in the sciences and engineering related to radiological and nuclear threat detection and forensics needed to solve long-term, high-risk challenges; and 2) develop the next generation workforce in the nuclear sciences, engineering, and related fields.

- **Problem:** The ARI addresses elements of the grand challenges (as first described on page 31 and shown again below) through breakthrough and fundamental research. Radiological and nuclear detection and nuclear forensics is multi-disciplinary. Areas traditionally associated with R/N expertise have aging subject matter experts and shrinking funding. Areas not traditionally associated with R/N expertise can provide new perspectives but are not necessarily aware of their potential impact. Analyses and reviews conducted by the USG partner agencies on radiological and nuclear detection and forensics capabilities have resulted in the identification of five grand challenges:
 - Cost effective equipment with sufficient performance to ensure wide spread deployment (Cost Effective).
 - Detection of special nuclear material (SNM), i.e. uranium or plutonium, especially when shielded (Shielding).
 - Enhanced wide area search capabilities in a variety of scenarios, to include urban and highly cluttered environments (Search).
 - Monitoring along challenging GNDA pathways (Pathways).
 - Forensics determination of the origin and history of interdicted materials (Forensics).
- **Solution:** Provide continued investment in fundamental science, engineering, and related fields to build capability at the university level. Students supported by the project are provided funding to help them in their work toward undergraduate and graduate degrees. The ARI program is also reaching out to non-traditional areas to solicit their ideas to solving R/N detection and forensics challenges.
- **Impact:** Since the ARI program was started in 2007, it has awarded over 100 grants to more than 55 academic institutions and sponsored over 160 students. These grants have resulted in over 580 journal publications which have increased the fundamental knowledge in areas such as nuclear engineering, physics, and chemistry, as well as other disciplines not traditionally associated with R/N detection like social sciences, deterrence theory, and applied mathematics.

The ARI Program follows established academic practices of peer review and competitive research awards. These practices include conducting an annual program review that enables faculty and student researchers funded by these competitively awarded DHS grants to present their latest finding to both DHS program managers as well as their peers. Presentations follow accepted practices used at scientific conferences: professors, post-doctoral research associates, and students give scheduled talks in topic area sessions; students present posters at forums designed to foster face-to-face interactions with researchers.

Sub Project

- *Materials Science for Nuclear Detection (Materials)* – Research in this area focuses on high-risk, long-term research aimed at developing greatly improved radiation detector materials for gammas and neutrons that are highly sensitive, selective, low-cost, and rugged. This

research aims to understand the fundamental properties of radiation sensing materials, such as mechanisms of light production in scintillator materials and charge mobility and lifetimes in semiconductor materials.

- *Analytical Techniques for Nuclear Detection (Analytics)* – This sub-project investigates innovative data processing and analysis techniques that will lead to major performance improvements through state-of-the-art computational methodologies. Current and prior research in this area has included fundamental algorithm development for real-time gamma-ray imaging and radionuclide identification and application of machine learning to facilitate mobile search/detection performance. The research also includes advances in simulation and modeling techniques to provide early understanding of the operational benefits of new threat detection approaches or background suppression.
- *Fundamentals of Nuclear Forensics (Forensics)* – This sub-project develops analytical techniques that can be used to determine the processing history and transit route of pre-detonation nuclear materials. Research emphasis includes identifying ways to improve analytical techniques and methodologies (e.g., speed, accuracy, and precision) for determining the physical, chemical, radiological, or morphological properties of nuclear or other radioactive materials.
- *Science and Engineering for Radiation Threat Sensing (Radiation)* – Research in this area explores radically new approaches to threat detection, eventually leading to sensor or detection system concepts that are highly sensitive to R/N signatures and selective in their ability to distinguish and locate these materials from naturally occurring background radiation. This includes research into new detection system concepts that provide new insights in how threat materials can be detected even in challenging pathways.
- *Science and Engineering of Shielded Threat Detection (Shielding)* – This research area includes investigations to overcome the challenge of detecting shielded SNM, with a focus on component technologies used in non-intrusive inspection or active interrogation approaches for cargo scanning, vehicle scanning, and human-portable scanning applications. Fundamental research in this area addresses a range of studies to augment conventional nonintrusive inspection approaches including: 1) transformational low-power, low-weight, high-yield neutron and gamma-ray producing sources; 2) high-efficiency, fast-recovery, low-cost detectors for active detection; 3) novel active interrogation inspection concepts; and 4) investigations into unique signatures and fundamental data associated with active detection methods such as nuclear resonance fluorescence.

FY 2017 Key Milestone Events (Prior Year)

- Performed project reviews of each ARI grantee at the site of lead performer.
- Funded 45 research efforts at 29 universities to address long-term, high-risk challenges in R/N Detection and Forensics.
 - Completed investigation of new materials and approaches capable of large area neutron detection.
 - Completed investigation on advanced techniques to improve properties of the detector material cadmium-zinc-telluride (CZT).
 - Completed a feasibility evaluation of a modeling and experimental project on a nuclear reactor type and its ties to nuclear forensics.

FY 2018 Planned Key Milestone Events (Year of Execution)

- Release a Notice of Funding Opportunity (NOFO) announcement to solicit new proposals for research, and award up to 15 new grants.
- Hold annual ARI Program Review to host over 40 grants to present their research to DNDO and interagency audiences.
- Fund over 40 research efforts at over 30 universities to address long-term, high-risk challenges in R/N Detection and Forensics.
 - Complete feasibility evaluations in approaches to improve the performance of plastic scintillators through loading and conjugated polymers.
 - Complete a feasibility evaluation on monochromatic x-rays and their ability to enable low-dose scanning
 - Complete a feasibility evaluation on a project that is modeling actinide metals for use in nuclear forensics

FY 2019 Planned Key Milestone Events (Budget year)

- Funds budgeted in CWMD's R&D appropriation for future execution.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$10,612	\$11,496	\$11,018	\$11,964	
Obligations	\$10,612	\$9,849	\$10,971	\$11,964	

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
Development of Improved CMT and CZT Detectors	4th QTR FY11	4th QTR FY17
Large Area High Sensitivity Neutron Detection	4th QTR FY11	4th QTR FY17
Nuclear Data Measurement Using Gamma Rays	4th QTR FY11	4th QTR FY17
Electron Tracking for gamma imaging Electrophoretic Boron in Silicon	4th QTR FY11	4th QTR FY17
FY 2018		
Physics Driven Scintillator Design	4th QTR FY13	4th QTR FY18
Scintillating Conjugated Polymers	4th QTR FY13	4th QTR FY18
GND A Deterrence Theory	4th QTR FY13	4th QTR FY18
Structure Property Relationships of Metal Actinide Alloys	4th QTR FY13	4th QTR FY18
Low Dose Inspection with Monochromatic Gammas	4th QTR FY13	4th QTR FY18
Low Cost Glass Ceramic Scintillator Materials for Neutron and Gamma Ray Detection	4th QTR FY13	4th QTR FY18
Organic Field Effect Transistor SSPM	4th QTR FY13	4th QTR FY18
Notice of Funding Opportunity for up to 15 new grants	4th QTR FY18	4th QTR FY23

Type of Research

Basic

Technology Readiness Level

Level 1

Transition Plans

The ARI program funds grants that are low TRL (1-3). These grants often are investigating fundamental concepts and only start to develop applications for the technology. Research executed in ARI grants helps determine the feasibility of the technology to help the mission. Those concepts and technologies that show feasibility can transition to Exploratory Research for further development, either from additional development in academia, or the commercial sector.

Small Business Innovation Research (SBIR)

The Small Business Innovation Research (SBIR) program enables technological innovation by strengthening the role of small business concerns in Federally-funded R&D. The DNDO SBIR program is specifically focused on meeting Federal research and development needs for R/N detection.

- **Problem:** The statutory purpose of the SBIR Program is to stimulate technological innovation by strengthening the role of innovative small business concerns in Federally-funded R&D.
- **Solution:** DNDO's SBIR program serves to identify, explore, develop, and demonstrate scientific and technological approaches that address gaps in the larger framework for R/N detection capabilities; significantly improve the performance of R/N detection and nuclear forensics methods, components, and systems; and/or significantly reduce the operational burden of these technologies. SBIR programs transition near-term solutions, supporting identified capability gaps, into commercial products or services.
- **Impact:** The SBIR program stimulates the technological innovation by strengthening the role of innovative small business concerns in Federally-funded R&D. The goals of the program include:
 - Stimulate technological innovation.
 - Meet Federal research and development needs.
 - Foster and encourage participation in innovation and entrepreneurship by socially and economically disadvantaged persons.
 - Increase private-sector commercialization of innovations derived from Federal research and development funding.

Under the SBIR Program, Phase I efforts are six months long and result in a feasibility evaluation. Phase II efforts are two years long and result in a Proof of Concept Demonstration.

Sub-Projects

- *Embedding of Advanced Search Technique for Detect, Locate, and Track for Pedestrian-based Search:* Advancement of search techniques to improve the ability to localize and track a radiation source anomaly.
- *Miniaturization of Support Infrastructure for Non-Intrusive Inspection X-Ray Systems:* Aims to shrink the footprint for support infrastructure necessary to run high energy x-ray sources.
- *Stable Semiconductor Modules as Core Components in Pager Radiation Detectors:* Development of an advanced detector module for the next generation of radiation pager detectors.
- *Mass/Shielding Anomaly Passive Detector Module:* Develop an innovative system to detect anomalous dense masses in conveyances without the use of irradiation technologies.
- *Smartphone/Smart device Toolkit for Virtual and Actual Radiation Detection, Identification, and Localization:* Development and demonstration of a user-friendly and straightforward smartphone/smart device toolkit for radiation detection, identification, and localization based on the presence of a simulated or virtual radiological source.
- *Plastic Composite Based Scintillators for Multi-Signature Radiation Detectors:* Demonstration of a detector technology that combines gamma and neutron sensitivity with good efficiency at a reduced cost compared to the current commercial-off-the-shelf (COTS) scintillators.

- *Portable Linear Accelerator (Linac) for Active Interrogation Systems for Radiological Gamma Isotope Source Replacement:* Development and commercialization of a portable accelerator for detection of shielded SNM and replacement of radiological gamma isotope sources currently used for commercial non-medical applications.
- *Unattended Radiation Detection Systems:* Aims to develop a system capable of radiation detection and analysis, capturing relevant contextual information (e.g., video or pictures) from the surrounding environment, and transmitting the all relevant information, but have low-energy requirements to facilitate long periods of operation without direct operator interface.
- *New Starts:* This sub-project is for initiation of new SBIR contracts through solicitation activities.

FY 2017 Key Milestone Events (Prior Year)

- *Embedding of Advanced Search Technique for Detect, Locate, and Track for Pedestrian-based Search:*
 - Continued technology maturation of a real-time source localization and tracking capability leading to development of pre-production prototypes providing real-time detection and identification capability, and a wide area search add-on module for a commercial handheld radiation detector.
- *Miniaturization of Support Infrastructure for Non-Intrusive Inspection X-Ray Systems:*
 - Completed contracts leading to proof of concept demonstrations of laboratory scale prototypes of continuous wave x-ray systems with a smaller footprint than commercially available continuous wave x-ray systems. The availability of such a source will enable high-throughput scanning of cargo and conveyances for active interrogation applications used for shielded threat detection.
 - Initiated one contract for further development of a continuous wave x-ray system with smaller footprint to support potential transition of the system to the commercial market.
- *Stable Semiconductor Modules as Core Components in Pager Radiation Detectors:*
 - Continued four Phase II contracts for development of modular high efficiency gamma and high efficiency neutron semiconductor based detectors for pager radiation detectors.
- *Mass/Shielding Anomaly Passive Detector Module:*
 - Continued one Phase II contract for development of component technologies for a passive system that detects large mass anomalies through the sensing of changes in a gravity-based signal with an emphasis on personally owned vehicle applications. Such a technology could be used for screening personally owned vehicles for anomalies that could be indicative of shielded threats without the use of ionizing radiation.
- *Smartphone/Smart Device Toolkit for Virtual and Actual Radiation Detection, Identification, and Localization:*
 - Concluded two Phase I contracts leading to feasibility evaluations of approaches for development of smart device toolkits that enable operator R/N training without a radiation source physically present. These toolkits provide a capability to conduct R/N training at a much lower cost than training requiring the use of radiation sources.
 - Initiated two Phase II contracts for further development of smart device toolkits that enable operator R/N training without a radiation source physically present. These training toolkits provide a capability to conduct R/N training at a much lower cost than training requiring the use of radiation sources.
- *Plastic Composite Based Scintillators for Multi-Signature Radiation Detectors:*
 - Concluded three Phase I contracts leading to feasibility evaluations of fabrication and testing of very low cost composite plastic

- scintillator materials capable of combined gamma, thermal, and fast neutron detection for handheld and backpack applications.
- Initiated two Phase II contracts for further development of very low cost composite plastic scintillator materials capable of combined gamma, thermal, and fast neutron detection for handheld and backpack applications.
- *Portable Linear Accelerator (Linac) for Active Interrogation Systems for Radiological Gamma Isotope Source Replacement:*
 - Concluded two Phase I contracts leading to a feasibility evaluations of approaches for development of a compact x-ray radiation source that can be used for isotope source replacement and mobile radiography applications.
 - Initiated one SBIR Phase II contract for further development of a compact x-ray radiation source that can be used for isotope source replacement and mobile radiography applications. This source could be a longer term and lower cost solution for medical isotopes while also reducing potential RDD threats. It could also be used for radiography in human portable applications such as on-board ships.
- *Unattended Radiation Detection Systems:*
 - Initiated three Phase I contracts for feasibility evaluations of unattended radiation detection systems that can be rapidly deployed and run for multiple days at a time without operator intervention while providing data fusion capabilities such as radiation detection combined with video. Approaches are being investigated with applications to unattended borders, urban search, and other areas where manpower resources are limited.

FY 2018 Planned Key Milestone Events (Year of Execution)

- *Embedding of Advanced Search Technique for Detect, Locate, and Track for Pedestrian-based Search:*
 - Conclude SBIR Phase III contract supporting transition of an integrated photomultiplier tube base providing real-time source detection and identification capability and a wide area search add-on module for a commercial handheld detector to the commercial market.
- *Miniaturization of Support Infrastructure for Non-Intrusive Inspection X-Ray Systems:*
 - Continue SBIR Phase III contract for further development of a continuous wave x-ray system with smaller footprint to support potential transition of the system to the commercial market. The availability of such a source will enable high-throughput scanning of cargo and conveyances for active interrogation applications used for shielded threat detection.
- *Stable Semiconductor Modules as Core Components in Pager Radiation Detectors:*
 - Conclude four SBIR Phase II contracts leading to Proof of Concept Demonstrations of laboratory scale modular high efficiency gamma and high efficiency neutron semiconductor based detectors for pager radiation detectors.
- *Mass/Shielding Anomaly Passive Detector Module:*
 - Conclude one SBIR Phase II contract leading to laboratory scale Proof of Concept Demonstration for development of component technologies for a passive system that detects large mass anomalies through the sensing of changes in a gravity-based signal with an emphasis on personally owned vehicle applications. Such a technology could be used for screening personally owned vehicles for anomalies that could be indicative of shielded threats without the use of ionizing radiation.
- *Smartphone/Smart device Toolkit for Virtual and Actual Radiation Detection, Identification, and Localization:*
 - Continue at least one SBIR Phase II contract for further development of smart device toolkits that enable operator R/N training without a radiation source physically present. These training toolkits provide a capability to conduct R/N training at a much lower

cost than training requiring the use of radiation sources.

- *Plastic Composite Based Scintillators for Multi-Signature Radiation Detectors:*
 - Continue at least one SBIR Phase II contract for further development of very low cost composite plastic scintillator materials capable of combined gamma, thermal neutron, and fast neutron detection for handheld and backpack applications.
- *Portable Linear Accelerator (Linac) for Active Interrogation Systems for Radiological Gamma Isotope Source Replacement:*
 - Continue one SBIR Phase II contract for further development of a compact x-ray radiation source. This source can be used in place of gamma ray emitters used in some mobile radiography systems. This source could be a longer term and lower cost solution while also reducing potential RDD threats. It could also be used for radiography in human portable applications such as on-board ships.
- *Unattended Radiation Detection Systems:*
 - Conclude three Phase I contracts leading to feasibility evaluations of unattended radiation detection systems that can be rapidly deployed and run for multiple days at a time without operator intervention while providing data fusion capabilities such as radiation detection combined with video. Approaches are being investigated with applications to unattended borders, urban search, and other areas where manpower resources are limited.
 - Initiate at least one Phase II contract for further development of unattended radiation detection systems.
- *New Starts:*
 - Initiate up to six new SBIR Phase I contracts under the DHS SBIR solicitation released in FY 2018.
 - Initiate up to one new SBIR Phase III contract.

FY 2019 Planned Key Milestone Events (Budget year)

- Funds budgeted in CWMD's R&D appropriation for future execution.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$2,046	\$3,957	\$4,522	\$1,939	
Obligations	\$2,045	\$3,957	\$4,723	\$1,939	

FY 2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system. Actual amount of R&D set-aside for small business is determined in the year of execution after assessing the appropriations, and comparison of responses to DNDO's annual announcement for proposals to DNDO mission requirements.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
Phase I: Unattended Radiation Detection Systems	4th QTR	2nd QTR FY18
Phase II: Plastic Composite Based Scintillators for Multi-Signature Radiation Detectors	4th QTR	4th QTR FY19
Phase II: Smartphone/Smart device Toolkit for Virtual and Actual Radiation Detection, Identification, and Localization	4th QTR	4th QTR FY19
Phase II: Portable Linear Accelerator (Linac) for Active Interrogation Systems for Radiological Gamma Isotope Source Replacement	4th QTR	4th QTR FY19
Phase III: Miniaturization of Support Infrastructure for Non-Intrusive Inspection X-Ray Systems	4th QTR	2nd QTR FY19
FY 2018		
Phase I New Start: Phase I contracts resulting from FY 2018 DHS SBIR Solicitation	3rd QTR	1st QTR FY19
Phase II New Start: Phase II contracts resulting from the Phase I contracts awarded under the Unattended Radiation Detection Systems initiated in FY 2017 DHS SBIR Solicitation	3rd QTR	3rd QTR FY20
Phase III New Start: Phase III contract To Be Determined	4th QTR	2nd QTR FY20

Type of Research

Developmental

Technology Readiness Level

Levels 4-7

Transition Plans

The primary objective of the SBIR program, at the whole-of-government level, is for new innovative products to reach the consumer market towards one or more identified end users – (i.e. commercialization). The DNDO SBIR program also seeks projects which can meet R&D needs identified by end-users and analysts, as well as the development of components which can be integrated into larger projects like ATDs. Aspects of the technologies developed under SBIR will support and can further augment technologies of the Exploratory Research Program and Advanced Technology Demonstration program.

Detection Capability Development - PPA**Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Detection Capability Development	-	-	\$19,851	-	-	\$15,155	-	-	-	-	-	(\$15,155)
Total	-	-	\$19,851	-	-	\$15,155	-	-	-	-	-	(\$15,155)
Subtotal Discretionary - Appropriation	-	-	\$19,851	-	-	\$15,155	-	-	-	-	-	(\$15,155)

With the transfer of the functions of DNDO to CWMD, no funds are included in the FY 2019 President's Budget for DNDO's Detection Capability Development PPA. Funding for the programs previously supported through this PPA are discussed in CWMD's FY 2019 R&D CJ.

The Detection Capability Development PPA incorporates the user requirements of DHS's operational components into R/N detection systems. It achieves this by coordinating its integrated lifecycle management and systems engineering lifecycle activities with the end-user community and managing the task execution of DNDO's SDP.

Recognizing that innovation can originate in a variety of sectors, DNDO utilizes a commercial first approach that gives preference for solutions available in the private sector marketplace. Using this approach, DNDO can leverage industry-led innovations and developments, resorting to a Federally-sponsored and managed development and acquisition process when no commercial solution is feasible or private industry chooses not to commercialize a product.

Detection Capability Development-PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$19,851	\$15,155	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$5,113	\$5,055	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$24,964	\$20,210	-
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	\$24,964	\$20,210	-
Obligations (Actual/Projections/Estimates)	\$19,205	\$20,210	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Detection Capability Development – PPA

Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$19,851
FY 2018 President's Budget	-	-	\$15,155
FY 2019 Base Budget	-	-	\$15,155
Transfer to CWMD/R&D from DNDO/R&D/DCD for CWMD	-	-	(\$15,155)
Total Transfers	-	-	(\$15,155)
Total Adjustments-to-Base	-	-	(\$15,155)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$15,155)

Detection Capability Development – PPA Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Detection Capability Development	\$19,851	\$15,155	-	(\$15,155)
Total	\$19,851	\$15,155	-	(\$15,155)
Discretionary - Appropriation	\$19,851	\$15,155	-	(\$15,155)

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	-	\$21	-	(\$21)
25.1 Advisory and Assistance Services	\$9,682	\$7,129	-	(\$7,129)
25.2 Other Services from Non-Federal Sources	\$217	-	-	-
25.3 Other Goods and Services from Federal Sources	\$9,952	\$8,005	-	(\$8,005)
Total - Non Pay Object Classes	\$19,851	\$15,155	-	(\$15,155)

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
HPRDS He3 Alternative Implementation (Wide-Area Search and Identification (WASID))	\$3,778	\$0		\$0
RPM Replacement	\$4,598	\$6,292		(\$6,292)
RPM Open Systems Architecture	\$0	\$0		\$0
On Dock Rail	\$3,473	\$0		\$0
Mobile Relocatable Radiological/Nuclear Detection MRRND	\$0	\$0		\$0
International Rail	\$2,875	\$3,357		(\$3,357)
Maritime Non-Containerized Cargo	\$3,627	\$2,790		(\$2,790)
Small Vessel Standoff Detection	\$1,500	\$2,216		(\$2,216)
SIGMA	\$0	\$500		(\$500)
Total Non Pay Cost Drivers	\$19,851	\$15,155		(\$15,155)

NARRATIVE EXPLANATION OF CHANGES:

- Wide-Area Search and Identification (WASID) Program:** WASID expands the capability of backpack R/N detection systems to include isotope identification. The WASID program objective is to field a wearable R/N detector system with expansion capability to perform identification to meet the wide-area search mission. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- Radiation Portal Monitor Open Systems Architecture (ROSA) Program:** ROSA is a program which is the follow on to Radiation Portal Monitor Replacement (RPM RP) program (previously referred to as RPM RP Program 1) will explore an open systems architecture model as an option to recapitalize the remainder of the legacy RPM fleet beyond the approximately 200 units planned under RPM RP. ROSA will be modular with a defined a set of hardware and software interfaces that enable assembly of an RPM from a set of commercial-off-the-shelf (COTS) components. An open systems approach will allow for more agile technology insertion and reduced sustainment costs. In FY 2018, ROSA development efforts were funded under the RPM Replacement Program. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.

- **Mobile and Relocatable Radiological and Nuclear Detection (MRRND) Program:** MRRND is a program with the following objectives: (1) provide an enhanced capability using mobile systems/surge assets to detect and classify R/N threat sources and weapon components that may be smuggled into the U.S.; (2) Procure and deploy more agile, surge capable, relocatable and mobile R/N scanning assets; and (3) create flexible and dynamic GNDA capabilities that provide an agile, adaptable, and mobile architecture. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **International Rail (IRAIL) Program:** The IRAIL program is a program with the objective to identify and detect R/N material entering the United States via freight rail. IRAIL supports the CBP-led Integrated Rail Inspection System (IRIS) Program by leading the radiation detection equipment (RDE) sub-system procurement and test and evaluation efforts. This program also includes the development of a capability that integrates different sensor types, such as Non-Intrusive Inspection (NII) and RDE, which can be applied to other pathways as well, and which will improve CBP Officer efficiencies and support data analytics. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **Maritime Non-Containerized Cargo (MNCC) Program:** The MNCC Program is a program with the objective to provide efficient and effective scanning of the most diverse cargo types – break bulk cargo (transported unpackaged in large quantities) and roll-on, roll-off (vehicles, bags, bundles, crates, loose materiel, and containerized liquid) – for R/N material entering the United States at sea POEs. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **Small Vessel Standoff Detection (SVSD) Program:** The SVSD Program is a program with the goal of developing and fielding for the USCG and CBP a greater capability to conduct boat-to-boat R/N detection. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **SIGMA:** SIGMA is a cost-effective, operationally practical, continuous and ubiquitous R/N detection capability. Current gamma and neutron human portable R/N detectors do not feed into an automated detector network capable of wide-area monitoring. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.

Detection Capability Development PPA Research and Development

Technology Readiness Level Exhibit

Detection Capability Development Program:

The Detection Capability Development Program incorporates the user requirements of DHS's operational Components into R/N detection systems. It achieves this by coordinating its integrated lifecycle management and systems engineering lifecycle activities with the end-user community and managing the task execution of DNDO's SDP.

Recognizing that innovation can originate in a variety of sectors, DNDO has adopted a "commercial first" approach that gives preference for solutions available in the private sector marketplace. Using this approach, DNDO can leverage industry-led innovations and developments, resorting to a Federally-sponsored and managed development and acquisition process when no commercial solution is feasible or private industry chooses not to commercialize a product.

Sub-Projects

- *Wide-Area Search and Identification (WASID) Program:* WASID expands the capability of backpack R/N detection systems to include isotope identification. Helium-3 (^3He) is integral to neutron detection, and the national shortage of ^3He requires DNDO to procure an alternative wearable solution for R/N detection. WASID will transition DHS away from ^3He -dependent systems. It will look to transition mature DNDO Wearable, Intelligent Nuclear Detection (WIND) technologies to a deployable capability. The WASID program objective is to field a wearable R/N detector system with expansion capability to perform identification to meet the wide-area search mission.
- *International Rail (IRAIL) Program:* The IRAIL Program is a program identifying and detecting R/N material entering the United States via freight rail. IRAIL supports the CBP-led Integrated Rail Inspection System (IRIS) Program by leading the radiation detection equipment (RDE) sub-system procurement and test and evaluation efforts. Currently, limited R/N scanning of freight rail cargo exists at rail crossings at U.S. international POEs. Existing NII technology to address these threats is approaching the end of its useful service life; the addition of passive radiation detection equipment will improve R/N threat detection.
- *Maritime Non-Containerized Cargo (MNCC) Program:* The MNCC Program is a program with the objective to provide efficient and effective scanning of the most diverse cargo types – break bulk cargo (transported unpackaged in large quantities) and roll-on, roll-off (vehicles, bags, bundles, crates, loose materiel, and containerized liquid) – for R/N material entering the United States at sea POEs. When break bulk cargo is off loaded from ships, CBP Officers scan it for R/N material, often using hand held devices. This capability is not suitable for the high volume of cargo being offloaded at U.S. ports and has been identified as an area for risk reduction. The MNCC program will conduct analysis to identify materiel, non-materiel, or combined solutions that will reduce the risk of R/N material being offloaded at U.S. ports, and inside break bulk cargo not being detected.
- *Small Vessel Standoff Detection (SVSD) Program:* The SVSD Program is a program with the goal of developing and fielding for the USCG and CBP a greater capability to conduct boat-to-boat R/N detection. This program is also referred to as SVSD Increment 2. For SVSD Increment 1, a radiation detection backpack-based solution, the USCG and CBP vessel's R/N detection stand-off distance and detection

frequency is limited. Furthermore, SVSD increment 1 is not integrated with the vessel structure. This physically limits USCG and CBP personnel conducting R/N scanning during routine operations, especially during high seas, inclement weather, and when operating in a hostile environment. SVSD Increment 2 will provide the USCG and CBP increased R/N detection capability, including increased stand-off distance, detection frequency, and integration with the vessel's structure and components.

- *SIGMA*: SIGMA is a cost-effective, operationally practical, continuous and ubiquitous R/N detection capability. Current gamma and neutron human portable R/N detectors do not feed into an automated detector network capable of wide-area monitoring. SIGMA provides low cost radiation detectors with spectroscopic gamma and neutron sensing capability, packaged as automated and networked threat detection and identification capability with web-based command and control.
- *Mobile and Relocatable Radiological and Nuclear Detection (MRRND) Program*: MRRND is a program with the following objectives: (1) provide an enhanced capability using mobile systems/surge assets to detect and classify R/N threat sources and weapon components that may be smuggled into the U.S.; (2) procure and deploy more agile, surge capable, relocatable and mobile R/N scanning assets; and (3) create flexible and dynamic detection capabilities that provide an agile, adaptable, and mobile architecture.
- *Radiation Portal Monitor Open Systems Architecture (ROSA) Program*: ROSA is a program which is the follow on to Radiation Portal Monitor Replacement (RPM RP) program (previously referred to as RPM RP Program 1) will explore an open systems architecture model as an option to recapitalize the remainder of the legacy RPM fleet beyond the approximately 200 units planned under RPM RP. ROSA will be modular with a defined a set of hardware and software interfaces that enable assembly of an RPM from a set of commercial-off-the-shelf (COTS) components. An open systems approach will allow for more agile technology insertion and reduced sustainment costs.

FY 2017 Key Milestone Events (Prior Year)

- HAIBP: Complete the System Threat Review and Qualitative Risk Analysis.
- RPM RP Program 1 (ROSA): Complete construction of, test and evaluate a full-scale prototype to test key features and refine technical documentation.
- IRAIL: Conduct and Complete IRAIL Pathway Decomposition Study.
- MNCC: Begin initial acquisition program documentation.
- SVSD Increment 2: Complete the System Threat Review and characterization test to help inform project initiation decision.

FY 2018 Planned Key Milestone Events (Year of Execution)

- HAIBP (WASID): Conduct Rapid Development and Characterization Testing.
- RPM RP Program 1 (ROSA): Conduct an analysis of alternatives (AoA) and conduct market research (e.g., Request for Information and Industry Day).
- IRAIL: Support CBP in the completion and release of a RFP and source selection decision (to include a Capabilities Demonstration) for IRIS.
- MNCC: Initiate a System Threat Review and an analysis of alternatives.
- SVSD Increment 2: If project initiated, prepare RFP and plan to conduct test and evaluation.

FY 2019 Planned Key Milestone Events (Budget year)

- Funds budgeted in CWMD's R&D appropriation for future execution.

Delayed Milestones

- FY 2017 ODR: Complete SCP deployment activities, conduct SCP performance testing at Savannah River National Laboratory and operational assessment at PoT PCT. Completion was delayed nine-months due to a negotiation of project cost share agreement with port authority. (The delay of the negotiations took place from approximately Sept 2016 to June 2017. Site construction was not completed until Dec. 2017.)

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$21,400	\$21,029	\$24,964	\$20,321	
Obligations	21,400	\$20,538	\$18,835	\$20,321	

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
3He Alternative Implementation Backpack (HAIBP) Program	Ongoing	Ongoing
Radiation Portal Monitor Replacement Program (RPM RP) Program 1 (ROSA)	Ongoing	Ongoing
On Dock Rail (ODR) Program	Ongoing	Ongoing
International Rail (IRAIL) Program	Ongoing	Ongoing
Maritime Non-Containerized Cargo (MNCC) Program	1ST QTR	Ongoing
Small Vessel Standoff Detection (SVSD) Program	Ongoing	Ongoing
FY 2018		
Radiation Portal Monitor Replacement Program (RPM RP) Program 1 (ROSA)	Ongoing	Ongoing
Wide Area Search Identification (WASID)	Ongoing	Ongoing
International Rail (IRAIL) Program	Ongoing	Ongoing
Maritime Non-Containerized Cargo (MNCC) Program	Ongoing	Ongoing
Small Vessel Standoff Detection (SVSD) Program	Ongoing	Ongoing
SIGMA Transition	1ST QTR	Ongoing

Type of Research

Developmental

Technology Readiness Level

5-7

Transition Plans

The detection capabilities under these programs will be transitioned to DHS operational component(s) (CBP, USCG, TSA, etc.) after test and evaluation to ensure they meet operational requirements, and after an operational readiness review is conducted with the DHS operational component(s) deploying the capability. Post-implementation review activities are conducted after the initial deployed units have been in operational use for 12 to 18 months to provide the necessary information to determine the degree to which a materiel investment operating in its intended environment has met the needed capability. Throughout the life of the capability, DNDO works collaboratively with the DHS operational components to manage the equipment configuration to ensure it continues to meet its operational requirements; as well as collect and analyze operational performance and maintenance data to maximize performance per maintenance dollar, and inform future procurement requirements.

*Detection Capability Assessments –PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Detection Capability Assessments	-	-	\$39,272	-	-	\$34,127	-	-	-	-	-	(\$34,127)
Total	-	-	\$39,272	-	-	\$34,127	-	-	-	-	-	(\$34,127)
Subtotal Discretionary - Appropriation	-	-	\$39,272	-	-	\$34,127	-	-	-	-	-	(\$34,127)

With the transfer of the functions of DNDO to CWMD, no funds are included in the FY 2019 President's Budget for DNDO's Detection Capability Assessments PPA. Funding for the programs previously supported through this PPA are discussed in CWMD's FY 2019 O&S CJ.

The Detection Capability Assessment PPA, supports the development and acquisition process for mission-related technologies. DNDO continually assesses R/N detection capabilities through a variety of means, including test and evaluation (T&E) campaigns to characterize and collect performance data on commercially available and emerging technologies and systems.

Rigorous and scientifically defensible testing requires a team of trained and experienced subject matter experts, including nuclear physicists, statisticians, analysts, and testers. While T&E campaigns evaluate systems under development, the Red Team (RT) Project evaluates deployed systems and operations and their associated tactics, techniques, and procedures, in as-close-to-realistic-environments as possible. The RT Project presents adversary tactics and radiological signature training devices to Federal and SLTT (FSLTT) R/N detection and interdiction operations. These presentations can either be covert or overt in nature. DNDO Program Assessments project performs objective reviews of the effectiveness of R/N detection capabilities and their associated activities by examining programs, CONOPS, protocols, policies, procedures, and training.

Detection Capability Assessment – PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$39,272	\$34,127	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$8,426	\$1,686	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$47,698	\$35,813	-
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	\$47,698	\$35,813	-
Obligations (Actual/Projections/Estimates)	\$42,081	\$35,813	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Detection Capability Assessment – PPA

Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$39,272
FY 2018 President's Budget	-	-	\$34,127
FY 2019 Base Budget	-	-	\$34,127
Transfer to CWMD/O&S/C&OS from DNDO/R&D/DCA for CWMD	-	-	(\$34,127)
Total Transfers	-	-	(\$34,127)
Total Adjustments-to-Base	-	-	(\$34,127)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$34,127)

Detection Capability Assessment – PPA Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Detection Capability Assessments	\$39,272	\$34,127	-	(\$34,127)
Total	\$39,272	\$34,127	-	(\$34,127)
Discretionary - Appropriation	\$39,272	\$34,127	-	(\$34,127)

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$457	\$382	-	(\$382)
25.1 Advisory and Assistance Services	\$15,351	\$14,173	-	(\$14,173)
25.3 Other Goods and Services from Federal Sources	\$23,464	\$19,572	-	(\$19,572)
Total - Non Pay Object Classes	\$39,272	\$34,127	-	(\$34,127)

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Operational Readiness Assessment	\$8,801	\$9,868	-	(\$9,868)
Studies & Infrastructure	\$8,977	-	-	-
Test & Evaluation Program	\$18,000	\$24,259	-	(\$24,259)
Information Sharing	\$3,494	-	-	-
Total – Non Pay Cost Drivers	\$39,272	\$34,127	-	(\$34,127)

Detection Capability Assessment – PPA Research and Development

Technology Readiness Level Exhibit

Test, Evaluation, and Analysis

The DNDO research, development, and acquisition process is anchored by rigorous assessments of mission-related technologies as they are developed, deployed, and implemented. These programs are supported by the Test, Evaluation, and Analysis Program (T&E) campaigns to characterize, verify, and validate technical performance and assess the operational effectiveness and suitability of technologies under development, as well as that of commercially available systems prior to deployment (full operational capability). DNDO utilizes a suite of test instrumentation and automated data collection systems to enable testing teams to rapidly verify and validate data. The Standards project follows a cycle of development, use, and revision of consensus and technical capability standards to ensure that each standard remains effective for the assessment of R/N detection technology.

- **Problem:** Support DNDO's focus on preventing nuclear terrorism by assuring that detection equipment and systems meet specific requirements and standards.
- **Solution:** Plan and execute tests and evaluations to provide critical information on the technical and operational capabilities and limitations of our detection technologies, acquisition decisions, and facilitate the development of standards and requirements.
- **Impact:** These tests and evaluations provide critical information on the effectiveness of detection technologies used to prevent nuclear terrorism.

Sub-Projects

- *T&E Operations:* The sub-project funds the staff resources necessary to independently plan test activities, ensure scientific defensibility and rigor, oversee test execution, and report results.
- *Operational Analysis and Technical Assessments (OATA):* The OATA sub-project provides the subject matter experts that conduct technical assessments. The activities and products produced from this effort will transform data collected during assessments into actionable knowledge of R/N detectors under acquisition consideration. The OATA Project has four main elements: Tools for Test Data Management; Spectral Data and Algorithm Analysis Tools; Test Modeling and Simulation; and Technical Assessment. The OATA sub-project is executed through the DNDO Data Mining, Analysis, and Modeling Cell (DMAMC). In addition, lessons learned are captured and documented to preserve and share institutional knowledge among key stakeholders to reduce costs, risks and improve efficiencies and performance.
- *Directed Test:* Through the Directed Test sub-project, DNDO conducts test campaigns using mature, commercially available R/N detection systems in operational scenarios faced by FSLTT front-line operators. These Directed Tests produce independent assessments of equipment

to confirm vendor performance claims and can help with development and/or refinement of the front-line operator CONOPS and can help identify training needs.

- *Standards and Conformity Testing:* The sub-project includes work on national and international consensus standards, development of technical capability standards, and standards validation. Conformity assessments are a systematic examination of the extent to which an R/N detection system conforms to specified standards. Such conformity assessments require testing facilities that can reliably test equipment against the standards.
- *Sources and Infrastructure:* The sub-project provides oversight for the R/N Countermeasures Test and Evaluation Center (RNCTEC) test venue and the design, fabrication, and management of radiation signature training devices and radioactive sources to support the Test and Evaluation Program.

FY 2017 Key Milestone Events (Prior Year)

- Published *Aerial Radiation Detection Systems Technical Capability Standard (TCS)*, conducted interagency coordination on two TCSs, and supported the publication of a revision to *ANSI N42.37*. (Certain American National Standards Institute (ANSI) standards are the standards that are used to test rad/nuc detection equipment against. There are standards for each group of detection equipment.)
- Conducted a conformity test campaign against the *Aerial Radiation Detection Systems TCS*. This TCS is used to test aerial mounted radiation detection systems such as those that might be mounted on a helicopter, plane, etc.
- Completed IT upgrades at Radiological Nuclear Countermeasures Test and Evaluation Complex (RNCTEC). RNCTEC is a facility within the National Nuclear Security Site outside of Las Vegas, NV where testing of detection devices is conducted using special nuclear material.
- Began Radiation Signature Training Devices (RSTD) fabrication; delivered additional radiation signature training devices. RSTDs are used to illicit an alarm from the detection devices during training.
- Began disposing of obsolete testing equipment at RNCTEC.
- Planned, executed, and/or provided reports for 12 developmental or operational test campaigns to include Radseeker, On Dock Rail, and RPM Replacement test events.
- Planned the Robotics R/N Detection Directed Test. In response to the National Bomb Squad Commanders Advisory Board (NBSCAB) request, to provide best practices for radiological and nuclear detection equipment integration by assessing the integration of Personal Radiation Detectors and Radiation Isotope Identification Devices with bomb squad robots, with respect to their performance, capabilities, and suitability.
- Continued building interconnections between Report Analysis and Archive System (RAAS) and the Data, Mining, Analysis, Modeling Cell (DMAMC) Lexicon, Modeling Catalog, and Instruments Catalog and added ability to search and filter uploaded documents and improve aggregate views of data. On track to be completed by FY 2018 as planned. These are web-based reports and summaries of previous test, evaluation and analysis activities that are used by scientists to search for information to answer questions from end users.
- Included DHS Science and Technology consequence management instrument database into the Instrument Library, and expanded the number of models incorporated into the ModCat and Background Catalogs. These are web-based information catalogs and tools to provide quick access to reusable material, data, and tools to support modeling, simulation, and analysis.
- Continued domestic and international partnership to further expand the Replicative Assessment of Spectrometric Equipment (RASE) database and enhance the capability for dynamic systems such as portals. RASE is semi-empirical analysis code for performance evaluation of

radiation search and identification tools (both hardware and software).

- Sustained DMAMC capability and continue to dynamically populate the compendium of data. Responded to 40 major technical and scientific requests for information and analysis.
- Designed two radiological source kits to support normalization testing.
- Began development of summary reports for all RDE technology categories currently deployed in MDDUs. MDDUs are a national Rad/Nuc detection “surge” asset, designed to augment federal, state, local, tribal and territorial (FSLTT) stakeholder Rad/Nuc detection and reporting capabilities.
- Developed a framework to establish and maintain the DMAMC network. Continued integration of Design of Experiment in DNDO T&E campaigns.

FY 2018 Planned Key Milestone Events (Year of Execution)

- Support the revision of the *ANSI N42.48* American National Standard Performance standards for Spectroscopic Personal Radiation Detectors (SPRDs).
- Continue to dispose of obsolete testing equipment at RNC TEC.
- Plan, execute, and/or provide reports for at least nine developmental or operational test campaigns.
- Plan and execute up to two Directed Tests (Robotics R/N Detection, and one to be determined).
- Assemble, characterize and deliver two source kits.
- Continue building interconnections between Report Analysis and Archive System and the DMAMC Lexicon, Modeling Catalog and Instruments Catalog and add ability to search and filter uploaded documents and improve aggregate views of data.
- Continue development of the Radiological and Nuclear Data Repository in FY 2018 to illuminate areas that yield opportunities for T&E process improvements and efficiencies.
- Sustain DMAMC capability and deploy initial crisis response capability. Respond to 100 major technical and scientific requests for information and analysis.
- Continue development of summary reports for all RDE technology categories currently deployed in the MDDU.
- Deploy the DMAMC SME network management system.
- Begin Central Data Repository, and Radiological and Nuclear Data Repository

FY 2019 Planned Key Milestone Events (Budget Year)

- No longer to be represented as an R&D activity; funds budgeted in CWMD’s O&S appropriation for future execution as an operational activity.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$16,254	\$26,828	\$47,698	\$35,872	
Obligations	\$16,254	\$21,435	\$45,557	\$35,872	

FY 2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
Completed IT upgrades at RNC TEC.	1st QTR	4th QTR
Designed two radiological source kits to support normalization testing	1st QTR	4th QTR
Executed the COTS Vehicle-Mounted Mobile Systems "Honey Badger" Directed Test (Phase 1) in support of Federal, state, local and tribal partners	1st QTR	1st QTR
Planned the Robotics R/N Detection Directed Test	3rd QTR	4th QTR
Performed ODR SCP Performance Test	1st QTR	1st QTR
Completed 12 developmental/operational test events	1st QTR	4th QTR
FY 2018		
Assemble, characterize and deliver two source kits	1st QTR	4th QTR
Continue excessing obsolete testing infrastructure at RNC TEC	1st QTR	4th QTR
Plan and execute the Robotics R/N Detection Directed Test	1st QTR	2nd QTR
Publish the Active Interrogation TCS	1st QTR	4th QTR
Plan, execute, and/or provide reports for at least nine developmental or operational test campaigns	1st QTR	4th QTR
Deploy DMAMC SME network management system	1 st QTR	4 th QTR

Type of Research

Not Applicable

Technology Readiness Level

Not Applicable

Transition Plans

Not Applicable

Operational Readiness Assessment (ORA)

The Operational Readiness Assessment (ORA) Program is DNDO's primary means to objectively assess the operational effectiveness and performance the deployed R/N detection capabilities at the FSLTT levels in support of the front-line operators. ORA also assesses the effectiveness of DNDO programs in support of the front-line operators.

- **Problem:** Objectively assess the operational effectiveness and performance of deployed R/N detection capabilities at the FSLTT levels in support of the front-line operators.
- **Solution:** Evaluate deployed systems and operations and their associated tactics, techniques and procedures, in as-close-to-realistic environments as possible.
- **Impact:** These assessments provide objective findings and recommendations to improve the effectiveness and performance of front-line operators.

Sub-Projects

- *Program Assessments (PA):* Performs objective reviews of the effectiveness of R/N capabilities and their associated activities by examining R/N detection programs, CONOPS, protocols, policies, procedures, and training. PA conducts assessments that provide insights on what is successfully being accomplished and identifies areas for improvement. These assessments are conducted to provide objective findings and recommendations and establish a documented baseline to provide a historic perspective for future endeavors.
- *Red Team (RT):* Fulfills a mission need to evaluate deployed systems and operations and their associated tactics, techniques and procedures, in as-close-to-realistic environments as possible. The RT Project presents adversary tactics and radiological signature training devices to FSLTT R/N detection and interdiction operations. These presentations can either be covert or overt in nature. RT identifies gaps and vulnerabilities in deployed systems, provides recommendations to mitigate them, and conducts analysis across multiple assessments to identify issues systemic to the DNDO mission to prevent nuclear terrorism. The desired outcome improves our Nation's capability to detect and defeat a radiological or nuclear attack on the homeland over time.

FY 2017 Key Milestone Events (Prior Year)

- Conducted 49 overt and covert operations and adversarial-based assessments of the U.S. R/N detection capabilities.

FY 2018 Planned Key Milestone Events (Year of Execution)

- Conduct at least 20 overt and covert operations and adversarial-based assessments of the U.S. R/N detection capabilities.
- Initiate/complete at least three program assessments and perform other assessments as required.

FY 2019 Planned Key Milestone Events (Budget year)

- No longer to be represented as an R&D activity; funds budgeted in CWMD's O&S appropriation for future execution as an operational activity.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$10,110	\$12,675	\$8,801	\$9,868	
Obligations	\$10,110	\$10,256	\$8,718	\$9,868	

FY 2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
Program Assessments	1st QTR	Ongoing
Red Team	1st QTR	Ongoing
FY 2018		
Program Assessments	1st QTR	Ongoing
Red Team	1st QTR	Ongoing

Type of Research

Not Applicable

Technology Readiness Level

Not Applicable

Transition Plans

Not Applicable

*Nuclear Forensics –PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Nuclear Forensics	-	-	\$18,838	-	-	\$18,361	-	-	-	-	-	(\$18,361)
Total	-	-	\$18,838	-	-	\$18,361	-	-	-	-	-	(\$18,361)
Subtotal Discretionary - Appropriation	-	-	\$18,838	-	-	\$18,361	-	-	-	-	-	(\$18,361)

With the transfer of the functions of DNDO to CWMD, no funds are included in the FY 2019 President's Budget for DNDO's Nuclear Forensics PPA. Funding for the programs previously supported through this PPA are discussed in CWMD's FY 2019 R&D and O&S CJs.

The Nuclear Forensics PPA advances the science of nuclear forensics - the examination of materials recovered from R/N events of an illicit or hostile nature in order to determine their character and origin in the context of legal proceedings or national security. Together, the GNDA and nuclear forensics efforts strengthen the detection of nuclear or other radioactive materials that are out of regulatory control;¹ enable the identification and closure of illicit R/N trafficking networks; promote nuclear security; and deter potential adversaries by increasing their perceived and actual risk of failure and the prospect of being held accountable for planned or attempted attacks. This PPA includes the National Technical Nuclear Forensics Center (NTNFC), which through its operational readiness, technology advancement, and expertise development missions, provides centralized planning, integration and advancement of USG nuclear forensics capabilities while leading the interagency implementation of the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States (FY 2015-2019)*.

The Nuclear Forensics Program is organized into three mission areas: Operational Readiness, Technology Advancement, and Expertise Development. DNDO programs and activities focused on nuclear forensics are also aligned with the goals and investment priorities delineated in the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States (FY 2015-2019)*.

¹ The term "out of regulatory control" refers to materials that are being imported, possessed, stored, transported, developed, or used without authorization of the appropriate regulatory authority, either inadvertently or deliberately.

Nuclear Forensics – PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$18,838	\$18,361	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$4,516	\$1,552	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$23,354	\$19,913	-
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	\$23,354	\$19,913	-
Obligations (Actual/Projections/Estimates)	\$21,785	\$19,913	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Nuclear Forensics – PPA Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$18,838
FY 2018 President's Budget	-	-	\$18,361
FY 2019 Base Budget	-	-	\$18,361
Transfer to CWMD/O&S/C&OS from DNDO/R&D/NF for CWMD	-	-	(\$8,654)
Transfer to CWMD/R&D from DNDO/R&D/NF for CWMD	-	-	(\$9,707)
Total Transfers	-	-	(\$18,361)
Total Adjustments-to-Base	-	-	(\$18,361)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$18,361)

Nuclear Forensics – PPA Non Pay Budget Exhibits

Non Pay Summary

Organization (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Nuclear Forensics	\$18,838	\$18,361	-	(\$18,361)
Total	\$18,838	\$18,361	-	(\$18,361)
Discretionary - Appropriation	\$18,838	\$18,361	-	(\$18,361)

Non Pay by Object Class

Non-Pay Object Classes (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$80	\$110	-	(\$110)
25.1 Advisory and Assistance Services	\$3,116	\$2,563	-	(\$2,563)
25.3 Other Goods and Services from Federal Sources	\$14,415	\$13,219	-	(\$13,219)
25.5 Research and Development Contracts	\$292	\$1,819	-	(\$1,819)
41.0 Grants, Subsidies, and Contributions	\$935	\$650	-	(\$650)
Total - Non Pay Object Classes	\$18,838	\$18,361	-	(\$18,361)

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers (Dollars in Thousands)	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Operational Readiness	\$3,727	\$3,970	-	(\$3,970)
Technology Advancement	\$9,883	\$9,152	-	(\$9,152)
Expertise Development	\$5,228	\$5,239	-	(\$5,239)
Total – Non Pay Cost Drivers	\$18,838	\$18,361	-	(\$18,361)

NARRATIVE EXPLANATION OF CHANGES:

- **Operational Readiness:** DNDO ensures readiness through joint planning, exercises, assessments, and promoting international engagements. Along with supporting attribution, the USG readiness posture helps to deter sponsors of terrorists. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **Technology Advancement:** DNDO leads activities that advance the USG capability to rapidly, accurately, and credibly characterize and identify the nature, origin, and history of nuclear materials interdicted before a detonation. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.
- **Expertise Development:** DNDO sustains a preeminent workforce of scientists educated and trained in nuclear forensics-related specialties. As described in the *Nuclear Forensics and Attribution Act (P.L. 111-140)*, the “National Nuclear Forensics Expertise Development Program” maintains technical expertise through support to graduate and undergraduate students, faculty, and scientific staff at the DoD and DOE laboratories. No funds are included in FY 2019 because of the transfer of DNDO functions to CWMD.

Nuclear Forensics – PPA Research and Development

Technology Readiness Level Exhibit

Operational Readiness

Through the Operational Readiness Project, DNDO, as the USG National Technical Nuclear Forensics (NTNF) program integrator, provides centralized planning, evaluation, and stewardship of nuclear forensics capabilities through interagency coordination and integration; international collaboration; and leading the coordination of joint exercises, assessments, and corrective actions. DNDO leads the development of foundational documents that establish interagency strategic goals, objectives, requirements, processes, plans, and operational procedures for the NTNF mission. DNDO sponsors and leads assessments to evaluate these efforts and improve the Nuclear Forensics capability across the mission spectrum from pre- to post-detonation, both within the United States and abroad. DNDO also coordinates partner agency programs to facilitate alignment and eliminate duplication. Another key component of ensuring operational readiness is the conduct of regular, rigorous nuclear forensics exercises. Such exercises assess multiagency integration, readiness, field sampling techniques, laboratory analysis, data evaluation and reporting, and communication flow during a planned to actual R/N attack. The major exercises alternate between pre- and post-detonation scenarios involving nuclear materials. These exercises focus on the continuous improvement of operations across the NTNF community. Exploring the technical and operational shortcomings and gaps enable DNDO and its partners to identify corrective actions based on after-action reports and lessons learned.

- **Problem:** The need to maintain and advance the operational readiness of the USG technical nuclear forensics capabilities in order to deter, prevent, and respond to planned or actual R/N attacks.
- **Solution:** Coordination and integration of nuclear forensics activities for the USG, including interagency program planning from the strategic to tactical level, continual evaluation of the technical nuclear forensics capability through assessments and analyses, increasingly rigorous and realistic exercises, promoting international collaboration to advance global nuclear forensics capabilities, and facilitating NTNF strategic communications to support deterrence of R/N smuggling or attacks.
- **Impact:** A ready, robust, enduring, and publicized technical nuclear forensics capability.

Sub-Projects

- *Assessments and Analysis:* The Assessments and Analysis sub-project strengthens nuclear forensics capability through regular evaluations and assesses processes and capabilities to ensure readiness and to identify lessons learned, best practices, strengths, and areas needing improvement. An important aspect of the Assessments and Analysis Project is the Nuclear Forensics Science Panel (NFSP). The NFSP comprises experts in technical fields with relevance to nuclear forensics, such as nuclear weapons design and testing, analytical and radiochemistry, statistics, nuclear production processes, and modeling and simulation of nuclear processes. At the request of the DNDO and interagency partners, the NFSP assesses various aspects of NTNF and answers technical questions that may guide future operational or R&D activities.

- *Centralized Planning:* The Centralized Planning sub-project conducts efficient interagency program planning and integration of respective agency nuclear forensics capabilities and resources. This involves working closely with partners across six departments and agencies – as well as the White House – to effectively coordinate and align USG technical capabilities and operational activities while leveraging interagency investment in R&D in order to address priority needs and ensure unity of effort. DNDO accomplishes this integration through its leadership of the Nuclear Forensics Executive Council, NTNF Steering Committee, and issue-specific working groups.
- *Exercises:* The Exercises sub-project strengthens and assesses nuclear forensics capability through jointly planned and executed exercises across the entire nuclear forensics mission space and are inclusive of all partner agencies across the USG. Well-documented lessons learned and a robust corrective actions program play a significant role in improving the collective nuclear forensics capabilities and future exercise planning and execution. This includes the conduct of rigorous full-scale interagency exercises to rehearse, evaluate, identify gaps, and improve the nuclear forensics capabilities.
- *International Engagements:* The International Engagements sub-project facilitates multilateral and bilateral collaborations in a strategic, cost-effective manner that supports the USG national objective to advance international nuclear forensics capabilities and build foreign partner capacity. DNDO activity in this area involves subject-matter expert contributions to multilateral initiatives and organizations, such as the, GICNT, IAEA, and the Nuclear Forensics International Technical Working Group (ITWG), to develop key technical and policy-oriented guidance documents that are based upon best practices. Bilateral work features direct collaboration between DNDO and foreign governments on pre-detonation nuclear forensics and related technical projects. These activities are prioritized based on the DNDO's R&D interests and the concurrent benefits of building relationships and strengthening partner nations' capabilities.

FY 2017 Key Milestone Events (Prior Year)

- Enhanced interagency coordination through leadership of the NTNF Steering Committee, Executive Council, and issue-specific working group, and led the development of the *Joint Interagency Annual Review of the National Strategic Five-Year Plan* and the annual update of the NTNF Budget Crosscut.
- Assisted in the development of an interagency WMD Attribution Framework (WAF) Implementation Plan, in close coordination with interagency partners. The WAF describes the USG process for providing timely, authoritative assessments to appropriate U.S. officials regarding the nature, source, perpetrator, and pathway of an attempted or actual WMD attack.
- Created path forward for an interagency forensic response plan for nuclear and radiological WMD as directed by the WAF.
- Advanced nuclear forensics bilateral engagements with Sweden, the United Kingdom, and Canada which included completion of a new U.S.-Sweden Technical Annex, "Cooperation and Information Exchange in Best Practices for Processing Evidence Contaminated with Radioactive Material," signed by both governments in March 2017; discussing current cooperation with the United Kingdom during the annual Joint Working Group 29 Nuclear Forensics User Group meeting; and collaborating with Canada on certified reference material development and characterization; initiated collaborative discussions with Israel and at their request, provided certified reference materials for Israel's uranium chronometry R&D activities.
- Coordinated the planning and execution of the first ever Outside Continental United States (OCONUS) deployment of the USG interagency Ground Collection Task Force (GCTF) during the combined US (PROMINENT HUNT) and Canada (STAUNCH MAPLE) counterterrorism exercises held in Halifax, Nova Scotia; April 24-28 2017.

FY 2018 Planned Key Milestone Events (Year of Execution)

- Lead the development of the *Joint Interagency Annual Review* of the *National Strategic Five-Year Plan* and the annual update of the *NTNF Budget Crosscut*. Continue to enhance interagency coordination through leadership of the NTNF Steering Committee, Executive Council, and issue-specific working groups.
- Continue to advance international nuclear forensics efforts through participating in and contributing to activities of the key multilateral nuclear forensics initiatives, including the GICNT, IAEA, and Nuclear Forensics ITWG, as well as bilateral work with the UK, Sweden, and Canada.
- Support the development and execution of an interagency tabletop exercises culminating in a full-scope response exercise, in close coordination with NTNF partners, to test the newly codified WAF, WAF Implementation Plan, and associated processes.
- Coordinate the planning and execution of one pre-detonation materials exercise, one pre-detonation device exercise, and two post-detonation collections exercises.

FY 2019 Planned Key Milestone Events (Budget Year)

- No longer to be represented as an R&D activity; funds budgeted in CWMD's O&S appropriation for future execution as an operational activity.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$2,830	\$4,317	\$3,727	\$3,970	
Obligations	\$2,505	\$4,015	\$3,634	\$3,970	

FY 2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
Interagency coordination	1st QTR	Ongoing
International Engagements (bilateral and multilateral initiatives)	1st QTR	Ongoing
Coordinate/plan pre/post-detonation exercise	1st QTR	4th QTR
FY 2018		
Interagency coordination	1st QTR	Ongoing
International Engagements (bilateral and multilateral initiatives)	1st QTR	Ongoing
Coordinate/plan pre/post-detonation exercise	1st QTR	4th QTR

Type of Research

Operational readiness supports technology development by exercising operational capabilities and assists in identifying gaps for future development efforts. Operational readiness also supports operational testing of technologies under development to ensure technologies can perform under operational conditions.

Technology Readiness Level

Levels 5-7

Transition Plans

Technologies developed will be operationally tested under realistic conditions resulting in stakeholder buy-in and adoption by operational community.

DNDO's Nuclear Forensics R&D efforts are informed by high level policy guidance, legislation, and pre-eminent scientific expertise, included in National Security/Homeland Security Policy Directives, the *Joint Interagency Annual Review* of the President's *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the U.S.*, the 2010 *Nuclear Forensics and Attribution Act*², and the 2010 National Academy of Sciences Report, *Nuclear Forensics: A Capability at Risk*. Our R&D efforts support our operational partners' needs and capabilities, help maintain a viable workforce, and focus the efforts of our students and universities, all of which is connected to a strong exercise program.

² <https://www.congress.gov/111/plaws/publ140/PLAW-111publ140.pdf>

DNDO, through the Technology Advancement Project, leads activities that advance the USG capability to rapidly, accurately, and credibly characterize and identify the nature, origin, and history of nuclear materials interdicted before a detonation. These techniques allow experts to reach technical conclusions about interdicted material based on known signatures, comparative samples of materials, and modeling of manufacturing processes to support attribution assessments for decision makers. The Technology Advancement Project benchmarks and advances forensics methodologies to provide results with well-understood uncertainties and develops signatures and data evaluation tools to support attribution assessments. In addressing the pre-detonation materials forensics capability development mission, the Technology Advancement Project provides advanced operational capability to the Bulk Special Nuclear Material Analysis Program (BSAP). BSAP is an interagency program coordinated by the National Nuclear Security Administration Office of Nuclear Forensics (Department of Energy (DOE)). It is the program that operates the Nuclear Forensics analytical capability for interdicted nuclear materials. The FBI, Department of Energy (DOE) Office of Intelligence and Counterintelligence, and DHS are participants in the program. The methods and signatures are provided to operators in the FBI, Department of Defense (DoD), DOE, and intelligence community.

- **Problem:** There is a need to assess, identify, develop, demonstrate, and operationalize scientific and technological approaches that address gaps in the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States FY 2015 –2019*, and to continuously improve the speed, quality, and confidence of pre-detonation bulk material nuclear forensics methodologies.
- **Solution:** The Technology Advancement Project explores innovative, low-risk, later-stage technologies and methodologies. Specifically, the Technology Advancement program develops technologies and methodologies that:
 - Address capability gaps and weaknesses found in the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States FY 2015 - 2019*;
 - Assesses current forensics laboratory performance, identifies improvement areas, develops methodologies, and fields solutions to enhance operational nuclear forensics capabilities; and
 - Develops pre-detonation material nuclear forensics signatures to determine material and statistical population characteristics that can uniquely identify linkages with known or predicted material characteristics.
- **Impact:** Capabilities developed under the Technology Advancement program continuously improve the USG pre-detonation materials and the nuclear forensics operational capability to increase speed, confidence and accuracy of results. In addition, Technology Advancement efforts support development of the next generation of nuclear forensic scientific expertise.

Sub-Projects

- *Reference Material Development:* Reference materials serve as a standard for assessing forensic analysis methods. The Reference Material Development Project prepares certified reference materials and other well-characterized materials to support the Methodology Benchmarking Project, exercises, and operational quality assurance activities. Specific activities include but are not limited to, validating measurement methods and operational laboratory proficiency testing performed through the interagency Bulk Special Nuclear Materials Analysis Program.

The National Technical Nuclear Forensics Center (NTNFC) has prioritized the community needs for certified reference materials for nuclear forensics, and the plan extends for the next 20 years due to the limited capacity of the specialized laboratories and personnel.

- *Plutonium Processing Signatures:* The Plutonium Processing Signatures Project is operating a capability to simulate industrial production-scale plutonium materials processing on a much smaller, laboratory scale. The produced materials are analyzed to reveal and confirm discriminating signatures and are also used for creating well-characterized reference materials for methodology validation and signature development. This effort is specifically useful to simulate production processes from which the USG does not have representative samples, but since the processing steps are known, such production materials can be replicated.
- *Uranium Processing Signatures:* The Uranium Processing Signatures Project continues to operate and improve a capability to simulate industrial production-scale uranium materials processing on a much smaller, laboratory scale. The materials are analyzed to reveal and confirm discriminating signatures and are also used for creating well-characterized reference materials for methodology validation and signature development. This effort is specifically useful to simulate production processes from which the USG does not have representative samples, but since the processing steps are known, such production materials can be replicated.
- *Material Characterization:* The Material Characterization Project allows for operational use of validated analytical methods to inform and support signature development and to provide information to the Nuclear Materials Information Program. As new signatures are developed, materials are characterized to support development and validation of those signatures. This is a continuing effort, coordinated with DOE and the New Methodology Development, New Signature Development, and Data Evaluation Tools Projects.
- *Methodology Benchmarking:* The Methodology Benchmarking Project evaluates and benchmarks laboratory capabilities to perform specific analytical methods. This project identifies (1) the most accurate, precise, and timely methods available and appropriate for operational use, and (2) gaps for which improved methods are needed and that will be developed under the New Methodology Development Project. Improved methods are then transitioned to the operational laboratories through a technology transfer workshop.
- *Data Evaluation Tools:* The Data Evaluation Tools Project develops and demonstrates the next generation of tools for data pattern analysis and methods to assess whether or not measurements from samples can be linked and included or excluded from specific families of signatures.
- *New Methodology Development:* The New Methodology Development Project advances the accuracy, precision, and timeliness of measurement techniques. This project focuses on activities at TRLs 5-7, while Transformational and Applied R&D in the Exploratory Research Program addresses efforts at TRLs 2-5.
- *New Signature Development:* The New Signature Development Project determines material and statistical population characteristics that can uniquely identify linkages with known or predicted material characteristics. This project focuses on activities at TRLs 5-7, while Transformational and Applied R&D in the Exploratory Research Program addresses efforts at TRLs 2-5.

FY 2017 Key Milestone Events (Prior Year)

- Produced two certified reference materials for forensic method improvement and quality assurance purposes.
- Fully characterized four nuclear forensic relevant samples to assist in populating the U.S. National Nuclear Forensics Library and to maintain a sharp operational nuclear forensics workforce.
- Operated the laboratory-scale uranium processing capability to produce uranium materials for signature development.
- Completed development of the laboratory-scale plutonium processing capability to produce plutonium materials for signature development.

- Continued transition to operational use an improved methodology for characterization of trace elements in uranium.
- Commenced transition to operational use an improved methodology for characterization of trace elements in plutonium.
- Commenced benchmarking study for improving measurements of trace elements in uranium.

FY 2018 Planned Key Milestone Events (Year of Execution)

- Produce two certified reference materials for forensic method improvement and quality assurance purposes.
- Fully characterize four nuclear forensic relevant samples to assist in populating the U.S. National Nuclear Forensics Library and to maintain a sharp operational nuclear forensics workforce.
- Operate the laboratory-scale uranium and plutonium processing capabilities to produce uranium and plutonium materials for signature development.
- Complete transition to operational use an improved methodology for characterization of trace elements in uranium.
- Continue transition to operational use an improved methodology for characterization of trace elements in plutonium.
- Continue benchmarking study for improving measurements of trace elements in uranium.

FY 2019 Planned Key Milestone Events (Budget year)

- Funds budgeted in CWMD's R&D appropriation for future execution.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$9,968	\$9,851	\$9,883	\$9,152	
Obligations	\$9,934	\$9,673	\$9,397	\$9,152	

FY 2015 obligation data compiled using final spend plans owing to retrieval-challenged data housed in legacy accounting system.

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
New/Improved Methodology Development	1st QTR	Ongoing
Nuclear Forensic Certified Reference Material Production	1st QTR	Ongoing
Radiological & Nuclear Material Characterizations	1st QTR	Ongoing
Methodology Benchmarking Study	1st QTR	Ongoing
Stable & Radioisotope Mass Separators	1st QTR	Ongoing
Radiological Sealed Source Library	1st QTR	Ongoing
Plutonium and Uranium Signature Development	1st QTR	Ongoing
Data Evaluation Tools	1st QTR	Ongoing
FY 2018		
New/Improved Methodology Development	1st QTR	Ongoing
Nuclear Forensic Certified Reference Material Production	1st QTR	Ongoing
Radiological & Nuclear Material Characterizations	1st QTR	Ongoing
Methodology Benchmarking Study	1st QTR	Ongoing
Stable & Radioisotope Mass Separators	1st QTR	Ongoing
Radiological Sealed Source Library	1st QTR	Ongoing
Plutonium and Uranium Signature Development	1st QTR	Ongoing
Data Evaluation Tools	1st QTR	Ongoing

Type of Research

Developmental:

Reference Material Development, Material Characterization, Methodology Benchmarking, Plutonium Processing Signatures, Uranium Processing Signatures

Applied:

New Signature Development, New Methodology Development, Data Evaluation Tools

Technology Readiness Level

Levels 5-7

Transition Plans

Successful Technology Advancement methodologies and concepts transition to operational customers through the Bulk Special Nuclear Material (SNM) Analysis Program.

National Nuclear Forensics Expertise Development

As mandated by the *Nuclear Forensics and Attribution Act, 2010 (P.L. 111-140)*, the National Nuclear Forensics Expertise Development Program (NNFEDP), as well as the Federal Expertise Development Program (FEDP) which resides within, are the comprehensive USG effort to address the enduring challenge of sustaining a preeminent workforce of scientists and policymakers educated and trained in nuclear forensics-related specialties. NNFEDP initiatives aim to maintain the technical expertise required to execute the Nation's nuclear forensics mission through interdisciplinary R&D collaboration among students, academic departments, universities, and national laboratories. FEDP enhances the education of the Federal workforce in areas critical to technical nuclear forensics, facilitates technical and professional development, and promotes understanding of partner department and agency missions. These programs are led by DNDO in close collaboration with the Departments of Defense, Energy, and Justice (Federal Bureau of Investigation), through a biannual Expertise Development Committee.

- **Problem:** Current TNF activities leverage significantly off the shrinking nuclear weapons complex which has been in decline since the end of the Cold War with nuclear scientists leaving the field for other pursuits. The majority of nuclear scientists remaining are retired or nearing retirement. Additionally, compounding the issue, the number of students entering into the academic pipeline in nuclear forensics-related degree programs has declined significantly since the 1970s.
- **Solution:** Provide long-term and continued investment to promote education and training within academia, the national and defense laboratories that perform nuclear forensics research, and the Federal workforce. Bolster the existing workforce through providing technical and policy training and education opportunities for senior and junior scientists as well as Federal personnel.
- **Impact:** An enduring and sustainable nuclear forensics workforce which is able to meet technical and policy mission requirements.

Sub-Projects

- *Academics:* The Academics Sub Project supports a current DHS management performance measure for DNDO. National Strategic Five-Year Plan activities and investment areas under this goal include the implementation of academic and workforce programs designed to ensure a robust and enduring nuclear forensics workforce. Initiatives included in this project are an undergraduate summer school, graduate fellowships and internships, and collaborative national laboratory and university R&D support.
- *Assessments Project:* The Assessments Sub Project evaluates the state of the workforce within the national and defense laboratory system, relative to USG NTNF mission requirements, in order to appropriately scale and scope the NNFEDP into future years.
- *Laboratories Project:* The Laboratories Sub Project supports post-doctorate fellowships and early-career awards at the national laboratories as well as planned outreach and recruitment activities to potential university and student participants. Additionally, the Laboratories Project supports development and presentation of curricula related to nuclear forensics training for the Federal workforce.

FY 2017 Key Milestone Events (Prior Year)

- Implemented three new initiatives supporting universities and students, as well as scientific staff at the DOE national laboratories, focused on strengthening and sustaining the technical expertise of the nuclear forensics workforce.

- Supported two research awards, 10 Seaborg Institute nuclear science summer interns, one undergraduate summer school, eight graduate fellows, 14 post-doctorate fellowship positions, one early-career award, and dedicated one-on-one senior scientist/student mentoring at the national laboratories.
- Enhanced university and student engagement in nuclear forensics-related R&D through a dedicated outreach strategy.
- Sponsored one nuclear forensics course for the Federal workforce: “Nuclear Testing, Diagnostics, Forensics, and Stockpile Stewardship.”
- Initiated a study to evaluate the projected state of the nuclear forensics technical workforce within the next 20 years to determine a long-term objectives and goals for the expertise development program efforts.

FY 2018 Planned Key Milestone Events (Year of Execution)

- Support three research awards; 10 Seaborg Institute nuclear science summer interns; one undergraduate summer school; four graduate fellowships; 14 post-doctorate fellowship positions; and one early-career award.
- Continue to enhance university and student engagement in nuclear forensics-related R&D through a dedicated outreach strategy.
- Sponsored two nuclear forensics courses; 1). “Overview of Nuclear Forensics for the Federal Workforce” at Oak Ridge National Laboratory, and 2). “Nuclear Testing, Diagnostics, Forensics, and Stockpile Stewardship” at Lawrence Livermore National Laboratory and the Nevada National Security Site.
- Evaluate the current state of the nuclear forensics workforce within the DOE national laboratories and DoD radiochemistry laboratory to inform and guide expertise development program efforts.

FY 2019 Planned Key Milestone Events (Budget Year)

- No longer to be represented as an R&D activity; funds budgeted in CWMD’s O&S appropriation for future execution as an operational activity.

Delayed Milestones

- N/A

Overall Project Funding

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Project Funding	\$5,383	\$4,863	\$5,228	\$5,239	
Obligations	\$5,383	\$4,563	\$4,403	\$5,239	

Project Schedule

Research & Development Description	Planned Start Date	Planned Completion
FY 2017		
Glen T. Seaborg Nuclear Science Summer Internship	1st QTR	Ongoing
Nuclear Forensics Undergraduate Summer School	1st QTR	Ongoing
Post-Doctoral Fellowships	1st QTR	Ongoing
Early-Career Award	1st QTR	Ongoing
Nuclear Forensics Research Awards	1st QTR	Ongoing
Federal Expertise Development Course	1st QTR	Ongoing
FY 2018		
Glen T. Seaborg Nuclear Science Summer Internship	1st QTR	Ongoing
Nuclear Forensics Undergraduate Summer School	1st QTR	Ongoing
Post-Doctoral Fellowships	1st QTR	Ongoing
Early Career Award	1st QTR	Ongoing
Nuclear Forensics Research Awards	1st QTR	Ongoing
Federal Expertise Development Courses	1st QTR	Ongoing

Type of Research

Basic, Applied, Developmental

Technology Readiness Level

TRL 1-7

Transition Plans

NNFEDP transition plans revolve around on the ability to transition people, from academia to the national laboratories or Federal agencies, and knowledge, from senior scientists and policymakers to junior workforce staff. Any research performed within the NNFEDP is at the direction of other Federal research programs which are responsible for transitioning the research from TRL 1-3 into an operational method or tool.

Department of Homeland Security

Domestic Nuclear Detection Office

Federal Assistance



Fiscal Year 2019
Congressional Justification

Table of Contents

Federal Assistance1

 Budget Comparison and Adjustments..... 3

 Non Pay Budget Exhibits..... 7

Federal, State, Local, Territorial, and Tribal Support - PPA..... 8

 Budget Comparison and Adjustments..... 8

 Non Pay Budget Exhibits..... 11

Securing the Cities - PPA 12

 Budget Comparison and Adjustments..... 12

 Non Pay Budget Exhibits..... 15

Federal Assistance

Budget Comparison and Adjustments

Comparison of Budget Authority and Request

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Federal, State, Local, Territorial, and Tribal Support	-	-	\$25,193	-	-	\$23,384	-	-	-	-	-	(\$23,384)
Securing the Cities	-	-	\$21,135	-	-	\$21,135	-	-	-	-	-	(\$21,135)
Total	-	-	\$46,328	-	-	\$44,519	-	-	-	-	-	(\$44,519)
Subtotal Discretionary - Appropriation	-	-	\$46,328	-	-	\$44,519	-	-	-	-	-	(\$44,519)

With the transfer of its functions to the Countering Weapons of Mass Destruction Office (CWMD), no funds are included in the Fiscal Year (FY) 2019 President's Budget for the Domestic Nuclear Detection Office (DNDO). Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD.

Federal Assistance Budget Authority and Obligations

Budget Authority <i>(Dollars in Thousands)</i>	FY 2017	FY 2018	FY 2019
Enacted/Request	\$46,328	\$44,519	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$10,874	\$21,008	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$57,202	\$65,527	-
Collections – Reimbursable Resources	\$50	-	-
Total Budget Resources	\$57,252	\$65,527	-
Obligations (Actual/Projections/Estimates)	\$44,009	\$65,527	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Federal Assistance
Collections – Reimbursable Resources

Collections <i>(Dollars in Thousands)</i>	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Department of Homeland Security - Transportation Security Administration Source	-	-	\$50	-	-	-	-	-	-
Total Collections	-	-	\$50	-	-	-	-	-	-

Federal Assistance Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$46,328
FY 2018 President's Budget	-	-	\$44,519
FY 2019 Base Budget	-	-	\$44,519
Transfer to CWMD/FA from DNDO/FA/FSLTTS for CWMD	-	-	(\$23,384)
Transfer to CWMD/FA from DNDO/FA/STC for CWMD	-	-	(\$21,135)
Total Transfers	-	-	(\$44,519)
Total Adjustments-to-Base	-	-	(\$44,519)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$44,519)

Federal Assistance Non Pay Budget Exhibits

Non Pay Summary

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Federal, State, Local, Territorial, and Tribal Support	\$25,193	\$23,384	-	(\$23,384)
Securing the Cities	\$21,135	\$21,135	-	(\$21,135)
Total	\$46,328	\$44,519	-	(\$44,519)
Discretionary - Appropriation	\$46,328	\$44,519	-	(\$44,519)

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$225	\$242	-	(\$242)
25.1 Advisory and Assistance Services	\$9,108	\$10,434	-	(\$10,434)
25.2 Other Services from Non-Federal Sources	\$400	\$573	-	(\$573)
25.3 Other Goods and Services from Federal Sources	\$18,720	\$15,620	-	(\$15,620)
41.0 Grants, Subsidies, and Contributions	\$17,875	\$17,650	-	(\$17,650)
Total - Non Pay Object Classes	\$46,328	\$44,519	-	(\$44,519)

*Federal, State, Local, Territorial, and Tribal Support - PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Federal, State, Local, Territorial, and Tribal Support	-	-	\$25,193	-	-	\$23,384	-	-	-	-	-	(\$23,384)
Total	-	-	\$25,193	-	-	\$23,384	-	-	-	-	-	(\$23,384)
Subtotal Discretionary - Appropriation	-	-	\$25,193	-	-	\$23,384	-	-	-	-	-	(\$23,384)

With the transfer of its functions to CWMD, no funds are included in the FY 2019 President's Budget for DNDO. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD.

Federal, State, Local, Territorial, and Tribal Support – PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$25,193	\$23,384	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$9,407	\$2,472	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$34,600	\$25,856	-
Collections – Reimbursable Resources	-	-	-
Total Budget Resources	\$34,600	\$25,856	-
Obligations (Actual/Projections/Estimates)	\$21,105	\$25,856	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Federal, State, Local, Territorial, and Tribal Support – PPA

Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$25,193
FY 2018 President's Budget	-	-	\$23,384
FY 2019 Base Budget	-	-	\$23,384
Transfer to CWMD/FA from DNDO/FA/FSLTTS for CWMD	-	-	(\$23,384)
Total Transfers	-	-	(\$23,384)
Total Adjustments-to-Base	-	-	(\$23,384)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$23,384)

**Federal, State, Local, Territorial, and Tribal Support – PPA
Non Pay Budget Exhibits**

Non Pay Summary

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Federal, State, Local, Territorial, and Tribal Support	\$25,193	\$23,384	-	(\$23,384)
Total	\$25,193	\$23,384	-	(\$23,384)
Discretionary - Appropriation	\$25,193	\$23,384	-	(\$23,384)

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$214	\$207	-	(\$207)
25.1 Advisory and Assistance Services	\$5,859	\$6,984	-	(\$6,984)
25.2 Other Services from Non-Federal Sources	\$400	\$573	-	(\$573)
25.3 Other Goods and Services from Federal Sources	\$18,720	\$15,620	-	(\$15,620)
Total - Non Pay Object Classes	\$25,193	\$23,384	-	(\$23,384)

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Joint Analysis Center	\$6,513	\$4,109	-	(\$4,109)
JACCIS	\$3,541	\$3,350	-	(\$3,350)
Assistance	\$8,139	\$8,843	-	(\$8,843)
Training	\$4,417	\$4,423	-	(\$4,423)
Exercises	\$1,879	\$2,259	-	(\$2,259)
Federal, State, and Local Outreach	\$705	\$400	-	(\$400)
Total – Non Pay Cost Drivers	\$25,193	\$23,384	-	(\$23,384)

*Securing the Cities - PPA***Budget Comparison and Adjustments****Comparison of Budget Authority and Request**

Organization (Dollars in Thousands)	FY 2017 Enacted			FY 2018 President's Budget			FY 2019 President's Budget			FY 2018 to FY 2019 Total Changes		
	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount	Pos.	FTE	Amount
Securing the Cities	-	-	\$21,135	-	-	\$21,135	-	-	-	-	-	(\$21,135)
Total	-	-	\$21,135	-	-	\$21,135	-	-	-	-	-	(\$21,135)
Subtotal Discretionary - Appropriation	-	-	\$21,135	-	-	\$21,135	-	-	-	-	-	(\$21,135)

With the transfer of its functions to CWMD, no funds are included in the FY 2019 President's Budget for DNDO. Further information on FY 2019 funding for those functions can be found in the FY 2019 Congressional Justifications for CWMD.

Securing the Cities – PPA

Budget Authority and Obligations

Budget Authority (Dollars in Thousands)	FY 2017	FY 2018	FY 2019
Enacted/Request	\$21,135	\$21,135	-
Carryover and/or Recoveries (Actual/Estimates/Projections)	\$1,467	\$18,536	-
Rescissions to Current Year/Budget Year	-	-	-
Net Sequestered Resources	-	-	-
Supplementals	-	-	-
Total Budget Authority	\$22,602	\$39,671	-
Collections – Reimbursable Resources	\$50	-	-
Total Budget Resources	\$22,652	\$39,671	-
Obligations (Actual/Projections/Estimates)	\$22,904	\$39,671	-
Personnel: Positions and FTE			
Enacted/Request Positions	-	-	-
Enacted/Request FTE	-	-	-
Onboard and Actual FTE; Includes Collections - Reimbursable Resources			
Onboard (Actual/Estimates/Projections)	-	-	-
FTE (Actual/Estimates/Projections)	-	-	-

Securing the Cities – PPA Summary of Budget Changes

Budget Formulation Activity <i>(Dollars in Thousands)</i>	Positions	FTE	Amount
FY 2017 Enacted	-	-	\$21,135
FY 2018 President's Budget	-	-	\$21,135
FY 2019 Base Budget	-	-	\$21,135
Transfer to CWMD/FA from DNDO/FA/STC for CWMD	-	-	(\$21,135)
Total Transfers	-	-	(\$21,135)
Total Adjustments-to-Base	-	-	(\$21,135)
FY 2019 Request	-	-	-
FY 2018 TO FY 2019 Change	-	-	(\$21,135)

Securing the Cities – PPA Non Pay Budget Exhibits

Non Pay Summary

Organization <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Securing the Cities	\$21,135	\$21,135	-	(\$21,135)
Total	\$21,135	\$21,135	-	(\$21,135)
Discretionary - Appropriation	\$21,135	\$21,135	-	(\$21,135)

Non Pay by Object Class

Non-Pay Object Classes <i>(Dollars in Thousands)</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Change
21.0 Travel and Transportation of Persons	\$11	\$35	-	(\$35)
25.1 Advisory and Assistance Services	\$3,249	\$3,450	-	(\$3,450)
41.0 Grants, Subsidies, and Contributions	\$17,875	\$17,650	-	(\$17,650)
Total - Non Pay Object Classes	\$21,135	\$21,135	-	(\$21,135)

Non Pay Cost Drivers

Leading Non Pay Cost-Drivers <i>Dollars in Thousands</i>	FY 2017 Enacted	FY 2018 President's Budget	FY 2019 President's Budget	FY 2018 to FY 2019 Total Changes
Securing the Cities	\$21,135	\$21,135	-	(\$21,135)