United States
Environmental Protection Agency

Fiscal Year 2020

Justification of Appropriation Estimates for the Committee on Appropriations

Tab 03: Science and Technology

EPA-190-R-19-002

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Environmental Protection Agency
2020 Annual Performance Plan and Congressional Justification

Table of Contents – Science and Technology

APPROPRIATION: Science & Technology
Resource Summary Table

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Science & Technology				
Budget Authority	$685,123.0	$713,823.0	$463,060.0	-$250,763.0
Cancellation of Funds	$0.0	-$7,350.0	-$23,000.0	-$15,650.0
Budget Authority Post Cancellation of Funds		$706,473.0	$440,060.0	-$266,413.0
Total Workyears	2,009.8	2,039.2	1,497.5	-541.7

*For ease of comparison, Superfund transfer resources for the audit and research functions are shown in the Superfund account.

Bill Language: Science and Technology

For science and technology, including research and development activities, which shall include research and development activities under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980; necessary expenses for personnel and related costs and travel expenses; procurement of laboratory equipment and supplies; and other operating expenses in support of research and development, $463,060,000, to remain available until September 30, 2021.

Program Projects in S&T

(Dollars in Thousands)

Program Project	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Clean Air				
Clean Air Allowance Trading Programs	$7,543.1	$7,569.0	$5,739.0	-$1,830.0
Atmospheric Protection Program	$8,572.7	$8,018.0	$0.0	-$8,018.0
Federal Support for Air Quality Management	$5,722.3	$6,714.0	$3,776.0	-$2,938.0
Federal Vehicle and Fuels Standards and Certification	$90,650.1	$94,240.0	$77,826.0	-$16,414.0
Subtotal, Clean Air	$112,488.2	$116,541.0	$87,341.0	-$29,200.0
Indoor Air and Radiation				
Indoor Air: Radon Program	$133.5	$159.0	$0.0	-$159.0
Radiation: Protection	$2,407.4	$2,246.0	$990.0	-$1,256.0
Radiation: Response Preparedness	$3,259.5	$3,266.0	$3,793.0	$527.0
Reduce Risks from Indoor Air	$40.0	$326.0	$0.0	-$326.0
Subtotal, Indoor Air and Radiation	$5,840.4	$5,997.0	$4,783.0	-$1,214.0

Program Project	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Enforcement				
Forensics Support	$12,016.5	$13,669.0	$10,883.0	-$2,786.0
Homeland Security				
Homeland Security: Critical Infrastructure Protection	$9,504.5	$9,788.0	$7,457.0	-$2,331.0
Homeland Security: Preparedness, Response, and Recovery	$22,767.3	$22,918.0	$24,847.0	$1,929.0
Homeland Security: Protection of EPA Personnel and Infrastructure	$415.0	$416.0	$500.0	$84.0
Subtotal, Homeland Security	$32,686.8	$33,122.0	$32,804.0	-$318.0
IT / Data Management / Security				
IT / Data Management	$2,296.0	$3,089.0	$2,747.0	-$342.0
Operations and Administration				
Facilities Infrastructure and Operations	$70,101.6	$68,339.0	$67,274.0	-$1,065.0
Workforce Reshaping	$0.0	$0.0	$5,994.0	$5,994.0
Subtotal, Operations and Administration	$70,101.6	$68,339.0	$73,268.0	$4,929.0
Pesticides Licensing				
Pesticides: Protect Human Health from Pesticide Risk	$2,888.3	$2,531.0	$2,401.0	-$130.0
Pesticides: Protect the Environment from Pesticide Risk	$2,309.7	$3,072.0	$2,257.0	-$815.0
Pesticides: Realize the Value of Pesticide Availability	$362.0	$424.0	$615.0	$191.0
Subtotal, Pesticides Licensing	$5,560.0	$6,027.0	$5,273.0	-$754.0
Research: Air and Energy				
Research: Air and Energy	$87,503.9	$91,906.0	$31,707.0	-$60,199.0
Research: Safe and Sustainable Water Resources				
Research: Safe and Sustainable Water Resources	$104,163.5	$106,257.0	$69,963.0	-$36,294.0
Research: Sustainable Communities				
Research: Sustainable and Healthy Communities	$131,757.3	$134,327.0	$53,631.0	-$80,696.0
Research: Chemical Safety and Sustainability				
Human Health Risk Assessment	$33,568.7	$36,523.0	$22,689.0	-$13,834.0
Research: Chemical Safety and Sustainability				
Endocrine Disruptors	$12,501.0	$16,253.0	$10,346.0	-$5,907.0
Computational Toxicology	$21,153.1	$21,409.0	$17,630.0	-$3,779.0

Program Project	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Research: Chemical Safety and Sustainability (other activities)	$45,933.8	$52,745.0	$35,901.0	-$16,844.0
Subtotal, Research: Chemical Safety and Sustainability	$79,587.9	$90,407.0	$63,877.0	-$26,530.0
Subtotal, Research: Chemical Safety and Sustainability	$113,156.6	$126,930.0	$86,566.0	-$40,364.0
Water: Human Health Protection				
Drinking Water Programs	$3,458.2	$3,519.0	$4,094.0	$575.0
Congressional Priorities				
Water Quality Research and Support Grants	$4,094.0	$4,100.0	$0.0	-$4,100.0
Cancellation of Funds	$0.0	-$7,350.0	-$23,000.0	-$15,650.0
TOTAL S&T	**$685,123.0**	**$706,473.0**	**$440,060.0**	**-$266,413.00.0**

*****For ease of comparison, Superfund transfer resources for the audit and research functions are shown in the Superfund account.

***** Fact Sheet tables do not include applicable cancellation of funds *****

Clean Air

Clean Air Allowance Trading Programs

Program Area: Clean Air
Goal: Core Mission
Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$14,720.4	$15,270.0	$13,292.0	-$1,978.0
Science & Technology	***$7,543.1***	***$7,569.0***	***$5,739.0***	***-$1,830.0***
Total Budget Authority	$22,263.5	$22,839.0	$19,031.0	-$3,808.0
Total Workyears	61.8	63.9	63.7	-0.2

Program Project Description:

This program is responsible for managing the Clean Air Status and Trends Network (CASTNET), a long-term ambient monitoring network, established under Title IX of the Clean Air Act (CAA) Amendments of 1990, which serves as the Nation's primary source for atmospheric data on the dry component of acid deposition, regional ground-level ozone, and other forms of particulate and gaseous air pollution. Used in conjunction with the National Atmospheric Deposition Program's (NADP) wet deposition networks and other ambient air quality networks, CASTNET's long-term datasets and data products are used to determine the effectiveness of national and regional emission control programs. The CASTNET Program provides spatial and temporal trends in ambient air quality and atmospheric deposition in non-urban areas and sensitive ecosystems (e.g, National Parks). Maintaining the CASTNET monitoring network continues to be critical for assessing the environmental benefits realized from the Acid Rain Program and regional programs that control transported emissions (thereby reducing secondary pollutant formation of ozone and fine particles).

EPA's Long-Term Monitoring (LTM) Program was created to assess the health of water bodies in response to changes in deposition of atmospheric pollutants. Today, it ensures that the Clean Air Act continues to be effective in reducing the impact of atmospheric pollutants (e.g., strong acid anions) on surface waters in New England, the Adirondack Mountains, the Northern Appalachian Plateau (including the Catskill and Pocono mountains), and the Blue Ridge region. This program is operated cooperatively with partners in state agencies, academic institutions, and other federal agencies. The LTM surface water chemistry monitoring program provides field measurements for understanding biogeochemical changes in sulfur, nitrogen, acid neutralizing capacity (ANC), aluminum, and carbon in streams and lakes in relation to changing pollutant emissions. The LTM program is one of the longest running programs at EPA, providing a longitudinal dataset based on sampling and measurements that go back to 1983.

Clean Air Allowance Trading Programs, established under Title I and IV of the Clean Air Act, help implement the National Ambient Air Quality Standards (NAAQS) and the Acid Rain

Program, as well as reduce toxics emissions and regional haze. Pollutants reduced include sulfur dioxide (SO_2), nitrogen oxides (NO_x), ground-level ozone, fine particulate matter ($PM_{2.5}$), and mercury. EPA provides assistance to states as they develop, implement, and assess their state and regional programs to address major regional and national air issues from large stationary sources. This assistance has traditionally come in the form of technical analysis, modeling, and emissions monitoring support.

The Cross-State Air Pollution Rule (CSAPR) requires 27 states to limit their state-wide emissions of SO_2 and/or NO_x in order to reduce or eliminate the states' contributions to fine particulate matter and/or ground-level ozone pollution in other states. The emissions limitations are defined in terms of maximum state-wide "budgets" for emissions of annual SO_2, annual NO_x, and/or ozone-season NOx from each state's large electric generating units. In September 2016, EPA finalized an update to CSAPR for the 2008 ozone NAAQS. On December 6, 2018, EPA finalized the Determination Regarding Good Neighbor Obligations for the 2008 Ozone National Ambient Air Quality Standard, also known as the CSAPR Close-Out Rule, which determined the CSAPR Update Rule fully addresses 20 states' interstate pollution transport obligations for the 2008 national ambient air quality standards (NAAQS) for ground-level ozone.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Improve Air Quality in the *FY 2018–2022 EPA Strategic Plan*. In FY 2020, EPA will:

- Continue quality assurance, analysis, and reporting of environmental data from the CASTNET deposition/rural ozone and LTM surface water monitoring networks.
- Analyze and assess trends in sulfur and nitrogen deposition, rural ozone concentrations, surface water quality, and other indicators of ecosystem health and ambient air quality in non-urban areas of the U.S.
- Assure the continuation of ongoing SO_2 and NO_X emission reductions from power plants in the eastern half of the U.S. by implementing CSAPR and the CSAPR update, and across the contiguous U.S. by implementing the Acid Rain Program.[1]
- Ensure accurate and consistent results for the clean air and allowance trading programs. Continue work on performance specifications and investigating monitoring alternatives and methods to improve the efficiency of monitor certification and emissions data reporting.
- Work with states to implement emission reduction programs to comply with CAA Section 110(a)(2)(D)(i)(I) requirements.[2]

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

[1] Clean Air Act §§ 110(a)(2)(D) and 401.
[2] For more information on program performance, please see: http://www.epa.gov/airmarket/progress/progress-reports.html.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$63.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to the adjustments in salary, essential workforce support, and benefits costs.

- (-$1,893.0) This program change reduces support for the Program with impacts to activities such as technical analysis, modeling, and emissions monitoring support to states as they develop, implement, and assess their state and regional programs to address regional and national air issues from large stationary sources.

Statutory Authority:

Clean Air Act.

Atmospheric Protection Program

Program Area: Clean Air
Goal: Core Mission
Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$92,753.7	$95,436.0	$13,965.0	-$81,471.0
Science & Technology	***$8,572.7***	***$8,018.0***	***$0.0***	***-$8,018.0***
Total Budget Authority	$101,326.4	$103,454.0	$13,965.0	-$89,489.0
Total Workyears	204.5	203.7	120.0	-83.7

Program Project Description:

The Atmospheric Protection Program supports implementation and compliance with greenhouse gas (GHG) emission standards for light-duty and heavy-duty vehicles developed under EPA's Federal Vehicle and Fuels Standards and Certification Program. Resources under this program also support compliance activities for implementing the National Highway Traffic Safety Administration's (NHTSA) Corporate Average Fuel Economy (CAFE) standards. Under authorities contained in the Clean Air Act and the Energy Policy Act, EPA is responsible for issuing certificates and ensuring compliance with both the GHG and CAFE standards.

FY 2020 Activities and Performance Plan:

Resources and FTE are proposed for elimination for this program in FY 2020.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$8,018.0 / -30.8 FTE) This funding change eliminates the Program.

Statutory Authority:

Clean Air Act; Pollution Prevention Act (PPA), §§ 6602-6605; National Environmental Policy Act (NEPA), § 102; Clean Water Act, § 104; Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), § 8001; Energy Policy Act of 2005, § 756.

Federal Support for Air Quality Management

Program Area: Clean Air
Goal: Core Mission
Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$128,588.0	$128,001.0	$107,298.0	-$20,703.0
Science & Technology	***$5,722.3***	***$6,714.0***	***$3,776.0***	***-$2,938.0***
Total Budget Authority	$134,310.3	$134,715.0	$111,074.0	-$23,641.0
Total Workyears	792.0	816.7	636.8	-179.9

Program Project Description:

Federal support for the criteria pollutant and air toxics programs includes a variety of tools to characterize ambient air quality and the level of risk to the public from air pollutants and to measure national progress toward improving air quality and reducing associated risks. The Federal Support for Air Quality Management Program supports development of State Implementation Plans (SIPs) through modeling and other tools and assists states in implementing, attaining, maintaining, and enforcing the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. The Program also develops and provides information, training, and tools to assist state, tribal, and local agencies, as well as communities, to reduce air toxics emissions and risk specific to their local areas. Finally, the Program includes activities related to the Clean Air Act (CAA) stationary source residual risk and technology review program, which involves an assessment of source categories subject to Maximum Achievable Control Technology (MACT) standards to determine if more stringent standards are needed to further reduce the risks to public health and to determine if any National Emission Standards for Hazardous Air Pollutants (NESHAP) (both MACT- and Generally Available Control Technology [GACT]-based standards) should be revised to reflect developments in practices, processes, and control technologies.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Improve Air Quality in the *FY 2018–2022 EPA Strategic Plan*. During FY 2020, as part of implementing key activities in support of attainment of the NAAQS, EPA will provide states and local air quality agencies with scientifically and technically sound assistance in developing SIPs. The assistance includes providing models, modeling inputs and tools, and technical data and guidance and identifying emission control options. EPA will ensure national consistency in how air quality modeling is conducted as part of regulatory decision-making, including federal and state permitting programs, SIP-related actions, as well as how conformity determinations are conducted across the U.S. The Agency will work with states and local air quality agencies to ensure that particulate matter (PM)

hot-spot analyses are conducted in a manner consistent with the transportation conformity regulation and guidance.
One of EPA's priorities is to fulfill its CAA and court-ordered obligations. Section 112 of the CAA requires that all NESHAP be reviewed and updated, as necessary, every eight years, taking into account developments in practices, processes and technologies related to those standards. In FY 2020, EPA will continue to conduct these periodic "technology reviews" and conduct risk assessments to determine whether MACT-based NESHAP appropriately protect public health. The Program will prioritize its work with an emphasis on meeting court-ordered deadlines.

EPA is working with other internal and external stakeholders on improving monitoring systems to fill data gaps and to better estimate population exposure to criteria and toxic air pollutants. EPA will continue to provide quality assurance proficiency testing for federal and commercial laboratories that produce data from $PM_{2.5}$ air monitoring systems to ensure quality data for use in determining air quality.

In FY 2020, EPA will work with partners to continue improving emissions factors and inventories, including the National Emissions Inventory. This effort includes gathering improved activity data from emissions monitoring and using geographic information systems and satellite remote sensing systems, where possible, for key point, area, mobile, and fugitive sources, and global emission events.

Performance Measure Targets:

Work under this program supports performance results in the Federal Support for Air Quality Management Program under the Environmental Programs and Management appropriation.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$38.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for FTE due to the adjustments in salary, essential workforce support, and benefits costs.

- (-$2,976.0 / +2.5 FTE) This net program change reflects an adjustment to EPA's support of state, tribal, and local agencies' Clean Air Act implementation activities.

Statutory Authority:

Clean Air Act.

Federal Vehicle and Fuels Standards and Certification

Program Area: Clean Air
Goal: Core Mission
Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Science & Technology	***$90,650.1***	***$94,240.0***	***$77,826.0***	***-$16,414.0***
Total Budget Authority	$90,650.1	$94,240.0	$77,826.0	-$16,414.0
Total Workyears	290.8	299.7	296.7	-3.0

Program Project Description:

Under the Federal Vehicle and Fuels Standards and Certification Program, EPA develops, implements, and ensures compliance with national emission standards to reduce mobile source related air pollution from light-duty cars and trucks, heavy-duty trucks and buses, nonroad engines and vehicles, and from the fuels that power these engines. The Program also evaluates new emission control technology and provides state, tribal, and local air quality managers and transportation planners with access to information on transportation programs and incentive-based programs. As part of ensuring compliance with national emission standards, the Program tests vehicles, engines, and fuels, and establishes test procedures for federal emissions and fuel economy standards.

National Vehicle and Fuel Emissions Laboratory (NVFEL): The NVFEL ensures air quality benefits and fair competition in the marketplace by conducting testing operations on motor vehicles, heavy-duty engines, nonroad engines, and fuels to certify that all vehicles, engines, and fuels that enter the U.S. market comply with all federal clean air and fuel economy standards. The NVFEL conducts vehicle emission tests as part of pre-production tests, certification audits, in-use assessments, and recall programs to ensure compliance with mobile source clean air programs.

Renewable Fuel Standard Program: EPA administers the Renewable Fuel Standard (RFS) Program. The RFS was created under the Energy Policy Act of 2005 (EPAct), which amended the Clean Air Act, and was expanded under the Energy Independence and Security Act of 2007 (EISA). The RFS Program requires a certain volume of renewable fuel to replace or reduce the quantity of petroleum-based transportation fuel, heating oil or jet fuel.

The four renewable fuel categories under the RFS are biomass-based diesel, cellulosic biofuel, advanced biofuel, and total renewable fuel. Obligated parties under the RFS Program are refiners or importers of gasoline or diesel fuel. Compliance is achieved by blending renewable fuels into transportation fuel, or by obtaining credits (called “Renewable Identification Numbers” or RINs) to meet an EPA-specified Renewable Volume Obligation (RVO).

Work with State and Local Governments: EPA works with state and local governments to ensure the technical integrity of the mobile source control emission benefits included in State Implementation Plans (SIPs) and transportation conformity determinations. EPA develops and provides information and tools to assist state, local, and tribal agencies, as well as communities, to reduce air toxics emissions and risks specific to their local areas. Reductions in emissions of mobile source air toxics, such as components of diesel exhaust, are achieved through establishing national emissions standards and partnership approaches working with state, local, and tribal governments, as well as a variety of stakeholder groups.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Improve Air Quality in the *FY 2018–2022 EPA Strategic Plan*. The Federal Vehicle and Fuels Standards and Certification Program supports the Agency's integrated criteria pollutant and greenhouse gas (GHG) compliance programs by operating test cells that simultaneously measure criteria pollutants and GHG emissions, reviewing certification applications for light-duty vehicles and heavy-duty engines to approve applications for both the criteria pollutant and GHG programs, and examining potential violations.

In FY 2020, the Federal Vehicle and Fuels Standards and Certification Program will continue to focus its efforts on certification decisions. The Agency will continue to perform its compliance oversight functions on priority matters, conducting compliance oversight tests where evidence suggests noncompliance. EPA will continue to conduct pre-certification confirmatory testing activities for emissions and fuel economy for passenger cars. EPA anticipates reviewing and approving about 5,000 vehicle and engine emissions certification requests, including light-duty vehicles, heavy-duty diesel engines, nonroad engines, marine engines, locomotives, and others. There has been a significant increase in demand for EPA's certification services over the last two decades, due in part to the addition of certification requirements for marine, other nonroad, and small spark-ignited engines.

EPA uses in-use emissions data provided by light-duty vehicle manufacturers to measure compliance and determine if any follow-up evaluation or testing is necessary. Since CY 2000, light-duty vehicle manufacturers have been required to test a number of newer and older in-use vehicles and provide the data to EPA, which receives over 2,100 test results annually. EPA reviews the data and determines if there are any specific vehicles, models, or manufacturers that are failing emissions in-use. The Agency will use this information submitted by light-duty manufacturers to determine if there are vehicle models that should be identified for testing for the upcoming model year prior to granting the manufacturer a certificate of conformity, which allows the manufacturer to sell vehicles in the U.S.

On August 2, 2018, EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) released a notice of proposed rulemaking, the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks (SAFE Vehicles Rule). This Notice of Proposed Rulemaking (NPRM) is the first formal step in setting the 2021-2026 Model Year (MY) standards that must be achieved by each

automaker for its car and light-duty truck fleet. With this proposal, EPA and NHTSA are seeking public comment on a wide range of regulatory options.[3]

On November 13, 2018, EPA announced the *Cleaner Trucks Initiative*, a new rulemaking effort to address NO_x emissions from heavy-duty trucks. As a part of this rulemaking effort, EPA will evaluate the technologies which can ensure real-world compliance with emissions standards and also will seek opportunities to modernize and streamline the regulatory framework for the heavy-duty highway sector.

In FY 2020, EPA also will oversee compliance with vehicle fuel economy labeling requirements. In past years, EPA conducted in-use audits of manufacturer "coast-down" data, revealing issues in manufacturer data submitted to EPA and, as a result, inaccurate fuel economy labels on more than a million vehicles from several well-known manufacturers.

In FY 2020, EPA will continue implementing the Tier 3 standards for light-duty vehicles and certifying manufacturers' fleets for vehicle Model Year 2021. EPA is responsible for establishing the test procedures needed to measure tailpipe emissions and for verifying manufacturers' vehicle fuel economy data. As a result, the Agency will deploy its laboratory testing resources to ensure that new cars and trucks are in compliance with the Tier 3 emissions standards.

EPA will continue working with the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO) on programs to control conventional pollutant emissions from marine and aircraft engines, respectively. In FY 2020, the Agency will work with ICAO on its program to develop international action plans to reduce particulate matter (PM) emissions from international civil aviation.

The Motor Vehicle Emissions Simulator (MOVES) is the Agency's emission modeling system that estimates emissions for mobile sources at the national, county, and project levels for criteria air pollutants, greenhouse gases, and air toxics. In FY 2020, MOVES will support the Agency's emission control programs, as well as provide critical support to states in their determination of program needs to meet air quality standards. The Agency also will evaluate the schedule for updates to MOVES.

In FY 2020, EPA will continue to provide state and local governments with assistance in developing SIPs and providing assistance with transportation conformity determinations. EPA will continue to work with states and local governments to ensure the technical integrity of the mobile source emission estimates in their SIPs. EPA will assist in identifying control options available and provide guidance, as needed. In addition, EPA will ensure national consistency in how conformity determinations are conducted across the U.S. and in the development of motor vehicle emissions budgets in air quality plans, for use in conformity determinations.

EPA will continue to provide assistance to state and local transportation and air quality agencies working on $PM_{2.5}$ hot-spot analyses. This will help ensure that analyses use the latest available information and that a measure of consistency exists across the nation. Additionally, EPA will

[3] Information on the proposal can be found at the following website: https://www.epa.gov/regulations-emissions-vehicles-and-engines/safer-affordable-fuel-efficient-safe-vehicles-proposed.

continue partnering with states to support inspection and maintenance (I/M) programs that focus on in-use vehicles and engines. Basic and/or enhanced I/M testing is currently being conducted in over 30 states with technical and programmatic guidance from EPA.

In FY 2020, EPA will continue to work with a broad range of stakeholders to develop targeted, sector-based, and place-based incentives for diesel fleets (including school buses, ports, and freight) to limit emissions from older, pre-2007 diesel engines not subject to stringent emissions standards. Because large numbers of people live near ports and are vulnerable to mobile source diesel emissions, EPA will focus its efforts on reducing mobile source emissions in and around ports. Approximately 39 million people in the U.S. currently live near ports and can be exposed to air pollution associated with emissions from diesel engines at ports, including particulate matter, nitrogen oxides, ozone, and air toxics.[4] EPA also is working with industry to bring about field testing and emissions testing protocols for a variety of innovative energy-efficient, emissions reducing technologies for the legacy fleet.

EPA will continue to implement the RFS Program and to carry out actions required by the EPAct of 2005 and the EISA of 2007, including operating and maintaining the credit trading systems. EISA expanded the renewable fuels provisions of EPAct and requires additional studies in various areas of renewable fuel use. EISA requires that EPA set an annual volume standard for renewable fuels and the 2021 RFS volume requirements are statutorily required to be promulgated in FY 2020.

EISA also requires EPA to develop a comprehensive lifecycle GHG methodology to implement the Act's GHG threshold requirements for the RFS. Producers of new and advanced biofuels regularly seek to qualify their fuels under RFS and EPA will continue to apply its lifecycle analysis to such fuels to evaluate and determine eligibility for the Program.

In FY 2020, EPA will maintain oversight of the RFS Program and continue to evaluate compliance with RFS provisions through its system, which is used to track the creation, trades, and use of billions of Renewable Identification Numbers (RINs) for compliance. The tracking system handles 4,000 to 6,000 submissions per day, typically averaging more than 20,000 transactions per day, and the generation of more than 1.4 billion RINs per month. RINs are generated with the production of qualifying renewable fuel and are used to achieve national RFS programmatic goals of reducing or replacing the quantity of petroleum-based transportation fuel, heating oil, or jet fuel produced. In FY 2020, EPA will continue to implement its Fuel and Fuel Additive Registration program. The Agency will prioritize its review and decisions for Part 79 registrations.

[4] EPA National Port Strategy Assessment Report: https://www.epa.gov/ports-initiative/national-port-strategy-assessment.

Performance Measure Targets:

(PM CRT) Number of certificates of conformity issued that demonstrate that the respective engine, vehicle, equipment, component, or system conforms to all of the applicable emission requirements and may be entered into commerce.

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Units
Target						5,200	5,000	5,000	Certificates
Actual		4,225	4,360	4,453	5,109	4,869			

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$4,120.0) This net change to fixed and other costs is a decrease due to the recalculation of base workforce costs for existing FTE due to the adjustments in salary, essential workforce support, and benefits costs.

- (+$165.0) This change to fixed and other costs is an increase due to the recalculation of lab utilities.

- (-$12,459.0 / -3.0 FTE) This program change streamlines technical assistance to industry, stakeholders, state and local governments, and other partners and focuses the Program on core statutory requirements.

Statutory Authority:

Title II of the Clean Air Act; Motor Vehicle Information Cost Savings Act; Alternative Motor Fuels Act of 1988; National Highway System Designation Act; Energy Policy Act of 1992; Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU); Energy Policy Act of 2005; Energy Independence and Security Act of 2007.

Indoor Air and Radiation

Indoor Air: Radon Program

Program Area: Indoor Air and Radiation
Goal: Core Mission
Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$2,575.1	$3,136.0	$0.0	-$3,136.0
Science & Technology	***$133.5***	***$159.0***	***$0.0***	***-$159.0***
Total Budget Authority	$2,708.6	$3,295.0	$0.0	-$3,295.0
Total Workyears	9.4	9.0	0.0	-9.0

Program Project Description:

Title III of the Toxic Substances Control Act (TSCA) authorizes EPA to undertake a variety of activities to address the public health risks posed by exposures to indoor radon. Under the statute, EPA studies the health effects of radon, assesses exposure levels, sets an action level, and advises the public of steps they can take to reduce exposure. EPA's Radon Program has provided important guidance, technical assistance, and funding to help states establish and support their own programs.

FY 2020 Activities and Performance Plan:

Resources and FTE are proposed for elimination for this program in FY 2020.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$159.0) This funding change eliminates the Program in the S&T account.

Statutory Authority:

Title III of the Toxic Substances Control Act (TSCA); Clean Air Act.

Radiation: Protection

Program Area: Indoor Air and Radiation
Goal: Core Mission
Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$9,286.8	$9,180.0	$2,307.0	-$6,873.0
Science & Technology	***$2,407.4***	***$2,246.0***	***$990.0***	***-$1,256.0***
Hazardous Substance Superfund	$2,176.9	$1,985.0	$1,933.0	-$52.0
Total Budget Authority	$13,871.1	$13,411.0	$5,230.0	-$8,181.0
Total Workyears	68.5	66.3	25.0	-41.3

Program Project Description:

EPA supports waste site characterization and cleanup by providing field and fixed laboratory environmental radiological and radioanalytical data and technical support, radioanalytical training to state and federal partners, and developing new and improved radioanalytical methods and field measurement technologies. The National Analytical Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama and the National Center for Radiation Field Operations (NCRFO) in Las Vegas, Nevada provide analytical and field operation support for radio analytical testing, quality assurance, analysis of environmental samples, field radiological measurement/support, and field measurement systems and equipment to support site assessment, cleanup, and response activities in the event of a radiological accident or incident.

Together, these organizations provide technical support for conducting site-specific radiological characterizations and cleanups. They also develop guidance for cleaning up Superfund and other sites that are contaminated with radioactive materials.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Improve Air Quality in the *FY 2018–2022 EPA Strategic Plan*. In FY 2020, EPA, in cooperation with states, tribes, and other federal agencies, will provide ongoing site characterization and analytical support for site assessment activities, remediation technologies, and measurement and information systems. EPA also will provide training and direct site assistance, including field surveys and monitoring, laboratory analyses, health and safety, and risk assessment support at sites with actual or suspected radioactive contamination.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$17.0) This change to fixed and other costs is a decrease due to the recalculation of base workforce costs for existing FTE due to the adjustments in salary, essential workforce support, and benefits costs.

- (-$86.0) This change to fixed and other costs is a decrease due to the recalculation of lab utilities.

- (-$1,153.0 / -7.2 FTE) This program change reflects a decrease in support activities at the National Analytical Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama and the National Center for Radiation Field Operations (NCRFO) in Las Vegas, Nevada.

Statutory Authority:

Atomic Energy Act of 1954; Clean Air Act; Energy Policy Act of 1992; Nuclear Waste Policy Act of 1982; Public Health Service Act; Safe Drinking Water Act; Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978; Waste Isolation Pilot Plant Land Withdrawal Act of 1992; Marine Protection, Research, and Sanctuaries Act; Clean Water Act.

Radiation: Response Preparedness

Program Area: Indoor Air and Radiation
Goal: Core Mission
Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$1,774.5	$1,952.0	$2,219.0	$267.0
Science & Technology	***$3,259.5***	***$3,266.0***	***$3,793.0***	***$527.0***
Total Budget Authority	$5,034.0	$5,218.0	$6,012.0	$794.0
Total Workyears	29.6	31.5	31.5	0.0

Program Project Description:

The National Analytical Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama, and the National Center for Radiation Field Operations (NCRFO) in Las Vegas, Nevada, provide laboratory analyses, field sampling and analyses, and direct scientific support to respond to radiological and nuclear incidents. This work includes measuring and monitoring radioactive materials and assessing radioactive contamination in the environment. This program comprises direct scientific field and laboratory activities to support preparedness, planning, training, and procedure development. In addition, program personnel are members of EPA's Radiological Emergency Response Team (RERT), a component of the Agency's Emergency Response Program, and are trained to provide direct expert scientific and technical assistance. EPA's Office of Radiation and Indoor Air program's RERT asset is identified as an Agency Critical Infrastructure/Key Resource and is part of the Nuclear Incident Response Team under the Department of Homeland Security.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.1, Improve Air Quality in the *FY 2018–2022 EPA Strategic Plan*. In FY 2020, EPA's RERT will continue to provide support for federal radiological emergency response and recovery operations under the National Response Framework and the National Oil and Hazardous Substances Pollution Contingency Plan. They also will support basic field operations (e.g., on-site technical support/consultation, fixed laboratory, and mobile laboratory analyses) to provide for the rapid collection of field measurements/samples and accurate radionuclide analyses of environmental samples.[5]

In FY 2020, NAREL and NCRFO will: maintain core levels of readiness for radiological emergency responses; participate in the most critical emergency exercises; provide scientific support to state radiation, solid waste, and health programs that regulate radiation remediation;

[5] For additional information, please see: https://www.epa.gov/radiation/radiological-emergency-response.

participate in the Protective Action Guidance[6] implementation; and respond, as required, to radiological incidents. NAREL and NCRFO will prioritize the development of rapid methods and techniques for the laboratory analysis of samples, development of updated field scanning technologies, and rapid deployment capabilities to ensure that field teams and laboratory personnel are ready to provide scientific data, analyses, and updated analytical techniques for radiation emergency response programs across the Agency.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$104.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to the adjustments in salary, essential workforce support, and benefits costs.

- (+$267.0) This change to fixed and other costs is an increase due to the recalculation of lab utilities.

- (+$156.0 / -0.6 FTE) This net program change reflects an adjustment in support activities for preparedness work, including basic laboratory analytic functions.

Statutory Authority:

Homeland Security Act of 2002; Atomic Energy Act of 1954; Clean Air Act; Post-Katrina Emergency Management Reform Act of 2006 (PKEMRA); Public Health Service Act (PHSA); Robert T. Stafford Disaster Relief and Emergency Assistance Act; Safe Drinking Water Act (SDWA).

[6] For additional information, please see: https://www.epa.gov/sites/production/files/2017-01/documents/epa_pag_manual_final_revisions_01-11-2017_cover_disclaimer_8.pdf.

Reduce Risks from Indoor Air

Program Area: Indoor Air and Radiation
Goal: Core Mission
Objective(s): Improve Air Quality

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$13,489.6	$13,369.0	$0.0	-$13,369.0
Science & Technology	***$40.0***	***$326.0***	***$0.0***	***-$326.0***
Total Budget Authority	$13,529.6	$13,695.0	$0.0	-$13,695.0
Total Workyears	42.8	46.0	0.0	-46.0

Program Project Description:

Title IV of the Superfund Amendments and Reauthorization Act of 1986 (SARA) authorizes EPA to conduct and coordinate research on indoor air quality, develop and disseminate information, and coordinate efforts at the federal, state, and local levels. EPA conducts field measurements and assessments and provides technical support for indoor air quality remediation, when requested.

FY 2020 Activities and Performance Plan:

Resources and FTE are proposed for elimination for this program in FY 2020.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$326.0 / -1.4 FTE) This funding change eliminates the Program in the S&T account.

Statutory Authority:

Title III of the Toxic Substances Control Act (TSCA); Title IV of the Superfund Amendments and Reauthorization Act of 1986 (SARA); Clean Air Act.

Enforcement

Forensics Support

Program Area: Enforcement
Goal: Rule of Law and Process
Objective(s): Compliance with the Law

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Science & Technology	***$12,016.5***	***$13,669.0***	***$10,883.0***	***-$2,786.0***
Hazardous Substance Superfund	$1,999.6	$1,824.0	$1,144.0	-$680.0
Total Budget Authority	$14,016.1	$15,493.0	$12,027.0	-$3,466.0
Total Workyears	65.2	69.0	52.1	-16.9

Program Project Description:

The Forensics Support Program provides expert scientific and technical support for criminal and civil environmental enforcement cases, as well as technical support for the Agency's compliance efforts. EPA's National Enforcement Investigations Center (NEIC) is an environmental forensic center accredited for both laboratory and field sampling operations that generate environmental data for law enforcement purposes. It is fully accredited under International Standards Organization (ISO) 17025, the main standard used by testing and calibration laboratories, as recommended by the National Academy of Sciences.[7] The NEIC maintains a sophisticated chemistry laboratory and a corps of highly trained inspectors and scientists with expertise across media. The NEIC works closely with EPA's Criminal Investigation Division to provide technical support (e.g., sampling, analysis, consultation, and testimony) to criminal investigations. The NEIC also works closely with EPA's Headquarters and Regional Offices to provide technical support, consultation, on-site inspection, investigation, and case resolution services in support of the Agency's Civil Enforcement Program.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.1, Compliance with the Law in the *FY 2018 - 2022 EPA Strategic Plan*. The Forensics Support Program provides expert scientific and technical support for EPA's criminal and civil enforcement efforts. In FY 2020, NEIC will continue to streamline its forensics work, and identify enhancements to our sampling and analytical methods, using existing technology. The Program will continue to focus its work on collecting and analyzing materials to characterize contamination, and attribute it to individual sources and/or facilities. In support of that effort, NEIC conducted two *kaizen* events in FY 2018 aimed at streamlining the timeline for completion of civil inspection reports and identifying efficiencies in laboratory operations. The results of these efforts will inform our work in FY 2020 and beyond.

[7] Strengthening Forensic Science in the United States: A Path Forward, National Academy of Sciences, 2009, available at: http://www.nap.edu/catalog.php?record_id=12589.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$359.0) This net change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to adjustments in salary and benefit costs.

- (+$20.0) This change to fixed and other costs is an increase due to recalculation of lab utilities.

- (-$3,165.0 / -12.2 FTE) This change reflects a focus on analyzing material to attribute it to individual sources or facilities and a reduction in other support.

Statutory Authority:

Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98–80, 97 Stat. 485 (codified at Title 5, App.) (EPA's organic statute); Act to Prevent Pollution from Ships (MARPOL Annex VI); Asbestos Hazard Emergency Response Act; Clean Air Act; Clean Water Act; Emergency Planning and Community Right-to-Know Act; Federal Insecticide, Fungicide, and Rodenticide Act; Marine Protection, Research, and Sanctuaries Act; Mercury-Containing and Rechargeable Battery Management Act; Noise Control Act; Oil Pollution Act; Resource Conservation and Recovery Act; Rivers and Harbors Act; Safe Drinking Water Act; Small Business Regulatory Enforcement Fairness Act; Toxic Substances Control Act.

Homeland Security

Homeland Security: Critical Infrastructure Protection

Program Area: Homeland Security
Goal: Core Mission
Objective(s): Provide for Clean and Safe Water

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$908.7	$880.0	$1,188.0	$308.0
Science & Technology	***$9,504.5***	***$9,788.0***	***$7,457.0***	***-$2,331.0***
Total Budget Authority	$10,413.2	$10,668.0	$8,645.0	-$2,023.0
Total Workyears	25.5	26.7	21.0	-5.7

Program Project Description:

Under the federal homeland security system, EPA is the Sector-Specific Agency responsible for implementing statutory and Presidential directives relating to homeland security for the water sector. EPA's Water Security Program is implemented through close partnerships with the water sector, state emergency response and water program officials, and other federal agencies—most notably the Department of Homeland Security (DHS), the U.S. Army Corps of Engineers, and the Intelligence Community. The Program is not driven by regulatory requirements on water systems or the states, but instead operates under the principles of cooperative federalism by engaging federal, state, and local entities in defining annual objectives and identifying high priorities for immediate action.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.2, Provide for Clean and Safe Water in the *FY 2018–2022 EPA Strategic Plan*. This program provides critical resources to coordinate and support protection of the nation's critical water infrastructure from terrorist threats and all-hazard events. Under this homeland security project area, EPA will train, in FY 2020, about 2,500 water utilities, state officials, and federal emergency responders to become more resilient to any natural or manmade incident that could endanger water and wastewater services. In FY 2020, EPA will provide tools, training, and technical assistance which will address the highest risks confronting the water sector.

Natural Disasters and General Preparedness

Drought, floods, hurricanes, earthquakes, and other natural disasters represent a high risk to the water sector owing to their historical frequency of occurrence and their enormous potential for destruction. As evident from several recent natural disasters, the level of preparedness within the water sector varies significantly—with many utilities lacking an adequate preparedness capability. In FY 2020, EPA will improve the preparedness of the water sector by providing nationwide

training sessions to address natural disasters and general preparedness with the objective to train water and wastewater systems, state officials, and emergency response partners. Specifically, EPA will:

- Provide in-person trainings and workshops which will include: Incident Command System (ICS)/National Incident Management System (NIMS) training; drought response training; flood response training; state functional exercises (e.g., scenarios of hurricanes, floods and earthquakes); resource typing and site access workshops; a regional interstate emergency response exercise (e.g., hurricane), etc.
- Conduct tabletop and functional exercises to improve the operation of intra-state and inter-state mutual aid agreements among water utilities.
- Implement lessons learned of relevance to the water sector from the 2017 hurricane season, as identified by reports from FEMA, the Water Agency Response Network, and EPA's Inspector General.
- Continue to address high priority security areas as identified in the stakeholder generated *2017 Roadmap to a Secure and Resilient Water and Wastewater Sector*[8] with an emphasis on projects addressing the following four priorities: (1) establishing the critical lifeline status of the water and wastewater sector and translating that definition into strong support for the sector's needs and capabilities; (2) improving detection, response, and recovery to contamination incidents; (3) advancing preparedness and improving capabilities of the water and wastewater sector for area-wide loss of water and power; and (4) advancing recognition of vulnerabilities and needed responses related to cyber risk management.
- Conduct nationwide training sessions with three critical, inter-dependent sectors: health care, emergency services, and energy. Most incidents, particularly natural disasters, have underscored the mutual reliance on the water sector with other lifeline sectors. Through training sessions with officials at the local, state, and federal levels from these other sectors, EPA will seek to improve coordination among critical lifeline sectors.
- Sustain operation of the Water Desk in the Agency's Emergency Operations Center in the event of an emergency by: updating roles/responsibilities; training staff in the incident command structure; ensuring adequate staffing during activation of the desk; and coordinating with EPA's regional field personnel and response partners.
- Develop annual assessments, as required under the National Infrastructure Protection Plan, to describe existing water security efforts and progress in achieving the sector's key metrics.

<u>Water Security Initiative and Water Lab Alliance</u>

Water Security Initiative. The Water Security Initiative (WSI) designs and demonstrates an effective system for timely detection and appropriate response to drinking water contamination threats and incidents through a pilot program that has broad application to the nation's drinking water utilities in high-threat cities. The FY 2020 request includes $3.4 million for necessary WSI Surveillance and Response System (SRS) activities to refine technical assistance products based on the five full-scale SRS pilots, implement a monitoring and response program for water utilities

[8]For more information, please see: https://www.waterisac.org/sites/default/files/public/2017_CIPAC_Water_Sector_Roadmap_FINAL_051217.pdf.

focused on source water chemical spills, and provide direct technical assistance to the dozens of water utilities that seek to leverage EPA's expertise in deploying their own warning system.

In FY 2020, EPA will train about 250 drinking water utilities in the design, operation, and response components of early contaminant warning systems. In FY 2020, EPA will:

- Continue efforts to promote the water sector's adoption of Water Quality Surveillance and Response Systems. This will help to rapidly detect and respond to water quality problems, such as contamination in the distribution system, in order to reduce public health and economic consequences through the development of several online training modules and webinars, as well as the provision of in-person direct technical assistance.
- Build upon the Drinking Water Mapping Application to Protect Source Waters (DWMAPS),[9] EPA will pilot an effort to compile and disseminate chemical storage data from state and local sources to ensure that drinking water utilities have access to the basic information (e.g., what chemicals are stored upstream from a surface water intake) necessary for implementing effective source water contamination detection and response systems.
- Conduct nationwide training sessions for its SRS Capabilities Assessment Tool,[10] a web-based, easy to use, decision support tool that presents the user with a series of questions by which to assess existing detection and response capabilities, compare these existing capabilities to a target capability, and identify potential enhancements to address gaps between the existing and target capabilities.
- Continue the successful SRS implementation pilot program[11] within the water sector - the purpose of which is to: demonstrate the application of SRS tools to designing and operating an early warning system for contamination events; illustrate additional applications of SRS tools, such as extending the SRS approach to source water monitoring; and identify champions, within the industry, for implementing surveillance and response systems.

Water Laboratory Alliance. In a contamination event, the sheer volume or unconventional type of samples could quickly overwhelm the capacity or capability of a single laboratory. To address this potential deficiency, EPA has established a national Water Laboratory Alliance (WLA) comprised of laboratories harnessed from the range of existing lab resources from the local (e.g., water utility) to the federal levels (e.g., the Centers for Disease Control and Prevention [CDC]'s Laboratory Response Network). In FY 2020, EPA will continue to promote, through exercises, expert workshops and association partnerships, the Water Laboratory Alliance Plan,[12] which provides a protocol for coordinated laboratory response to a surge of analytical needs. Under WLA, EPA will train, in FY 2020, approximately 100 laboratories in improving their ability to handle potential problems associated with surge capacity and analytical method capabilities during an emergency. In particular, EPA will:

[9] For more information, please see: https://www.epa.gov/sourcewaterprotection/dwmaps.
[10] For more information, please see: https://www.epa.gov/sites/production/files/2015-06/documents/srs_fact_sheet.pdf.
[11] For more information, please see: https://www.epa.gov/waterqualitysurveillance.
[12] For more information, please see: https://www.epa.gov/waterlabnetwork.

- Continue work with regional and state environmental laboratories to conduct exercises and continue efforts to automate the exercises, enabling laboratories and other members of the water sector to participate in exercises simultaneously and continue the innovative practice of pursuing validation of methods through exercises.
- Continue to expand the membership of the WLA with the intention of achieving nationwide coverage. The WLA has 160 member laboratories that are geographically diverse and can provide a wide range of chemical, biological, and radiological analyses.[13] For the WLA to become a robust infrastructure that can cover major population centers and address a diverse array of high priority contaminants, membership must continue to increase.
- Continue to target laboratories located in areas where the WLA has both inadequate membership levels and gaps in laboratory analytical capabilities.
- Coordinate with other federal agencies, primarily DHS, CDC, Food and Drug Administration, and Department of Defense, on biological, chemical, and radiological contaminants of high concern and how to detect and respond to their presence in drinking water and wastewater systems.
- Continue to implement specific recommendations of the Water Decontamination Strategy as developed by EPA and water sector stakeholders (e.g., defining roles and responsibilities of local, state, and federal agencies during an event).

Cybersecurity

Cybersecurity represents a substantial concern for the sector, given the ubiquitous access to critical water treatment systems from the Internet. In FY 2020, EPA will fulfill its obligations under Executive Order (EO) 13636 – *Improving Critical Infrastructure Cybersecurity* – which designated EPA as the lead federal agency responsible for cybersecurity in the water sector. EPA also will partner with the water sector to promote cybersecurity practices and gauge progress in the sector's implementation of these practices as directed by the Cybersecurity Enhancement Act of 2014, conducting nationwide training sessions in cybersecurity threats and countermeasures for about 200 water and wastewater utilities. Specifically, in FY 2020, EPA will:

- Conduct one-day classroom training, at locations distributed nationally, on water sector cybersecurity. The training will address cybersecurity threats, vulnerabilities, consequences, best practices, and incident response planning.
- Update and/or develop new course materials owing to the evolving nature of the cyber threat, such as the recently documented role of Russian state actors in infiltrating water system industrial control processes and business enterprise functions.
- Develop brief, targeted guidance documents for underserved segments of the water sector, such as small systems and technical assistance providers.
- Develop outreach materials to promote the adoption of cybersecurity practices across the water sector.

America's Water Infrastructure Act (AWIA)

[13] For more information, please see: https://www.epa.gov/dwlabcert/contact-information-certification-programs-and-certified-laboratories-drinking-water.

In FY 2020, EPA also will take actions to fulfill the mandates of the Community Water System Risk and Resilience section of AWIA requiring community water systems serving a population greater than 3,300 to prepare risk assessments and emergency response plans. EPA will provide guidance and technical assistance to these systems on how to conduct resilience assessments, prepare ERPs, and address threats from malevolent acts and natural hazards. EPA will provide technical assistance to water systems to address drinking water vulnerabilities where EPA determines an urgent and immediate need. The EPM Homeland Security: Critical Infrastructure Protection program also can support AWIA homeland security related work.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$244.0) This net change to fixed and other costs is a decrease due to the recalculation of base workforce costs for existing FTE due to adjustments in salary and benefit costs.

- (-$3,798.0 / -11.2 FTE) This streamlines emergency response efforts for natural disasters through further coordination with other federal agencies and through enhanced coordination of activities with work performed in the Homeland Security: Preparedness, Response, and Recovery Program.

- (+$1,711.0 / +2.9 FTE) These resources and FTE are provided to begin implementation and administration of the requirements of the Community Water System Risk and Resilience Section of the America's Water Infrastructure Act.

Statutory Authority:

Safe Drinking Water Act (SDWA), §§ 1431-1435; Clean Water Act; Public Health Security and Bioterrorism Emergency and Response Act of 2002; Emergency Planning and Community Right-to-Know Act (EPCRA), §§ 301-305.

Homeland Security: Preparedness, Response, and Recovery

Program Area: Homeland Security
Goal: Core Mission
Objective(s): Revitalize Land and Prevent Contamination

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Science & Technology	***$22,767.3***	***$22,918.0***	***$24,847.0***	***$1,929.0***
Hazardous Substance Superfund	$31,102.4	$31,648.0	$31,054.0	-$594.0
Total Budget Authority	$53,869.7	$54,566.0	$55,901.0	$1,335.0
Total Workyears	117.3	123.3	127.1	3.8

Program Project Description:

Exposure to hazardous chemicals, microbial pathogens, and radiological materials released into the environment could pose catastrophic consequences to the health of first responders and American citizens. EPA has responsibility, under legislation and Presidential Directives, to remediate contaminated environments created by incidents such as terrorist attacks, industrial accidents, or natural disasters.

The Homeland Security Research Program (HSRP) is one of six integrated and transdisciplinary national research programs. Each program is guided by a Strategic Research Action Plan (StRAP) that reflects the science needs of Agency program and regional offices, states, and tribes and is implemented with their active collaboration and involvement.

EPA's disaster-related responsibilities are described by the following three objectives in the HSRP's StRAP: (1) protecting America's water systems; (2) remediating indoor and outdoor contaminated areas, and (3) developing a nationwide laboratory network with the capability and capacity to analyze for chemical, biological, radiological, and nuclear (CBRN) agents during routine monitoring and in response to terrorist attacks and other disasters.

Funding supports EPA in carrying out these critical responsibilities, including EPA's efforts to help communities prepare for, endure, and recover from disasters – safeguarding their economic, environmental, and social well-being. The HSRP collaborates with state, local, and private sector organizations and key federal agencies[14] to prioritize research needs and prevent the duplication of scientific and technical work. HSRP will deliver effective tools, methods, information, and guidance to local, state, and federal decision-makers that will address both critical terrorism-related issues and natural or manmade disasters.

[14] Partners include: Department of Homeland Security (DHS), Department of Defense (DOD), Centers for Disease Control and Prevention (CDC), Federal Bureau of Investigation (FBI), National Institute of Health (NIH), National Science Foundation (NSF), Department of Energy (DOE), and Department of Agriculture (USDA).

EPA also is responsible for operating and maintaining the network of near real-time stationary and deployable monitors, known as *RadNet*, under the Nuclear/Radiological Incident Annex to the National Response Framework (NRF). This network is critical in responding to large-scale incidents such as Fukushima and is an EPA Critical Infrastructure/Key Resource asset. EPA additionally serves as the Sector-Specific Agency (SSA) for the water sector, coordinating water sector-specific risk assessment and management strategies and assessing and mitigating cybersecurity risks with the Department of Homeland Security (DHS) and the sector under Executive Order 13636: Improving Critical Infrastructure Cybersecurity.

Recent Accomplishments:

Assisting in the Development of Fentanyl Factsheet and Drug Lab Clean-up Approaches:
The misuse of fentanyl is quickly approaching an epidemic scale. As the popularity of fentanyl use rises, so does the potential for contamination of indoor environments. HSRP contributed to the development of a factsheet for EPA On-Scene Coordinators who may respond with or provide technical advice to local HazMat teams at sites with environmental fentanyl contamination. This factsheet summarizes information on characteristics, release scenarios, health effects, effect levels, personal safety, personal protective equipment, field detection, sampling, analysis, decontamination/cleanup, and waste management. HSRP also responded to a request by the U.S. Drug Enforcement Agency (DEA) to assist in devising potential clean-up approaches designed to maximize decontamination efficacy while minimizing damage to high value items. HSRP completed initial decontamination research to identify decontamination solutions that lead to efficacious *in situ* inactivation of fentanyl as part of cleanup procedures. These recommendations have been shared with responders in multiple EPA regions and state and local stakeholders.

Supporting Rapid Development of Sampling Plans for Biological Threat Incidents. Federal, state, and local decision makers need to access the latest contamination characterization methods following a pathogen or chemical threat contamination incident. The contaminated area must be quickly determined as well as public health risks. To improve response times, HSRP evaluated the current advantages and limitations of existing methods for sampling, analysis, and assessing risk and developed methods that will be readily available for characterizing large areas such as subway systems and urban centers. HSRP developed the *MicroSAP* tool to decrease the time required to construct sampling and analysis plans during emergency response by walking decision makers through the development process. This tool ensures that EPA's data quality standards and the latest science supporting sampling procedures is included in the sampling and analyses plans. An informational companion to the MicroSAP tool includes considerations for sampling, analysis, and data interpretation. Access to the companion guide is available online.[15]

Treatment Methods for Per- and Polyfluoroalkyl Substances (PFAS) Contamination Arising from Emergency Response. PFAS are found in products that resist heat, stains, grease, and water. These chemicals are identified as emerging contaminants because they do not break down in the environment and have the potential to bioaccumulate in plants and animals. PFAS in firefighting foam impacts the run-off water, which may spread contamination through the environment, down storm drains, and into drinking water. It also can cause secondary spread of PFAS when

[15] For more information, please see: MicroSAP Companion Guide.

contaminated sewer sludge is land-applied or disposed in landfills.[16] HSRP evaluated the effectiveness of on-site collection and treatment methods of water contaminated with PFAS resulting from firefighting activities. The results[17] of this work are assisting decision makers in designing approaches to minimize the impact of PFAS contaminated waste water under challenging emergency situations. The methods are not limited to emergency response and are applicable to other agency needs, such as treating water contaminated by other chemicals.

Analytical Method Supporting Ricin Cleanups. Ricin is a toxin if inhaled, injected, or ingested, and is easily extracted from castor-oil manufacturing waste material left from processing castor beans.[18] EPA identified a critical gap in the decontamination process in past ricin incidents. Residues were picked up while wiping down surfaces during the sampling process, tainting the samples. This prevented important analytical methods from being performed during the sample evaluation. The HSRP addressed this challenge by developing a processing method for environmental samples that enabled ricin detection by multiple analytical approaches.[19] In addition to removing potential interferences picked up during sampling, the process concentrates the samples and results in a 10-fold or more increase in the detection capability. The method was used by EPA during a December 2017 incident that involved a 70-year old woman in Vermont that made ricin to allegedly poison her neighbors at a retirement community.[20] Ricin was found post-decontamination due to the increased sensitivity of the new sample processing method. Without this method, the site may have been deemed clean, posing a public health risk.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.3, Revitalize Land and Prevent Contamination in the *FY 2018 - 2022 EPA Strategic Plan*.

Research Planning: EPA's Board of Scientific Counselors (BOSC) evaluates performance and provides feedback to the Agency for the HSRP Program. The HSRP Program, BOSC, and the Science Advisory Board will meet regularly over the next several years to seek input on topics related to research program design, science quality, innovation, relevance, and impact. This includes advising EPA on developing its strategic research direction and StRAPs for FY 2019 - FY 2022.

EPA collaborates with several science agencies and the research community to assess our research performance, such as the National Institutes of Health, National Science Foundation, Department of Energy, Department of Agriculture, U.S. Geological Survey, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Department of Defense, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, and others. EPA's state engagement program is designed to inform states about EPA's research programs and role within EPA and to better understand the science needs of state environmental agencies.

[16] For more information, please see: https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas.
[17] For more information, please see: Treatment of PFAS in Wash Water.
[18] For more information, please see: Ricin Overview.
[19] For more information, please see: Development of a Sample Processing Approach.
[20] For more information, please see: https://www.cbsnews.com/news/judge-detains-woman-accused-of-making-ricin-testing-it-on-neighbors/.

Key partners at the state level include the Environmental Council of the States, with its Environmental Research Institute of the States and the Interstate Technology and Regulatory Council, as well as state media associations such as the Association of Clean Water Administrators and the Association of State Drinking Water Administrators. This program also will work with the National Emergency Management Association and other appropriate national organizations reaching to state stakeholders to understand states' priority needs related to environmental emergency response and to ensure familiarity with the available scientific support.

The following work is reflected in the HSRP's StRAP. Research is planned and prioritized based on the needs of end-users of this science, including regional On-Scene Coordinators (OSCs), water utility companies, states, and EPA program and regional offices.

Characterizing Contamination and Assessing Exposure. During an incident, EPA oversees and provides support to state and local governments for site characterization[21] and remediation of contaminated water systems and indoor and outdoor areas. In FY 2020, HSRP will:

- Develop innovative bio-threat agent sampling and analytical methods for the Environmental Sampling and Analytical Methods (ESAM) program to support post-incident decisions regarding exposure assessment, remediation, and re-occupancy.[22]
- Conduct studies to support sample strategy options for characterization after a wide-area biological incident and examine methods and deployment strategies to reduce the logistical burden of characterization.
- Study the fate and transport of bio-threat agents after a release in an urban environment to inform sampling and decontamination.

Water System Security and Resilience. EPA will continue to address critical scientific knowledge gaps in responding to and recovering from contamination incidents, with a specific focus on addressing needs related to wide area attacks on urban centers and public areas as well as water contamination incidents. As the lead Agency overseeing the Water Sector, EPA addresses Water Sector research needs identified by the Water Sector Coordinating Council and the Water Government Coordinating Council's Critical Infrastructure Partnership Advisory Council.[23]

There are approximately 149,500 public drinking water systems and nearly 16,000 publicly owned wastewater treatment systems in the United States.[24,25] More than 80 percent of the U.S. population receives their potable water from these drinking water systems and about 75 percent of the U.S. population has its sanitary sewerage treated by these wastewater systems.[26] Within the past year, threats to drinking water systems ran the spectrum from toxic chemicals accidentally being introduced into a water system to concerns over an intentional attempt to poison a drinking water system.

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[21] The process of identifying and quantifying the contaminants in environmental samples of a site to determine the nature and extent of contamination present.
[22] To access ESAM, please see: https://www.epa.gov/homeland-security-research/sam.
[23] The Water Sector Coordinating Council is a "self-organized, self-run, and self-governed council" composed of water utilities. The Water Government Coordinating Council is responsible for interagency coordination of efforts related to the water sector.
[24] https://www.epa.gov/dwreginfo/information-about-public-water-systems.
[25] https://www.epa.gov/water-research/small-wastewater-systems-research-0.
[26] https://www.dhs.gov/cisa/water-and-wastewater-systems-sector.

In FY 2020, HSRP will:

- Conduct field-scale evaluations of water contamination sensors, decontamination methodologies, and water treatment at the Water Security Test Bed.[27]
- Develop methods to decontaminate infrastructure and manage contaminated water.

Remediating Wide Areas. Developing national resilience to disasters requires that decision-makers have the latest scientific information and ability to assess the downstream or cascading impacts of decisions. EPA will develop tools providing ready access to the latest science and supporting the decision-making process. In FY 2020, HSRP will:

- Develop a database for decontamination technologies data, including operational and logistical considerations to provide decision-makers.
- Develop a proof-of-concept virtual-reality tool to simulate a contaminated area, allowing the user to experience sampling and decontamination approaches. This tool supports pre-incident training and reduces the time responders spend in the hot zone during a response.
- Develop approaches to improve the capacity to conduct large-scale bio-agent cleanup; develop methods that are widely-available to local, state, and federal responders, such as deploying existing municipal equipment (e.g., street sweepers) and commercial off-the-shelf methods for effective distribution of decontaminants (e.g., pool chemicals).
- Develop scalable decontamination technologies for wide-area use and waste management approaches for a biological incident; develop approaches to predict decontamination efficacy and provide a basis for field-scale testing of remediation methods for chemical threats.

In addition to the activities above, EPA also conducts research across programs in areas such as lead. Within the HSRP, EPA is continuing to develop water infrastructure modeling tools that can be used to assist water utilities in understanding the impact of changes in their systems. The HSRP also is continuing to seek to test sensors that can indicate contamination in water.

Radiation Monitoring. The *RadNet* fixed monitoring network provides near real-time radiation monitoring coverage near each of the 100 most populous U.S. cities as well as expanded geographic coverage for a total of 140 monitoring sites. The *RadNet* air monitoring network will provide the Agency, first responders, and the public with greater access to data, and should there be a radiological emergency, improve officials' ability to make decisions about protecting public health and the environment during and after an incident. Additionally, the data will be used by scientists to better characterize the effect of a radiological incident.

In FY 2020, the Agency will continue to operate and maintain the *RadNet* air monitoring network, providing essential maintenance to routinely operating fixed stations. Fixed stations will operate in conjunction with deployable monitoring assets available during a radiological incident.

[27] Data from these studies are made available to water utilities through outreach activities.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$113.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to adjustments in salary and benefit costs.

- (-$30.0) This change to fixed and other costs is a decrease due to the recalculation of lab utilities and security.

- (+$402.0 / +5.0 FTE) This program change reflects an increase for a focused effort to meet EPA's responsibilities as the water Sector-Specific Agency (SSA) implementing specific statutory and Presidential directives relating to water security.

- (+$1,212.0 / -5.3 FTE) This net program change increases existing research in wide-area decontamination and critical infrastructure, while refocusing resources from the development of tools to support resilience of water systems. The reduction changes EPA's timeline to carry out its mandates to develop strategies and methods for characterizing, decontaminating, and managing waste from an intentional or unintentional release of chemical and radiological agents.

- (+$232.0 / -0.5 FTE) This net program change is to keep RadNet capabilities current with technology to monitor the nation's air, precipitation, and drinking water for radiation.

Statutory Authority:

Atomic Energy Act of 1954; Clean Air Act §§ 102, 103; Safe Drinking Water Act (SDWA) §§ 1431-1435, 1442; Robert T. Stafford Disaster Relief and Emergency Assistance Act; National Defense Authorization Act for Fiscal Year 1997 §§ 1411-1412; Public Health Security and Bioterrorism Preparedness Response Act of 2002; Toxic Substances Control Act (TSCA) § 10; Oil Pollution Act (OPA); Pollution Prevention Act (PPA); Resource Conservation and Recovery Act (RCRA); Emergency Planning and Community Right-to-Know Act (EPCRA); Clean Water Act; Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); Federal Food, Drug, and Cosmetic Act (FFDCA); Food Quality Protection Act (FQPA); Food Safety Modernization Act (FSMA) §§ 203, 208.

Homeland Security: Protection of EPA Personnel and Infrastructure

Program Area: Homeland Security
Goal: Rule of Law and Process
Objective(s): Improve Efficiency and Effectiveness

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$5,400.2	$5,405.0	$4,986.0	-$419.0
Science & Technology	***$415.0***	***$416.0***	***$500.0***	***$84.0***
Building and Facilities	$5,921.7	$6,676.0	$6,176.0	-$500.0
Hazardous Substance Superfund	$1,325.5	$968.0	$915.0	-$53.0
Total Budget Authority	$13,062.4	$13,465.0	$12,577.0	-$888.0
Total Workyears	8.0	9.6	12.2	2.6

Program Project Description:

This program supports activities to ensure that EPA's physical structures and assets are secure and operational and that physical security measures are in place to help safeguard staff in the event of an emergency. These efforts also protect the capability of EPA's vital laboratory infrastructure assets. Specifically, funds within this appropriation support security needs for the National Vehicle and Fuel Emissions Laboratory (NVFEL).

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.5, Improve Efficiency and Effectiveness in the *FY 2018–2022 EPA Strategic Plan*.

In FY 2020, the Agency will continue to provide enhanced physical security for the NVFEL and its employees. This funding supports the incremental cost of security enhancements required as part of an Agency security assessment review.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$85.0) This change to fixed and other costs is an increase due to the recalculation of lab utilities and security.

- (-$1.0) This program change reduces the budget for infrastructure security at the National Vehicle and Fuel Emissions Laboratory (NVFEL).

Statutory Authority:

Intelligence Reform and Terrorism Prevention Act of 2004; Homeland Security Act of 2002; Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98–80, 97 Stat. 485 (codified at Title 5, App.) (EPA's organic statute).

IT / Data Management/ Security

IT / Data Management

Program Area: IT / Data Management / Security
Goal: Rule of Law and Process
Objective(s): Improve Efficiency and Effectiveness

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$84,464.5	$83,256.0	$71,117.0	-$12,139.0
Science & Technology	***$2,296.0***	***$3,089.0***	***$2,747.0***	***-$342.0***
Hazardous Substance Superfund	$14,126.0	$13,824.0	$13,443.0	-$381.0
Total Budget Authority	$100,886.5	$100,169.0	$87,307.0	-$12,862.0
Total Workyears	412.6	439.9	456.9	17.0

Program Project Description:

The work performed under the Information Technology/Data Management (IT/DM) Program supports human health and the environment by providing critical IT infrastructure and data management. Science and Technology (S&T) resources for EPA's IT/DM Program fund the following activities: Quality Program,[28] EPA libraries, and One EPA Web.

The Quality Program provides quality policies and practices that are intended to ensure that all environmentally-related data activities performed by or for the Agency will result in the production of data that are of adequate quality to support their intended uses. The Quality Program provides Quality Assurance (QA) policies, training, oversight and technical support to assist EPA's programs in implementing quality management systems for all environmental data operations. It also oversees the implementation of EPA's Information Quality Guidelines.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.5, Improve Efficiency and Effectiveness in the *FY 2018 - 2022 EPA Strategic Plan*. The Quality Program will continue to provide technical support to all EPA program/regional offices and laboratories in implementing EPA quality policies, procedures and standards. In FY 2020, the Quality Program will conduct six Quality Management Plan reviews and four Quality System Assessments for selected EPA programs. These oversight activities help ensure the quality of EPA's data for intended uses, including environmental decision-making.

The Quality Program also will begin using an enterprise QA tracking and reporting IT system, which is expected to be implemented in late FY 2019. The enterprise QA tracking and reporting system will simplify, standardize and centralize the QA annual reporting process by providing a mechanism for EPA organizations' quality activities throughout the year. Additionally, the Quality

[28] More information about EPA's Quality Program can be found at: http://www.epa.gov/quality.

Program will provide oversight of EPA's Information Quality Guidelines and facilitate the development of the Agency's responses to public requests for correction of information disseminated by EPA. The Agency's S&T resources for IT/DM also will help provide library services through the EPA National Library Network to all EPA employees and access to environmental information to the public, as well as support the hosting of EPA's websites and Web pages.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$33.0) This net change to fixed and other costs is a net increase due to the recalculation of base workforce costs for existing FTE due to adjustments in salary, essential workforce support, and benefit costs.

- (-$375.0 / +1.2 FTE) This net program change reflects an adjustment to the technical support for conducting quality assurance oversight, training, policy development, and support for agencywide quality activities.

Statutory Authority:

Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98–80, 97 Stat. 485 (codified at Title 5, App.) (EPA's organic statute); Federal Information Technology Acquisition Reform Act; Federal Information Security Modernization Act (FISMA); Government Performance and Results Act (GPRA); Government Management Reform Act (GMRA); Clinger-Cohen Act (CCA); Rehabilitation Act of 1973 § 508.

Operations and Administration

Facilities Infrastructure and Operations

Program Area: Operations and Administration
Goal: Rule of Law and Process
Objective(s): Improve Efficiency and Effectiveness

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$292,535.1	$308,701.0	$308,335.0	-$366.0
Science & Technology	***$70,101.6***	***$68,339.0***	***$67,274.0***	***-$1,065.0***
Building and Facilities	$34,605.1	$27,791.0	$33,377.0	$5,586.0
Leaking Underground Storage Tanks	$1,056.6	$813.0	$773.0	-$40.0
Inland Oil Spill Programs	$753.8	$584.0	$665.0	$81.0
Hazardous Substance Superfund	$76,061.2	$75,253.0	$73,540.0	-$1,713.0
Total Budget Authority	$475,113.4	$481,481.0	$483,964.0	$2,483.0
Total Workyears	321.8	327.6	308.0	-19.6

Program Project Description:

Science & Technology (S&T) resources in the Facilities Infrastructure and Operations Program fund rent, utilities, and security. This program also supports centralized administrative activities and support services, including health and safety, environmental compliance and management, facilities maintenance and operations, energy conservation, sustainable buildings programs, and space planning. Funding for such services is allocated among the major appropriations for the Agency.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.5, Improve Efficiency and Effectiveness in the *FY 2018–2022 EPA Strategic Plan*. In FY 2020, EPA will continue to invest to reconfigure EPA's workspaces, enabling the Agency to release office space and reduce long-term rent costs, consistent with HR 4465,[29] the *Federal Assets Sale and Transfer Act of 2016*.

EPA is working toward the long-term performance goal in the *FY 2018–2022 EPA Strategic Plan* to reduce unused office and warehouse space by 850,641 square feet nationwide. This has the potential to provide a cumulative annual rent avoidance of nearly $28 million across all appropriations. These savings help offset EPA's escalating rent and security costs. Planned consolidations in FY 2020 will allow EPA to release an expected 146,477 square feet of space. For FY 2020, the Agency is requesting $26.82 million for rent, $20.31 million for utilities, and $13.75 million for security in the S&T appropriation.

[29] For additional information, please refer to: https://www.congress.gov/bill/114th-congress/house-bill/4465, *Federal Assets Sale and Transfer Act of 2016*.

Performance Measure Targets:

Work under this program supports performance results in the Facilities Infrastructure and Operations Program under the Environmental Programs and Management appropriation.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$380.0) This net change to fixed and other costs is a decrease due to the recalculation of rent, utilities, security, and transit subsidy.

- (-$685.0) This net program change reflects a decrease for facility operations contracts that support activities like custodial, landscaping, and warehouse activities at EPA's research and development facilities and laboratories. This change is partially offset by an increase for moves and space reconfiguration to assist the Agency in reducing its footprint.

Statutory Authority:

Federal Property and Administration Services Act; Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98–80, 97 Stat. 485 (codified at Title 5, App.) (EPA's organic statute).

Workforce Reshaping

Program Area: Operations and Administration
Goal: Rule of Law and Process
Objective(s): Improve Efficiency and Effectiveness

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$0.0	$0.0	$25,003.0	$25,003.0
Science & Technology	***$0.0***	***$0.0***	***$5,994.0***	***$5,994.0***
Total Budget Authority	$0.0	$0.0	$30,997.0	$30,997.0

Program Project Description:

Science and Technology (S&T) resources for the Workforce Reshaping Program support organizational restructuring efforts throughout the U.S. Environmental Protection Agency. To help achieve its mission, EPA will develop, review and analyze mission requirements and implement options to effectively align and redistribute the Agency's workforce based on program priorities, resource reallocation, and technological advances.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.5, Improve Efficiency and Effectiveness in the *FY 2018 - 2022 EPA Strategic Plan*. Effective workforce reshaping is critical to EPA's ability to accomplish its mission. EPA will be examining our statutory functions and processes to eliminate inefficiencies and streamline our processes. Primary criteria will include effectiveness and accountability, as EPA is focused on greater value and real results. These analyses will likely create a need to reshape the workforce. The Agency anticipates the need to offer voluntary early out retirement authority (VERA) and voluntary separation incentive pay (VSIP), and potentially relocation expenses, as part of the workforce reshaping effort.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$5,994.0) In support of the reprioritization of Agency activities, this increase will support:
  - Voluntary early out retirement authority;
  - Voluntary separation inventive pay, and
  - Workforce support costs for relocation of employees as we realign work assignments.

Statutory Authority:

Title 5 of the U.S.C.; Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98–80, 97 Stat. 485 (codified at Title 5, App.) (EPA's organic statute).

Pesticides Licensing

Pesticides: Protect Human Health from Pesticide Risk

Program Area: Pesticides Licensing
Goal: Core Mission
Objective(s): Ensure Safety of Chemicals in the Marketplace

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$56,288.2	$58,016.0	$49,440.0	-$8,576.0
Science & Technology	***$2,888.3***	***$2,531.0***	***$2,401.0***	***-$130.0***
Total Budget Authority	$59,176.5	$60,547.0	$51,841.0	-$8,706.0
Total Workyears	362.9	336.8	416.5	79.7

Total work years in FY 2020 include 126.0 FTE funded by pesticide maintenance and registration service fees.

Program Project Description:

EPA's Pesticide Program screens new pesticides before they reach the market and ensures that pesticides already in commerce are safe. As directed by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Federal Food, Drug, and Cosmetic Act (FFDCA), as amended by the Food Quality Protection Act (FQPA) of 1996, and the Pesticide Registration Improvement Extension Act of 2012 (PRIA),[30] EPA is responsible for registering and re-evaluating pesticides to protect consumers, pesticide users, workers who may be exposed to pesticides, children, and other sensitive populations. To make regulatory decisions and establish tolerances (maximum allowable pesticide residues on food and feed) for food use pesticides and for residential or non-occupational use, EPA must find the pesticide safe. This involves considering cumulative and aggregate risks and ensuring extra protection for children. The Agency must balance the risks and benefits of other uses.

EPA's Pesticide Program operates two laboratories, the Microbiology Laboratory,[31] and the Analytical Laboratory,[32] that support the goal of protecting human health and the environment through diverse analytical testing and analytical method development, and validation efforts. These laboratories provide a variety of technical services to EPA, other federal and state agencies, tribal nations, and other organizations to protect human health from pesticide risk.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.4, Ensure Safety of Chemicals in the Marketplace in the *FY 2018 - 2022 EPA Strategic Plan*. In FY 2020, the Microbiology Laboratory will protect human health by ensuring the availability of scientifically sound efficacy test methods

[30] Authority provided under the Pesticide Registration Improvement Extension Act of 2012 expired on September 30, 2017. Authority to continue to collect fees was authorized by H.R. 1625 - Consolidated Appropriations Act, 2018.
[31] For more information, please see: https://www.epa.gov/aboutepa/about-microbiology-laboratory.
[32] For more information, please see: https://www.epa.gov/aboutepa/about-analytical-chemistry-laboratory-acl.

for antimicrobial pesticides. By developing new methods for new uses and emerging pathogens, the regulated community can register new products and new claims for existing products. Specific initiatives for FY 2020 include:

- Data collection and analysis on the Organization for Economic Cooperation and Development (OECD) method for bactericidal claims to support adoption of the method for regulatory purposes. If needed, hold a technical workshop to share information and solicit feedback on use and guidance associated with the method.
- Finalize a method and associated guidance for *Legionella* in recirculating water for cooling tower remediation.
- Continue to support the CDC by generating data on a broad range of product formulations (e.g., antimicrobial wipes and ready-to-use formulations) and active ingredients to inform the CDC and other federal agencies (e.g., Veterans Administration) on options for surface decontamination for *Candida auris* including the drug resistant strain. In addition, method development activities will be extended in FY 2020 to include the assessment of standardized testing of *C. auris* with antimicrobial wipes.
- Complete verification studies and issue guidance/method for review and comment for testing sanitizing claims for copper containing surfaces.
- Initiate multi-laboratory studies for use of the OECD method to support fungicidal and virucidal claims.
- Assist with efforts to formulate a new approach for evaluating claims based on use of a disinfectant hierarchy for establishing efficacy claims for antimicrobials.
- Per an OIG recommendation, develop a risk-based post-registration testing program for antimicrobials to identify potentially ineffective antimicrobial products.
- Continue to post and maintain website for existing and new antimicrobial test methods and guidance documents.[33]

In FY 2020, the Analytical Chemistry Laboratory will continue to protect human health by ensuring the availability of appropriate analytical methods for analyzing pesticide residues in food and feed and ensuring their suitability for monitoring pesticide residues and enforcing tolerances. In addition, the Analytical Chemistry Laboratory will:

- Develop improved analytical methods using state of the art instruments to replace outdated methods, thus increasing laboratory efficiency and accuracy of the data;
- As needed, provide analytical support to fill in data gaps for the Pesticide Programs' risk assessment and for Section 18 emergency exemptions, and to perform studies for use in risk mitigation;
- Provide analytical assistance and technical advice to all regional offices in support of their enforcement cases;
- Verify that antimicrobial pesticides are properly formulated (as requested); and
- Operate EPA's National Pesticide Standard Repository.

[33] Please refer to the following website: https://www.epa.gov/pesticide-analytical-methods/antimicrobial-testing-methods-procedures-developed-epas-microbiology.

Evidence and Evaluation

The Microbiology Laboratory will continue efficacy method development activities to support EPA's antimicrobial pesticide regulatory programs. In support of these efforts, the Microbiology Laboratory submitted several methods for emerging pathogens (*Clostridium difficile* and biofilms) and selected formulation types (towelette) to American Society for Testing and Materials (ASTM) workgroups for technical review in FY 2018. The comments from the ASTM workgroups helped refine and improve the clarity of the methods, as well as modify formulas for quantitative efficacy method calculations. The results of these efforts will help inform EPA's method development activities in FY 2020 and beyond.

Through ongoing efficiency reviews of its analytical data processing procedures, the Analytical Chemistry Laboratory has streamlined its analytical data processing procedures by utilizing automated data transfer from the instruments and customized spreadsheets for data reporting. In FY 2020, the Analytical Chemistry Laboratory will continue to identify ways to improve efficiency in the laboratory, including streamlining data review processes according the ISO-17025 guidelines and using electronic media to store analytical data. By identifying efficiencies in the analytical processing procedures, the Analytical Chemistry Laboratory expects to reduce turn-around time and errors commonly seen with manual data processing, thus providing the Agency with more timely, traceable and accurate data for use in assessing risks of pesticides to human health and the environment.

Performance Measure Targets:

Work under this program supports performance results in the Pesticides: Protect the Environment from Pesticide Risk Program under the Environmental Programs and Management appropriation.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$121.0) This net change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to adjustments in salary, essential workforce support, benefit costs, and for laboratory fixed costs.

- (+$536.0 / +3.1 FTE) This net program change shifts 3.1 FTE and associated payroll from the Pesticides: Protect the Environment from Pesticide Risk Program to adjust FTE levels in accordance with actual utilization in support of protecting human health from pesticide risk.

- (-$787.0) This program change is a reduction in funding for pesticide program activities from annual appropriations with the intent to increase utilization of pesticide user fee collections. Proposed legislative language accompanying the President's Budget will expand EPA's scope of activities that can be funded with user fees.

Statutory Authority:

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); Federal Food, Drug, and Cosmetic Act (FFDCA), §408.

Pesticides: Protect the Environment from Pesticide Risk

Program Area: Pesticides Licensing
Goal: Core Mission
Objective(s): Ensure Safety of Chemicals in the Marketplace

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$38,380.7	$41,081.0	$30,668.0	-$10,413.0
Science & Technology	***$2,309.7***	***$3,072.0***	***$2,257.0***	***-$815.0***
Total Budget Authority	$40,690.4	$44,153.0	$32,925.0	-$11,228.0
Total Workyears	288.1	257.1	268.4	11.3

Total work years in FY 2020 include 85.0 FTE funded by pesticide maintenance and registration service fees.

Program Project Description:

Section 3(c)(5) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) states that the Administrator shall register a pesticide if it is determined that, when used in accordance with labeling and common practices, the product "will also not generally cause unreasonable adverse effects on the environment." FIFRA defines "unreasonable adverse effects on the environment," as "any unreasonable risk to man or the environment, considering the economic, social, and environmental costs and benefits of the use of any pesticide."[34]

In compliance with FIFRA, EPA conducts risk assessments using the latest scientific methods to determine the risks that pesticides pose to human health and ecological effects on plants, animals, and ecosystems that are not the targets of the pesticide. The Agency's significant regulatory decisions are posted for review and comment to ensure that these actions are transparent, and to allow stakeholders, including at-risk populations, to be engaged in decisions that affect their environment.

EPA's Pesticide Program operates two laboratories, the Microbiology Laboratory[35] and the Analytical Laboratory,[36] that support the goal of protecting human health and the environment through diverse analytical testing and analytical method development, and validation efforts. These laboratories will continue to provide a variety of technical services to EPA, other federal and state agencies, tribal nations, and other organizations to ensure the protection of the environment from pesticide risk.

[34] Federal Insecticide, Fungicide and Rodenticide Act. Sections 2 and 3, Definitions, Registration of Pesticides (7 U.S.C. §§ 136, 136a). Available online at: http://www.epa.gov/opp00001/regulating/laws.htm.
[35] For more information, please see: https://www.epa.gov/aboutepa/about-microbiology-laboratory.
[36] For more information, please see: https://www.epa.gov/aboutepa/about-analytical-chemistry-laboratory-acl.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.4 Ensure Safety of Chemicals in the Marketplace in the *FY 2018–2022 EPA Strategic Plan*. In FY 2020, EPA must determine that food and residential uses of pesticides are safe. For other risk concerns, EPA must balance the risks of the pesticides with benefits provided from the use of the product. To avoid unreasonable risks, EPA may impose risk mitigation measures such as modifying use rates or application methods, restricting uses, or denying some or all uses. In some regulatory decisions, EPA may determine that uncertainties in the risk determination need to be reduced and may require monitoring of environmental conditions, such as effects on water sources or the development and submission of additional laboratory or field study data by the pesticide registrant.

In addition to FIFRA responsibilities, the Agency has responsibilities under the Endangered Species Act (ESA).[37] Under ESA, EPA must ensure that pesticide regulatory decisions will not destroy or adversely modify designated critical habitat or result in jeopardy to the continued existence of species listed by the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS). Where risks are identified, EPA must work with FWS and NMFS in a consultation process to ensure these pesticide registrations also will meet ESA standard.

The national program laboratories of EPA's Pesticide Programs provide a diverse range of environmental data that the Agency uses to make informed regulatory decisions. The Analytical Chemistry Laboratory[38] and the Microbiology Laboratory[39] each provide critical laboratory testing and support activities to assist the decision-making processes of the Agency. The laboratories develop methods to test the efficacy of antimicrobial pesticides, evaluate the efficacy of antimicrobial products, and validate analytical chemistry methods to ensure that EPA, the Food and Drug Administration (FDA), the United States Department of Agriculture (USDA), and the states have reliable methods to measure and monitor pesticide residues in food and in the environment.

In FY 2020, the Microbiology Laboratory will work with the Department of Homeland Security and Department of Agriculture to evaluate various porous materials (wood, concrete, fabric, tile etc.) which simulate use sites in livestock, poultry and other food animal rearing operations. Outbreaks of avian influenza, swine fever etc. can be devastating to American agriculture and survival of these viruses on porous materials is not well understood. Currently, due to the unavailability of a quantitative test method, the response to an animal pathogen outbreak and submission of requests under FIFRA section 18 to address these outbreaks, relies on published, antiquated data, and the use of commonly available chemicals for remediation (e.g., citric acid, chlorine etc.) without extensive knowledge of their environmental impact from such widespread use. The goal of the laboratory is to develop a rapid efficacy test method for animal viruses to provide a tool for the development of efficacy data on porous materials. The availability of the

[37] The Endangered Species Act of 1973 sections 7(a)(1) and 7 (a)(2); Federal Agency Actions and Consultations (16 U.S.C. 1536(a)). Available at U.S. Fish and Wildlife Service, Endangered Species Act of 1973 internet site: http://www.fws.gov/endangered/laws-policies/section-7.html.
[38] Additional information on EPA's Analytical Chemistry Laboratory can be found at: https://www.epa.gov/aboutepa/about-analytical-chemistry-laboratory-acl.
[39] Additional information on EPA's Microbiology Laboratory can be found at: https://www.epa.gov/aboutepa/about-microbiology-laboratory.

method to the regulated community will support more effective, targeted chemistries and refined antimicrobial application techniques for porous materials, and the development of new products following contemporary regulatory requirements.

In FY 2020, the Analytical Chemistry Laboratory will continue to focus on analytical method development and validations as well as special studies to address specific short-term, rapid-turnaround priority issues. The laboratory also will continue to provide technical and analytical assistance to EPA's Enforcement and Compliance Assurance program and EPA regional offices in support of their enforcement cases. If requested by the United States Geological Survey (USGS), analytical support will continue in the sixth year of a multi-year multi-agency (EPA and USGS) project to assess the quality of rivers and streams across the United States. These data will allow USGS and EPA to study the patterns of exposure of agricultural and urban ecosystems to pesticides. The lab will continue to support pesticide registration review and U.S. tarp manufacturers by reviewing the permeability data of fumigants through newly manufactured tarps which impact pesticide buffer zones. In an effort to reduce emission of soil fumigants into the air, the Agency established certain buffer zone credits based on the tarps' permeability: the lower the permeability of a tarp, the lower the emission of fumigants into the air, and more fumigant remains in the soil for pest control. Thus, EPA can allow a greater buffer zone reduction credit. Pollinators are critical to agricultural productivity and have experienced declining population in recent years. The Analytical Chemistry Laboratory will continue to work to understand the effects on pollinators as part of the Program's existing registration and registration review processes.

In FY 2020, the Analytical Chemistry Laboratory will continue to provide national technical analytical support for the development of data needed for the Pesticides Program's risk assessments and for FIFRA section 18 emergency exemptions, and to perform studies for use in risk mitigation. The laboratory also provides analytical assistance and technical advice to all EPA's regional offices for use in enforcement cases and reviews and validates analytical methods or studies submitted as part of a pesticide registration.

Performance Measure Targets:

Work under this program supports performance results in the Pesticides: Protect the Environment from Pesticide Risk Program under the Environmental Programs and Management appropriation.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$48.0) This change to fixed and other costs is a decrease due to the recalculation of base workforce costs for existing FTE due to adjustments in salary, essential workforce support, benefit costs, and for laboratory fixed costs.

- (-$84.0 / -0.8 FTE) This program change reflects a reduction for pesticide program activities from annual appropriations with the intent to increase utilization of pesticide user fee collections. Proposed legislative language accompanying the President's Budget will expand EPA's scope of activities that can be funded with user fees.

- (-$683.0 / -4.1 FTE) This program change shifts 4.1 FTE and associated payroll to the Pesticides: Protect Human Health and Realize the Value of Pesticide Availability Programs to adjust FTE levels in accordance with actual utilization.

Statutory Authority:

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Endangered Species Act (ESA).

Pesticides: Realize the Value of Pesticide Availability

Program Area: Pesticides Licensing
Goal: Core Mission
Objective(s): Ensure Safety of Chemicals in the Marketplace

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$7,004.6	$8,226.0	$5,571.0	-$2,655.0
Science & Technology	***$362.0***	***$424.0***	***$615.0***	***$191.0***
Total Budget Authority	$7,366.6	$8,650.0	$6,186.0	-$2,464.0
Total Workyears	34.5	36.8	46.3	9.5

Total work years in FY 2020 include 10.5 FTE funded by the Reregistration and Expedited Processing Revolving Fund.

Program Project Description:

EPA's Chemical Safety and Pollution Prevention's national program laboratories make significant contributions to help the Agency realize the value of pesticides. This program operates two laboratories, the Microbiology Laboratory,[40] and the Analytical Laboratory,[41] that support the goal of protecting human health and the environment through diverse analytical testing and analytical method development, and validation efforts.

The primary focus of the Microbiology Laboratory is standardization of existing test methods and the development and validation of methods for new uses and emerging pathogens for antimicrobial products with public health claims – products used to kill or suppress the growth of pathogenic microorganisms on inanimate objects and surfaces. The laboratory is instrumental in advancing the science of antimicrobial product testing and provides technical expertise to standard-setting organizations and various agency stakeholder groups.

The Analytical Chemistry Laboratory[42] provides scientific, laboratory, and technical support through chemical analyses of pesticides and related chemicals to protect human health and the environment. The Analytical Chemistry Laboratory responsibilities include:

- Providing technical support and chemical analyses of pesticides and related chemicals;
- Developing new multiresidue analytical methods; and
- Operating the EPA *National Pesticide Standard Repository*, which collects and maintains pesticide standards (*i.e.*, samples of pure active ingredients or technical grade active ingredients, regulated metabolites, degradates, and related compounds.)

These laboratories provide a variety of technical services to EPA, other federal and state agencies, tribal nations, and other organizations to ensure the value of pesticide availability is realized.

[40] For more information, please see: https://www.epa.gov/aboutepa/about-microbiology-laboratory.
[41] For more information, please see: https://www.epa.gov/aboutepa/about-analytical-chemistry-laboratory-acl.
[42] https://19january2017snapshot.epa.gov/aboutepa/about-analytical-chemistry-laboratory-acl_.html.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.4 Ensure Safety of Chemicals in the Marketplace in the *FY 2018–2022 EPA Strategic Plan*. In FY 2020, EPA will realize the benefits of pesticides by ensuring the continued operation of the National Pesticide Standard Repository. The laboratories will continue to conduct chemistry and efficacy evaluations for antimicrobials. As the recognized source for expertise in pesticide analytical method development, EPA's laboratories will continue to provide quality assurance review, technical support, and training to EPA's regional offices, state laboratories, and other federal agencies that implement the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

In FY 2020, the Microbiology Laboratory will continue to evaluate Section 18 emergency exemptions and novel protocol requests for new uses and novel pathogens. The laboratory will continue the development of data and methods to support Section 18s for high consequence animal pathogens (e.g., avian influenza, foot and mouth diseases, etc.). In addition, the continued work to develop new methods for emerging pathogens (*Legionella, Candida auris,* etc.) provides a pathway for registrants to add new claims to existing antimicrobial pesticides. In some cases, the methods lead to the development of new products when currently registered formulations are not effective against emerging pathogens. The laboratory anticipates supporting up to 25 requests in support of these activities during FY 2020.

The Analytical Chemistry Laboratory will continue its work in developing and validating multiresidue methods using state-of-the-art methodology and instrumentation; in providing chemical analysis for assessing risk to human health and to the environment from agricultural use of pesticides; and in providing technical support to all EPA regions to ensure that pesticides products are formulated according to approved labels.

Evidence and Evaluation

The Microbiology Laboratory will continue to refine and develop methods to support EPA's Section 3 and Section 18 regulatory programs. In FY 2018, in support of these efforts, the Laboratory provided a new quantitative efficacy test method to USDA for evaluating chemicals against high consequence animal pathogens on hard and porous surfaces. Following training, demonstrations and technical consultation from the Microbiology Laboratory, USDA successfully produced data to support Section 18 requests for avian influenza and foot & mouth disease using the Microbiology Laboratory's method. The results of USDA's review of the method will be used to help inform EPA's method development activities for other emerging and high consequence pathogens in FY 2020 and beyond.

The Analytical Chemistry Laboratory maintains EPA's National Pesticide Standard Repository per CFR part 158. This lab collects and maintains an inventory of analytical standards of registered pesticides in the United States, as well as some that are not currently registered. EPA provides the pesticide standards (approximately 4,000 to 5,000 annually) to qualified federal, state, territorial, and tribal laboratories for food and product testing and environmental monitoring. In FY 2018, efficiency reviews showed that the turnaround time for a standard request is typically approximately 15 working days. Using the results of the efficiency review, in FY 2020 and beyond,

the Analytical Chemistry Laboratory will implement procedural changes to identify areas for improvement and reduce the turnaround time to 12 days (for those pesticide standard requests that are not complicated) to help federal agencies, states and tribes laboratories expedite enforcement efforts.

Performance Measure Targets:

Work under this program supports performance results in the Pesticides: Protect the Environment from Pesticide Risk Program under the Environmental Programs and Management appropriation.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$44.0) This change to fixed and other costs is a decrease due to the recalculation of base workforce costs for existing FTE due to adjustments in salary, essential workforce support, and benefit costs.

- (+$49.0) This program change reflects an increase in funding for pesticide laboratory operations and maintenance activities.

- (+$186.0 / +1.0 FTE) This program change shifts 1.0 FTE and associated payroll from the Pesticides: Protect the Environment Program to adjust FTE levels in accordance with actual utilization in support of realizing the value of pesticide availability.

Statutory Authority:

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); Federal Food, Drug, and Cosmetic Act (FFDCA) § 408.

Research: Air and Energy

Research: Air and Energy

Program Area: Research: Air and Energy
Goal: Rule of Law and Process
Objective(s): Prioritize Robust Science

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Science & Technology	***$87,503.9***	***$91,906.0***	***$31,707.0***	***-$60,199.0***
Total Budget Authority	$87,503.9	$91,906.0	$31,707.0	-$60,199.0
Total Workyears	273.9	276.8	153.8	-123.0

Program Project Description:

The Air and Energy (A-E) Research Program provides scientific information to EPA program and regional offices. The overall research effort is organized around six integrated and transdisciplinary national research programs. Each program is guided by a Strategic Research Action Plan (StRAP) that is the result of a collaboration with, and supportive of, EPA's programs and regional offices, states and tribes.

The resources requested for A-E will support the analysis of research data, as well as the publication of scientific journal articles to disseminate findings from prior EPA research related to air quality, its impacts to health and the environment, and resilience. The Program also will offer critical support to provide essential science and tools for policy decisions and public awareness on the topics described below. The A-E Research Program relies on successful partnerships with other EPA research programs, offices, academic and industry researchers, states, local and private sector organizations, as well as key federal agencies.

Recent accomplishments in the A-E Research Program include:

- **Per- and Polyfluorinated Substances (PFAS) Research:** EPA conducts research across programs on PFAS. PFAS are a class of chemicals of growing concern in the environment, and EPA has committed to taking action to support states, tribes, and local communities in understanding and managing risks associated with these chemicals. There is evidence to suggest that PFAS move through the air from various sources, as both particulate and volatile compounds, contributing to overall PFAS fate, transport, and exposure.[43] Within the A-E Program, EPA is developing and piloting sampling and analytical chemistry methods to identify and quantify PFAS in stack emissions and in ambient air. This research is being done in collaboration with EPA's Air Program, EPA Regions 1 and 4, and with the states of New Hampshire and North Carolina. This research will enable federal, state and tribal officials to detect and measure PFAS travelling through the air.

[43] For more information on the environmental fate & transport of PFAS, please see: https://pfas-1.itrcweb.org/wp-content/uploads/2018/03/pfas_fact_sheet_fate_and_transport__3_16_18.pdf.

- **Evaluating the Health Effects of Complex Air Pollution Mixtures:** EPA has previously documented the health effects associated with individual air pollutants.[44] Predicting public health impacts from mixtures of pollutants remains a major challenge in air quality assessment and communication with the public. EPA conducted a series of studies[45] comparing the health effects of two laboratory-generated atmospheres containing different complex pollutant mixtures that are representative of poor air quality across the United States. The results of the studies indicated that cellular DNA is altered when exposed to simulated air pollution mixtures that produce high ozone levels. High ozone and particulate matter levels were found to cause an irregular heartbeat and impacted the heart's ability to function effectively. Further study of air pollution mixtures may provide opportunities to create strategies that optimally reduce emissions of air pollutants that impair human health.

- **Wildland Fire Research:** Within the last decade, wildfires have increased in frequency and size and now burn more than 7 million acres annually, 40 percent more than previous decades.[46] Wildland fires are a national challenge impacting public and environmental health, as well as the economy. In FY 2018, the Agency conducted research to optimize the use of prescribed fire to reduce health and property risk from uncontrolled wildfires. Research indicates that proper use of prescribed fires can result in substantial decreases in air pollutant emissions, up to four times lower[47]. Through laboratory and field sampling, researchers evaluated fuel, meteorological and ignition properties to generate fires that produce less air pollution. This field work was done in Florida, Kansas, and Oregon to develop methods for ground- and aerial-based sampling for a comprehensive array of pollutants. Researchers added small sensors and other samplers to lightweight instruments which were carried aloft or used in ground applications. Researchers used these along with larger, ground-based instruments, to extensively characterize gaseous and particle emissions. Sufficient understanding of these effects can improve the use of prescribed burning for agricultural and fuel reduction purposes, while minimizing downwind impacts on air quality attainment in surrounding communities.

- **Helping States Reduce Non-Attainment Areas:** Several areas in the U.S. still face challenges meeting national air quality standards.[48] Fundamental science gaps remain in comprehending the unique chemistry and meteorology specific to these locations, which hinder states' abilities to improve air quality. Advanced monitoring in collaboration with states provides valuable insights into the complex interactions between emissions, chemistry, and meteorology in these nonattainment areas. This insight enables the development of effective solutions. EPA partnered with state agencies to conduct short-term, intensive field studies to understand high wintertime $PM_{2.5}$ levels and ultimately address ozone issues in states bordering Lake Michigan, the Long Island Sound, and the area around Salt Lake City. The insights gained in these studies will help states improve air quality and public health by providing a better understanding of site-specific air pollution sources, meteorology and chemistry.

[44] For more information, please see: https://www.epa.gov/isa.
[45] To access the studies, please see: https://pubs.acs.org/doi/abs/10.1021/acs.est.7b04857.
[46] For more information, please see: http://www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html.
[47] For more information, please see: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5120849/.
[48] https://fas.org/sgp/crs/misc/IN10891.pdf.

- **Nutrient Pollution Research:** Nutrient pollution is a multi-media, multi-pollutant problem facing the U.S. with far-ranging consequences for environmental conditions, economic prosperity, and human health and well-being.[49] EPA's A-E research is addressing nitrogen and co-pollutant loadings to watershed via atmospheric deposition. This research will provide information and tools that EPA's Office of Water, Office of Air and Radiation, and Regions, as well as states, tribes and communities can use to reduce atmospheric deposition of nitrogen and co-pollutants, to protect both airsheds and watersheds in an economically feasible manner.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 3 Objective 3.3, Prioritize Robust Science in the *FY 2018–2022 EPA Strategic Plan*. The A-E Program features three related research topics that include research areas that support EPA's mission to protect human health and the environment, fulfill the Agency's legislative mandates, and advance cross-agency priorities. The A-E Program will continue to measure progress toward environmental health goals and translate research results to inform communities and individuals about measures that can be taken to reduce the impacts of air pollution. In addition, research personnel will continue to analyze existing data from EPA on air quality, its impacts to health and the environment, and research to adapt to and prepare for extreme events and environmental change.

Research Planning: EPA's Board of Scientific Counselors (BOSC) evaluates performance and provides feedback to the Agency for the A-E Program. The A-E Program, BOSC, and Science Advisory Board will meet regularly over the next several years to seek input on topics related to research program design, science quality, innovation, relevance, and impact. This includes advising EPA on developing its strategic research direction and Strategic Research Action Plans for FY 2019-2022.

The Agency collaborates with several science agencies and the research community to assess our research performance, such as the National Institutes of Health, National Science Foundation, Department of Energy, Department of Agriculture, U.S. Geological Survey, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Department of Defense, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, and others. EPA's state engagement program is designed to inform states about EPA's research programs and role within EPA, and to better understand the science needs of state environmental agencies.

Key partners at the state level include the Environmental Council of the States, with its Environmental Research Institute of the States and the Interstate Technology and Regulatory Council, as well as state media associations such as the Association of Clean Water Administrators and the Association of State Drinking Water Administrators.

[49] For more information, please see: https://www.epa.gov/nutrientpollution/effects.

Performance Measure Targets:

(PM RD1) Percentage of Office of Research and Development (ORD) research products meeting customer needs.

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Units
Target						No Target Established	77	80	Percent
Actual						77			
Numerator						171			Products
Denominator						222			

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$2,234.0) This net change to fixed and other costs is a decrease due to the recalculation of base workforce costs due to adjustments in salary, essential workforce support and benefit costs.

- (-$31,324.0 / -75.7 FTE) This program change eliminates air quality research.

- (-$17,186.0 / -47.3 FTE) This program change reduces climate change research.

- (-$9,455.0) This program change eliminates funding for the Science to Achieve Results (STAR) program for FY 2020.

Statutory Authority:

Clean Air Act; Title II of Energy Independence and Security Act of 2007; Environmental Research, Development, and Demonstration Authorization Act (ERDDAA); National Environmental Policy Act (NEPA) § 102; Pollution Prevention Act (PPA); Global Change Research Act of 1990.

Research: Safe and Sustainable Water Resources

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Science & Technology	***$104,163.5***	***$106,257.0***	***$69,963.0***	***-$36,294.0***
Total Budget Authority	$104,163.5	$106,257.0	$69,963.0	-$36,294.0
Total Workyears	372.4	374.7	266.4	-108.3

Program Project Description:

The Safe and Sustainable Water Resources (SSWR) Research Program is developing cost-effective, innovative solutions to current, emerging, and long-term water resource challenges for complex chemical and microbial contaminants. The SSWR Research Program uses a systems approach to develop scientific and technological solutions for the protection of human health and watersheds. The research is being conducted in partnership with other EPA programs, federal and state agencies, academia, non-governmental agencies, public and private stakeholders, and the scientific community. This approach maximizes efficiency, interdisciplinary insights, and integration of results.

SSWR is dedicated to sustaining EPA's focus and commitment to robust research and scientific analysis to inform policy making under the authorities of the Safe Drinking Water Act and Clean Water Act. Our research supports EPA's Water Program in ensuring clean and safe waters through improved water infrastructure and sustainable water resource management.

The SSWR Program is one of six integrated and transdisciplinary national research programs. Each program is guided by a Strategic Research Action Plan (StRAP) that reflects the science needs of agency program and regional offices, states, and tribes, and is implemented with their active collaboration and involvement.

Recent accomplishments of the SSWR Program include the following:

- **Contaminants of Emerging Concern (CECs):**[50] Wastewater effluents contain traces of chemicals that have been disposed of in the sink or toilet. These contaminants, including pharmaceuticals and per- and polyfluoroalkyl substances (PFAS), can persist downstream, ending up in drinking source waters as chemical mixtures. SSWR researchers have been conducting studies to monitor the occurrence of these CECs in wastewater, surface waters, groundwater, and drinking water, with some studies being done in collaboration with the U.S. Geological Survey (USGS). The combined research efforts of EPA and USGS

[50] For more information, please see epa.gov/water-research/determining-prevalence-contaminants-treated-and-untreated-drinking-water.

produced a data set of approximately 700 chemically characterized CECs, and resulted in a group of the most highly characterized watersheds that have been impacted by wastewater. Research efforts to monitor the effects of chemical mixtures continue, which will increase our understanding of wastewater effluent impacts to human and aquatic health.

- **Drinking Water Treatment:**[51] To help utilities with compliance challenges and provide clean drinking water to their communities, SSWR researchers developed, patented, and pilot tested an affordable and easy-to-use drinking water treatment process specifically designed for small systems. It uses naturally occurring microorganisms to remove multiple contaminants in a single treatment process without generating hazardous waste. The technology has now been marketed commercially by a private company and highlights a successful technology transfer from a federal agency to a private sector company.[52] In order to continue meeting the relevant needs of small systems, SSWR researchers are currently conducting additional pilot studies in several small, rural communities.

- **Water Reuse:**[53] To augment water availability some states, utilities, and communities are developing innovative ways to manage and treat water for non-potable (non-drinking) use through water reuse, fit-for-purpose water treatment, and wastewater resource recovery. SSWR scientists are part of the *National Blue Ribbon Commission for Onsite Non-potable Water Systems*,[54] which works with a group of utilities and public health agencies interested in adopting decentralized non-potable water reuse approaches to develop a regulatory framework, a new business model for utilities, and a research needs summary. This effort, along with SSWR's research on microbial risk assessment models, human health impacts, and the performance and costs of non-potable water reuse systems, supports the continued expansion of decentralized water reuse and has helped facilitate the development of on-site, non-potable water reuse guidelines.

- **Recreational Water Quality:**[55] SSWR scientists are developing microbial source tracking (MST) tools that can help characterize fecal pollution from different animal groups. When present at recreational beaches, fecal pollution can harbor disease causing pathogens leading to unsafe conditions and economic loss for communities that rely on clean and safe waters. Recently, the City of Santa Cruz, California used an EPA developed procedure to help identify a chronic, but manageable source of fecal pollution at their beaches. City of Santa Cruz officials reported that the tool saved their community approximately $450,000 in laboratory testing costs and played a key role in a 50 percent reduction of beach contamination postings, with further decreases expected in the future. In addition, the Centers for Disease Control and Prevention (CDC) has started using EPA developed MST tools for waterborne disease outbreak investigations, demonstrating how EPA and CDC interagency collaborations can provide invaluable assistance to communities across the country.[56]

[51] For more information, please see: https://www.epa.gov/water-research/small-drinking-water-systems-research.
[52] For more information, please see: https://adedgetech.com/nomonia-biological-filtration.
[53] For more information, please see: uswateralliance.org/initiatives/commission.
[54] For more information, please see: http://uswateralliance.org/initiatives/commission.
[55] For more information, please see: youtube.com/watch?v=sFEZ6YoeyMI.
[56] For more information, please see: https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=341843.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 3 Objective 3.3, Prioritize Robust Science in the *FY 2018–2022 EPA Strategic Plan*. The SSWR Research Program's work in FY 2020 will focus explicitly on efforts integral to achieving the Agency's priorities and informing EPA's implementation of key environmental regulations by leveraging research in the areas of nutrients, harmful algal blooms, watersheds and water infrastructure (including water reuse).

High priority SSWR efforts in FY 2020 include:

- Assisting states, communities, and utilities in addressing stormwater and wastewater infrastructure needs through applied models and technical assistance. Developing risk assessments on stormwater capture for groundwater augmentation and reuse.
- Evaluating the fate and potential effects of microplastics on coral reefs and developing methods to extract and quantify microplastics in coastal estuarine sediments to assess potential impacts on benthic organisms. Research is planned to further investigate the nature, severity, exposure, and effects of microplastic and microfiber pollution in the aquatic environment to inform Clean Water Act regulatory programs and voluntary approaches that address the proliferation of plastics in marine and freshwater systems.
- Research and technical support to deliver safe drinking water. Efforts will focus on the complete water cycle–from protecting source waters and wetlands to improving drinking water and wastewater infrastructure and management. Research will assess the distribution, composition, and health impacts of known and emerging, chemical and biological contaminants.
- Improving methods for rapid and cost-effective monitoring of waterborne pathogens in recreational waters.
- Investigating health impacts from exposure to harmful algal/cyanobacteria toxins, and developing innovative methods to monitor, characterize, and predict blooms for early action.
- Supporting states in prioritizing watersheds for nutrient management and in setting water quality and aquatic life thresholds. These research and communication efforts will help states verify whether investments in implementing nutrient reduction management practices achieve their expected benefits.
- Providing water reuse research support for safe, fit-for-purpose potable and non-potable use by states.

In addition to the activities listed above, EPA also conducts research across programs on PFAS, lead, and nutrients.

Per- and polyfluoroalkyl substances (PFAS): PFAS are a class of chemicals of growing concern in the environment, and EPA has committed to taking action to support states, tribes and local communities in understanding and managing risks associated with these chemicals. A significant challenge for risk managers at the state and local level is how to identify and remove or treat PFAS chemicals, which are impacting drinking water supplies. There is a general lack of knowledge regarding how to measure and quantify different PFAS chemicals in water, how to remove or treat PFAS chemicals when detected, and how to estimate the cost of different treatment alternatives so

that utilities can make informed investment decisions. Within the SSWR Program, EPA is: (1) developing and validating standard methods for measuring different PFAS in water; (2) reviewing available literature on effectiveness and cost data for different water treatment technologies applied to different PFAS chemicals; and (3) conducting pilot- and bench-scale testing of the most promising technologies to further elucidate on their effectiveness. This work is being done in collaboration with water utilities and water treatment technology suppliers. The results of this work will be posted to EPA's public Drinking Water Treatability Database so the information will be widely available to stakeholders.[57]

Lead: EPA, CDC, and the American Academy of Pediatrics unanimously agree that there is no safe level of lead in a child's blood, and that even low levels can result in behavior and learning problems, lower IQ, and other health effects.[58] In response to overwhelming scientific consensus and continued public health concern, reducing childhood lead exposure is one of the highest priorities for EPA. SSWR research focuses on (1) establishing reliable models for estimating lead exposure from drinking water, (2) developing improved sampling techniques and strategies for identifying and characterizing lead in plumbing materials, including lead service lines, (3) developing guidance on optimizing lead mitigation strategies, and (4) testing and evaluation of treatment processes for removing lead from drinking water. The overall impact of this research will be providing information and tools that EPA's Office of Water and regions, as well as, states, tribes, utilities, and communities can use to minimize or eliminate lead exposure in drinking water.

Nutrient Pollution: Nutrient pollution is the most widespread water quality problem facing the US with far-ranging consequences for human and animal health and economic prosperity. [59] SSWR research comprehensively addresses the problems of excess nutrients in waterbodies, including harmful algal blooms. The overall impact of this research will be to provide information and tools that EPA's Office of Water, Office of Air and Radiation, and regions, as well as, states, tribes, and communities can use. SSWR information and tools are then used to reduce nutrient loadings, address legacy nutrient issues, and protect and restore watersheds and waterbodies that are sensitive to nutrient pollution in an economically feasible manner.

Research Planning: EPA has established a standing subcommittee under EPA's BOSC for the SSWR Program to evaluate its performance and provide feedback to the Agency. In addition, EPA will meet regularly with both the BOSC and the Science Advisory Board to seek their input on topics related to research program design, science quality, innovation, relevance and impact. This includes advising EPA on developing its strategic research direction and Strategic Research Action Plans for FY 2019-2022.

EPA collaborates with several science agencies and the research community to assess our research performance, such as the National Institutes of Health, National Science Foundation, Department of Energy, Department of Agriculture, U.S. Geological Survey, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Department of Defense, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, and others. EPA's state

[57] For more information, please see: https://iaspub.epa.gov/tdb/pages/general/home.do.
[58] For more information, please see the following: https://www.epa.gov/lead.
[59] For more information please see: https://www.epa.gov/nutrientpollution/problem.

engagement program is designed to inform states about EPA's research programs and role within EPA, and to better understand the science needs of state environmental agencies.

Key partners at the state level include the Environmental Council of the States, with its Environmental Research Institute of the States and the Interstate Technology and Regulatory Council, as well as state media associations such as the Association of Clean Water Administrators and the Association of State Drinking Water Administrators.

Performance Measure Targets:

(PM RD1) Percentage of Office of Research and Development (ORD) research products meeting customer needs.

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Units
Target						No Target Established	77	80	Percent
Actual						77			
Numerator						171			Products
Denominator						222			

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$893.0) This net change to fixed and other costs is an increase due to the recalculation of base workforce costs due to adjustments in salary, essential workforce support, and benefit costs.

- (-$246.0) This change to fixed and other costs is a decrease due to the recalculation of lab utilities.

- (-$9,124.0 / -30.0 FTE) This program change streamlines funding to the Program for research related to technical support and site-specific support; communication and technology transfer efforts; translation of nutrient modeling and monitoring data; and research assisting states to prioritize watersheds and differentiating sources of nutrient overloading.

- (-$24,154.0 / -78.3 FTE) This program change refocuses resources from research on recovering resources (e.g. nutrients) from wastewater, transformative water systems and life cycle analysis, and research on advancing water systems technologies for FY 2020.

- (-$3,663.0) This program change eliminates funding for the Science to Achieve Results (STAR) program for FY 2020.

Statutory Authority:

Safe Drinking Water Act (SDWA) § 1442(a)(1); Clean Water Act §§ 101(a)(6), 104, 105; Environmental Research, Development, and Demonstration Authorization Act (ERDDAA); Marine Protection, Research, and Sanctuaries Act (MPRSA) § 203; Title II of Ocean Dumping Ban Act of 1988 (ODBA); Water Resources Development Act (WRDA); Wet Weather Water Quality Act of 2000; Marine Plastic Pollution Research and Control Act of 1987 (MPPRCA); National Invasive Species Act; Coastal Zone Amendments Reauthorization Act (CZARA); Coastal Wetlands Planning, Protection and Restoration Act; Endangered Species Act (ESA); North American Wetlands Conservation Act; Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Toxic Substances Control Act (TSCA).

Research: Sustainable Communities

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Science & Technology	***$131,757.3***	***$134,327.0***	***$53,631.0***	***-$80,696.0***
Leaking Underground Storage Tanks	$311.3	$320.0	$424.0	$104.0
Inland Oil Spill Programs	$695.6	$664.0	$511.0	-$153.0
Hazardous Substance Superfund	$11,023.3	$11,463.0	$10,977.0	-$486.0
Total Budget Authority	$143,787.5	$146,774.0	$65,543.0	-$81,231.0
Total Workyears	439.1	440.9	294.1	-146.8

Program Project Description:

EPA's Sustainable and Healthy Communities (SHC) Research Program conducts research to support regulatory activities, management of solid waste, and remedial actions. SHC provides on-demand technical support at federal, tribal or state-led cleanup sites and during emergencies. SHC's research products are unique in that they account for the interrelationships between social, economic, health, ecological, and environmental factors.

Program scientists conduct health, environmental engineering, and ecological research and translate these into planning and analysis tools for localities throughout the United States to facilitate regulatory compliance and improve environmental and health outcomes. These tools aim to minimize negative unintended consequences to human health and the environment and promote more robust and efficient infrastructure in built and natural environments.

The SHC Program is one of six integrated and transdisciplinary national research programs. Each program is guided by a Strategic Research Action Plan (StRAP) that reflects the science needs of EPA program and regional offices, states, and tribes; and is implemented with their active collaboration and involvement.

Recent accomplishments of the SHC Program include:

- **Report on Sustainable Materials Management Options for Industrial, Construction & Demolition, and Municipal Materials.**[60] Material reuse is a potential source of savings in multiple sectors, but there are ongoing questions about how to do so safely and efficiently. This research addresses alternatives to help practitioners, regulators, and other stakeholders manage construction and demolition debris (CDD) in a manner that is protective of human health and the environment. This effort will build on previous

[60] For more information, please see: https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=342507&Lab=NRMRL.

materials management research, and will utilize life cycle analysis methods, as well as evaluation of human health and resource impacts.

- **Use Cases Demonstrating Uses of *EnviroAtlas*.** *EnviroAtlas*[61] provides a large volume of detailed Geographic Information System (GIS) information for users inside and outside the Agency and use cases that provide users with step-by-step applications of the data found in the *EnviroAtlas* to solve problems. Examples include using *EnviroAtlas* resources: (1) to determine where to address impaired waters, (2) in a Health Impact Assessment, (3) to determine where to best conserve land for biodiversity conservation, (4) to address Superfund and other contaminated site reuse, (5) to determine where to invest in ecosystem services markets, and (6) in the classroom. *EnviroAtlas* use cases are presented as GIS Story Maps or as reports and are available with other tutorial materials on the *EnviroAtlas* website. [62]
- **Report on Comparative Evaluation of Contaminant Mass Flux and Groundwater Flux Measurements in Fractured Rock Using Passive Flux Meters.**[63] Because ground water generally moves slowly, contamination often remains undetected for long periods of time. This makes cleanup of a contaminated groundwater supply difficult and expensive; more information on the subject is always in high demand.[64] At contaminated groundwater sites, groundwater flux and contaminant mass flux are important parameters. These parameters are used to understand the significance of contaminant loading to an aquifer, evaluate contaminant fate and transport, assess risk, design a groundwater remediation system, and assess remedial performance. This report summarizes a joint project among EPA headquarters and regional scientists to assess the ability of two existing technologies to measure groundwater flux and contaminant mass flux in a fractured bedrock setting and compare the results between the technologies. Results obtained using investigative methods are typically deployed at Superfund sites to characterize fractured bedrock hydrogeology.
- **Advances in the production of Platform Chemicals from Waste Cellulosic or Lignin Biomass.** There is currently no beneficial reuse for cellulosic and lignin waste material (forest-based waste biomass, demolition materials, crop waste) that are discarded in landfills. When burnt for waste volume reduction and energy recovery, the practice can pollute the air by generating hazardous waste (small particles and toxic organics) emission. This report describes suitable and beneficial use for these waste materials which are renewable and biodegradable. The information will be useful for informing practitioners' decisions that direct former waste material towards a beneficial purpose while minimizing other environmental impacts.
- **Asthma Intervention Study of the Removal of Chemical and non-Chemical Stressors and Educational Outreach to Vulnerable Communities Regarding the Results.**[65] In the United States, around eight percent of children and adults suffer from asthma[66], impacting quality of life throughout the country. SHC's research in this area fills a gap in asthma intervention. It focuses on the removal of chemical and non-chemical stressors and informs educational outreach to vulnerable communities regarding the results.

[61] For more information, please see: https://www.epa.gov/enviroatlas.
[62] For more information, please see: https://www.epa.gov/enviroatlas/enviroatlas-use-cases.
[63] For more information, please see: https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=342591&Lab=NRMRL.
[64] For more information, please see: https://www.epa.gov/sites/production/files/2015-08/documents/mgwc-gwc1.pdf..
[65] For more information, please see: https://www.epa.gov/children/childrens-health-research-regarding-asthma.
[66] For more information, please visit: https://www.cdc.gov/nchs/fastats/asthma.htm.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.3, Prioritize Robust Science in the *FY 2018–2022 EPA Strategic Plan*. More specifically, SHC's FY 2020 research will focus on conducting research to support regulatory activities and protocol development for EPA's Office of Land and Emergency Management, EPA's regional offices, and in support of state-delegated programs. SHC will provide on-demand technical support at federal-, tribal-, or state-managed cleanup sites, as well as assistance during emergencies. The Agency conducts health, environmental engineering, and ecological research, and prepares planning and analysis tools for localities nationwide to use in facilitating regulatory compliance and improving environmental and health outcomes. Also, EPA scientists will assess the environmental and health impacts of proposed projects (e.g. health impact assessments) on vulnerable groups such as children, tribes, and environmental justice communities.

Resources will support the research personnel who analyze existing data and publish scientific journal articles to disseminate findings associated with the data. Research efforts will include *EnviroAtlas* (a web-based atlas of ecosystem services), conducting a valuation of ecosystem services, studying how ecosystem services impact human health and community resilience, measuring impacts on vulnerable populations (e.g. children), and the remediation of contaminated sites.

Per- and polyfluoroalkyl substances (PFAS): PFAS are a class of chemicals of growing concern in the environment, and EPA has committed to taking action to support states, tribes, and local communities in understanding and managing risks associated with these chemicals. A significant challenge for risk managers at the state and local level is how to remove or treat PFAS at sites contaminated through a) the use of Aqueous Film-Forming Foam (AFFF)[67], a common fire-fighting method at military bases and airports, or b) industrial operations which create, consume, or dispose of PFAS containing compounds. Within the SHC Program, EPA is developing and testing methods for site remediation including treating or removing PFAS from groundwater and soil. The research includes examination of *in situ* chemical transformation that may take place to better understand which PFAS chemical precursors might result in the highest risk outcomes. This work is being done in collaboration with the Department of Defense through participation in their Strategic Environmental Research and Development Program.[68]

The SHC Program also is conducting research on end-of-life management of PFAS-containing materials (e.g. industrial waste, household waste) to ensure that PFAS from these materials do not impact the environment. Finally, SHC supports a technical support and assistance function for states, tribes, and local communities on issues pertaining to ecological and human health risk assessment and site engineering challenges related to PFAS.

Lead Research: EPA, CDC, and the Academy of Pediatrics unanimously agree that there is no safe level of lead in a child's blood, and that even low levels can result in behavior and learning

[67] For more information, please see: https://pfas-1.itrcweb.org/wp-content/uploads/2018/10/pfas_fact_sheet_afff__10_3_18.pdf.
[68] About SERDP: https://www.serdp-estcp.org/About-SERDP-and-ESTCP/About-SERDP.

problems, lower IQ, and other health effects[69] . In response to overwhelming scientific consensus and continued public health concerns, and federal coordination efforts, reducing childhood lead exposure is one of the highest priorities for EPA. The Agency has joined 17 other federal agencies in the Federal Action Plan to Reduce Childhood Lead Exposures and Associated Health Impacts[70]. The SHC Program will implement three actions under this goal:

1. Enhancing and applying data and tools (e.g., models or approaches) to determine the key drivers of blood lead levels from water, air, soil, dust, and food exposures to inform lead regulatory decisions and site assessments.
2. Generating data, maps and tools to identify and prioritize communities or locations to help focus efforts to reduce children's blood lead levels.
3. Generating data to address critical gaps for reducing uncertainty in lead modeling and mapping for exposure/risk analyses and for estimating population-wide health benefits of actions to reduce lead exposures.

EPA's research in this area, is essential to support ongoing EPA regulatory and non-regulatory efforts, as well as, filling in the data gaps for federal partners, states, tribes, and local communities.

Research Planning: EPA's Board of Scientific Counselors (BOSC) evaluates performance and provides feedback to the Agency for the SHC Program. The SHC Program, BOSC, and Science Advisory Board will meet regularly over the next several years to seek input on topics related to research program design, science quality, innovation, relevance, and impact. This includes advising EPA on its strategic research direction midway through the 4-year cycle of StRAPs.

EPA collaborates with several science agencies and the research community to assess our research performance, such as the National Institutes of Health, National Science Foundation, Department of Energy, U.S. Department of Agriculture and the White House's Office of Science and Technology Policy. EPA's state engagement program is designed to inform states about EPA's research programs and role within EPA, and to better understand the science needs of state environmental agencies.

Key partners at the state level include the Environmental Council of the States, with its Environmental Research Institute of the States and the Interstate Technology and Regulatory Council, as well as state media associations such as the Association of State and Territorial Solid Waste Management Officials.

Performance Measure Targets:

(PM RD1) Percentage of Office of Research and Development (ORD) research products meeting customer needs.

[69] For more information, please see the following: https://www.epa.gov/lead, https://www.cdc.gov/nceh/lead/default.htm, and https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/lead-exposure/Pages/Lead-Exposure-in-Children.aspx.
[70] https://www.epa.gov/lead/federal-action-plan-reduce-childhood-lead-exposure.

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Units
Target						No Target Established	77	80	Percent
Actual						77			
Numerator						171			Products
Denominator						222			

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$3,182.0) This net change to fixed and other costs is a decrease due to the recalculation of base workforce costs due to adjustments in salary, essential workforce support, and benefit costs.

- (-$16.0) This change to fixed and other costs is a decrease due to the recalculation of lab utilities.

- (-$34,228.0 / -74.0 FTE) This program change streamlines research support in FY 2020 by eliminating work related to the following activities: The Ecotox database; EPA's Report on the Environment (ROE); and the inclusion of a data layer in EnviroAtlas on ecosystem services and their beneficiaries.

- (-$17,574.0 / -57.7 FTE) This program change streamlines research efforts across environmental media by eliminating work related to: Research on the life cycle of materials in commerce; and the People, Prosperity & the Planet (P3) program for college-level competition.

- (-$16,173.0 / -24.7 FTE) This program change streamlines research on the following: the Health Impact Assessment (HIA) approach for assessing the impact of major planned infrastructure development (e.g. highway construction) at a city scale of governance; research into the mechanisms of chemical exposures and effects on human health outcomes and well-being, especially research into cumulative effects; research into the uptake and distribution of contaminates (e.g., lead, arsenic) within vulnerable populations; research into the environmental component of children's asthma.

- (-$9,523.0) This program change eliminates funding for the Science to Achieve Results (STAR) program for FY 2020.

Statutory Authority:

Reorganization Plan No. 3 of 1970, 84 Stat. 2086, as amended by Pub. L. 98-80, 97 Stat. 485 (codified at Title 5 App.) (EPA's organic statute).

Research: Chemical Safety and Sustainability

Research: Chemical Safety and Sustainability

Program Area: Research: Chemical Safety and Sustainability
Goal: Rule of Law and Process
Objective(s): Prioritize Robust Science

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$328.4	$0.0	$0.0	$0.0
Science & Technology	***$79,587.9***	***$90,407.0***	***$63,877.0***	***-$26,530.0***
Total Budget Authority	$79,916.3	$90,407.0	$63,877.0	-$26,530.0
Total Workyears	276.9	281.2	240.9	-40.3

Total Workyears in FY 2020 include 2.0 FTE funded by TSCA fees.

Program Project Description:

EPA's Chemical Safety for Sustainability (CSS) Research Program provides information, tools and methods to make better-informed, more-timely decisions about the tens of thousands of chemicals circulating in the United States, many of which have not been thoroughly evaluated for potential risks to human health and the environment.[71] CSS products strengthen the Agency's ability to evaluate and predict human health and ecological impacts from the use and disposal of manufactured and naturally occurring chemicals and their by-products.

The CSS Program works with multiple EPA program offices to plan and develop innovative research that directly addresses agency challenges and informs EPA decisions regarding chemicals. Products delivered by the CSS Program inform agency program offices as they implement environmental regulations that govern agency actions, including the evaluation of existing and new chemicals (TSCA), development and use of alternative testing protocols (TSCA, FIFRA, FQPA, FFDCA), chemical prioritization (TSCA, SDWA), evaluation of pesticide registrations (FIFRA), and mitigation activity at Superfund sites (CERCLA).

The CSS Program is one of six integrated and transdisciplinary national research programs. Each program is guided by a Strategic Research Action Plan (StRAP) that reflects the science needs of agency program and regional offices, states, and tribes, and is implemented with their active collaboration and involvement.

Recent Accomplishments of the CSS Program include:

- **Release of the TSCA Alternative Toxicity Testing Strategy Document, June 2018:**[72] Jointly developed by EPA's Office of Research and Development and the Office of Chemical Safety and Pollution Prevention, the strategy document promotes development

[71] For more information, please see: https://www.epa.gov/tsca-inventory/about-tsca-chemical-substance-inventory.
[72] For more information, please see: https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/alternative-test-methods-and-strategies-reduce.

and implementation of test methods within the TSCA program that are better, faster, less expensive, and reduce the need for animal use.

- **New Methods to Screen and Prioritize Chemicals for Developmental Neurotoxicity:**[73] Nearly 1 in 6 children in the U.S. are affected by neurodevelopmental disability,[74] but less than one percent of chemicals have been evaluated as potential neurotoxicants.[75] EPA's new screening methods provide a means through which to fill those essential data gaps. Data produced from new in vitro testing methods will be important for the implementation of TSCA as amended by the *Frank R. Lautenberg Chemical Safety for the 21st Century Act*, which requires consideration of susceptible subpopulations, including children.
- **Publication in *Scientific Data* on the Chemical and Products Database (CPDat):**[76] This database is intended for use by risk assessors of chemical and product safety. It provides data to inform TSCA-related chemical exposure estimates for more than 75,000 chemicals and 15,000 consumer products.

In addition to these specific accomplishments, CSS continues to work with the Agency's Office of Chemical Safety and Pollution Prevention (OCSPP), providing dedicated staff for the successful implementation of TSCA as amended by the *Lautenberg Chemical Safety for the 21st Century Act*.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 3 Objective 3.3, Prioritize Robust Science in the *FY 2018–2022 EPA Strategic Plan*. In FY 2020, the CSS Research Program will continue to produce innovative tools that accelerate the pace of data-driven chemical evaluations, enable EPA and state decisions to be environmentally sound, protective of public health, and support sustainable innovation of chemicals. CSS products will continue to leverage its key research areas to inform the Agency's implementation of key environmental regulations and to address contaminants of emerging concern, such as per- and polyfluoroalkyl Substances (PFAS) and focus on efforts integral to achieving the Administrator's priorities.

Computational Toxicology (*CompTox*): EPA continues to be a leader in developing innovative computational and high-throughput methods for efficiently screening large numbers of chemicals, including endocrine disrupting chemicals, in a shorter amount of time. These methods cost less, reduce the need for using vertebrate animals, and expand the number of relevant biological endpoints represented. In FY 2020, *CompTox* research will provide essential support to Agency activities across diverse regulatory frameworks (e.g. TSCA, FIFRA, FQPA, FFDCA, SDWA) and multiple EPA program offices. Development and application of new assessment methodologies add significant efficiency and effectiveness to Agency operations and provide states with the information to support effective decisions and actions. Specific *CompTox* activities in FY 2020 will include:

[73] For more information, please see: https://www.epa.gov/sites/production/files/2018-07/documents/dnt_factsheet_07_23_18_final.pdf.
[74] For more information, please see: https://www.cdc.gov/ncbddd/developmentaldisabilities/facts.html.
[75] For more information, please see: https://www.epa.gov/chemical-research/evaluating-effects-chemicals-nervous-system-development.
[76] For more information, please see: https://www.nature.com/articles/sdata2018125.

- Using *ToxCast*[77] data to develop high-throughput risk assessments on chemicals for which adequate information has not been available historically to conduct risk assessments.
- Developing approaches to use existing data on toxicity and exposure to inform screening and prioritization of the over 40,000 chemicals currently on the TSCA Active List.[78]
- Developing rapid, improved testing approaches that evaluate chemical responses of multiple genes simultaneously, and thereby more efficiently.
- Applying complex systems science to inform interpretive frameworks and exploit the use of new approach methodologies (NAMs).
- Exploring how high-throughput exposure and hazard information can be combined to predict potential for exposure and risk to susceptible subpopulations.
- Creating online software tools that integrate human health, environmental and exposure data to yield robust chemical information for chemical prioritization decisions.[79]

CompTox research directly supports the Agency's efforts to fulfill requirements for: chemical evaluation under the Toxic Substances Control Act of 1976 (TSCA) as amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act; pesticide evaluation under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); chemical testing for endocrine system impacts under the Food Quality Protection Act of 1996 (FQPA) (Public Law 104-170); and chemical evaluation as part of the Safe Drinking Water Act (SDWA).

Rapid Exposure, Dosimetry, and Modeling: In FY 2020, the CSS Program will continue to provide data, models and tools to characterize total human exposure to environmental chemicals, which will inform Agency chemical prioritizations and evaluations. This includes the continued development of advanced analytical and computational tools to detect and identify unknown chemicals in environmental media, biological media and consumer products.

The above-mentioned research areas can be leveraged in cooperation with efforts from other research programs to strengthen EPA's response to contaminants of emerging concern over high-profile chemicals like PFAS.

Per- and Polyfluoroalkyl Substances (PFAS): PFAS are a class of chemicals of growing concern in the environment, and EPA has committed to taking action to support states, tribes and local communities in understanding and managing risks associated with these chemicals.[80] A significant challenge is understanding PFAS chemical toxicity, because this class of chemicals includes thousands of different chemical compounds most of which have little or no published toxicity data available.[81] Within the CSS Program, EPA is addressing this gap by conducting high throughput computational toxicological screening assays on an initial set of 150 PFAS chemicals which have been selected to represent the full array of chemical and physical structural properties of the entire PFAS universe of compounds. The results will be used to identify subsets of PFAS chemicals with potentially high toxicity in order to prioritize for more detailed study, as well as enabling quantitative analysis to make inference about toxicity of chemicals for which there is no

[77] For more information, please see: https://www.epa.gov/chemical-research/toxicology-testing-21st-century-tox21.
[78] For more information, please see: https://www.epa.gov/tsca-inventory/interim-list-active-substances.
[79] For more information, please see: https://comtox.epa.gov/dashboard.
[80] For more information, please see: https://www.epa.gov/pfas/pfas-community-engagement.
[81] For more information, please see: https://www.epa.gov/pfas/epa-pfas-research.

experimental data. This work is being done in collaboration with the NIEHS National Toxicology Program.

Research Planning: EPA's Board of Scientific Counselors (BOSC) evaluates research dimensions, performance and provides feedback to the Agency for the CSS Program. The CSS program, BOSC, and Science Advisory Board will meet regularly over the next several years to seek input on topics related to research program design, science quality, innovation, relevance, and impact. This includes advising EPA on its strategic research direction as part of the review of the research and development program's StRAPs for FY 2019-2022.[82]

EPA collaborates with several science agencies and the research community to assess our research performance, such as the National Institutes of Health, National Science Foundation, U.S. Department of Energy, U.S. Department of Agriculture. EPA's state engagement program is designed to inform states about EPA's research programs and role within EPA, and to better understand the science needs of state environmental agencies.

Key partners at the state level include the Environmental Council of the States, with its Environmental Research Institute of the States and the Interstate Technology and Regulatory Council, as well as state media associations such as the Association of State and Territorial Solid Waste Management Officials.

Performance Measure Targets:

(PM RD1) Percentage of Office of Research and Development (ORD) research products meeting customer needs.

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Units
Target						No Target Established	77	80	Percent
Actual						77			
Numerator						171			Products
Denominator						222			

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$1,598.0) This net change to fixed and other costs is an increase due to the recalculation of base workforce costs due to adjustments in salary, essential workforce support, and benefit costs.

- (-$2,932.0 / -4.9 FTE) This program change reduces resources for the development of high-throughput toxicity testing and the Agency's development of improved methods for chemical evaluations.

- (-$3,330.0 / -6.7 FTE) This program change reduces research efforts focused on endocrine disrupting chemicals under this program.

- (-$15,971.0 / -29.5 FTE) This program change reduces funding for the development of virtual tissue models and tools that potentially can be used to conduct chemical toxicity

[82] EPA StRAPs may be found at: http://www.epa.gov/research/strategic-research-action-plans-2016-2019.

screening to understand impacts on human development and health outcomes, while minimizing the use of animal testing.

- (-$5,895.0) This program change eliminates funding for the Science to Achieve Results (STAR) program for FY 2020.

- (+0.8 FTE) This FTE change reflects an increase in reimbursable FTE funded by TSCA service fees to support risk assessment and evaluation science for new TSCA requirements.

Statutory Authority:

Clean Air Act §§ 103, 104; Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); Children's Health Act; 21st Century Nanotechnology Research and Development Act; Clean Water Act; Federal Food, Drug, and Cosmetic Act (FFDCA); Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Pollution Prevention Act (PPA); Resource Conservation and Recovery Act (RCRA); Safe Drinking Water Act (SDWA); Toxic Substances Control Act (TSCA).

Human Health Risk Assessment

Program Area: Research: Chemical Safety and Sustainability
Goal: Rule of Law and Process
Objective(s): Prioritize Robust Science

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Science & Technology	***$33,568.7***	***$36,523.0***	***$22,689.0***	***-$13,834.0***
Hazardous Substance Superfund	$2,822.9	$2,824.0	$5,338.0	$2,514.0
Total Budget Authority	$36,391.6	$39,347.0	$28,027.0	-$11,320.0
Total Workyears	152.8	150.2	111.6	-38.6

Program Project Description:

EPA's Human Health Risk Assessment (HHRA) Research Program is focused on the science of assessments that inform decisions made by EPA and its partners, including states and tribes. These assessments provide the scientific basis for decisions under an array of environmental laws, including the Clean Air Act (CAA), Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Toxic Substances Control Act (TSCA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The HHRA Program is one of six integrated and transdisciplinary national research programs. Each program is guided by a Strategic Research Action Plan (StRAP) that reflects the science needs of Agency program and regional offices, states, and tribes, and is implemented with their active collaboration and involvement.

The current portfolio of HHRA products encompass these four topic areas:

Integrated Risk Information System (IRIS): IRIS human health assessments are used by EPA and other health agencies to inform national standards, clean-up levels at local sites, and set advisory levels. These assessments inform decisions under the CAA, CWA, SDWA, CERCLA/Superfund, and TSCA. The IRIS Program utilizes a multi-step process which provides opportunities for public, stakeholder, and interagency engagement. The assessments are complex, multidisciplinary evaluations of scientific information, which are developed through a transparent process with independent peer review. IRIS is the only federal program to provide toxicity values for both cancer and non-cancer effects.

Integrated Science Assessments (ISAs): Provide a concise evaluation and synthesis of science necessary to support decisions to retain or revise the National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants (particulate matter, ozone, lead, sulfur oxides, nitrogen oxides, and carbon monoxide) as required every five years by sections 108(a)(2) and 109(d)(1) of

the CAA.[83] ISAs also inform the benefit-cost analyses that support the regulations designed to allow states and local areas to meet the NAAQS.

***Community and Site-specific Risk*:** Develop Provisional Peer-Reviewed Toxicity Values (PPRTVs) and exposure assessment tools to help inform EPA's timely response to contaminated Superfund and hazardous waste sites, as required by the CERCLA.[84] PPRTVs are typically developed for data poor chemicals for which no IRIS value exists.

Research to Advance Risk Assessment Methods: Develop tools and methods that support the scientific advances in assessments. This includes research to incorporate non-animal testing data into assessments. It also includes research on assessment methods for emerging contaminants such as perfluorinated compounds and biotechnologies.

Recent accomplishments in the HHRA Research Program include:

The HHRA Research Program has been developing new assessment product lines to enhance timely response, improve screening capabilities, and augment toxicity value derivations for health assessments. In April 2018, the NAS issued a consensus report on the progress of the IRIS Program in implementing recommendations from the Academies' 2011 and 2014 reports. In its overall conclusions the committee reported, "*The committee is encouraged by the steps that EPA has taken, which have accelerated during the last year under new leadership. It is clear that EPA has been responsive and has made substantial progress in implementing National Academies recommendations.*"

Development of HHRA Deliverables:

The Final IRIS assessment for Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) was completed and assessment plans for a number of chemicals, including naphthalene, uranium, and ammonia were released for public comment and discussion in public science meetings. A draft of Perfluorobutane Sulfonic Acid and related Compound Potassium Perfluorobutane Sulfonate was released for public comment in November 2018. IRIS continues to provide support to TSCA, as requested, on the first 10 TSCA risk evaluations and information management support utilizing the HHRA *Health and Environmental Research Online* (HERO) database.

The Final ISA for Oxides of Sulfur – Health Criteria to support the primary NAAQS for Sulfur Dioxide (SO2) was issued by 2019. In addition, the second draft ISA for Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter - Ecological Criteria was provided for peer review to the Clean Air Scientific Advisory Committee (CASAC) Secondary NAAQS Review Panel for Oxides of Nitrogen and Sulfur.

HHRA continues to provide ongoing technical support for EPA's human health and ecological risk assessment program, having delivered four high priority PPRTV assessments in FY 2018. In FY 2018 and 2019, HHRA made a significant effort to modernize its assessment infrastructure,

[83] For more information, please see: https://www.epa.gov/clean-air-act-overview/clean-air-act-title-i-air-pollution-prevention-and-control-parts-through-d#ia.
[84] See, 42 U.S.C. Sec. 9601 *et seq.*: http://uscode.house.gov/view.xhtml?path=/prelim@title42/chapter103&edition=prelim.

resulting in measurable improvements in efficiency and transparency in assessment development. This includes: 1) expansion of the HERO database to support TSCA and other Agency assessment needs; 2) accelerated development of the EPA Health Assessment Workplace Collaborative (EPA-HAWC) by incorporating very widely used benchmark dose modeling software (BMDS) allowing EPA-HAWC users to conduct analyses of dichotomous and continuous data to inform endpoint selection and to derive "best model" based risk estimates; 3) development of a power user version of BMDS that implements BMDS 3.0 in a broadly usable format; and, 4) development of automated evidence extraction, qualitative and quantitative evidence synthesis, and visual data integration tools built on an adaptable platform to support systematic review in high-priority topic areas such as exposure and ecological risk assessments.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 3/Objective 3.3, Prioritize Robust Science in the *FY 2018–2022 EPA Strategic Plan*. The HHRA Research Program's work in FY 2020 will focus on efforts integral to achieving the Administrator's priorities and informing the Agency's implementation of key environmental regulations. Specifically:

- HHRA is working to reaffirm specific statutory, legal, and decisional needs for chemical assessments in order to prioritize assessments for FY 2020. This includes assessments of perfluorinated compounds as well as chemicals (such as hexavalent chromium and inorganic arsenic) that are of interest to EPA's Water and Land and Emergency Management programs.
- HHRA will deliver the final ISA for particulate matter to support decisions to retain or revise the NAAQS, as well as a mature draft of an ozone ISA for CASAC review.
- HHRA is working to prioritize critical assessment needs for FY 2020, HHRA plans on delivering up to six Provisional Peer-Reviewed Toxicity Value (PPRTV) assessments that each have the potential for deriving multiple toxicity values to help inform EPA's clean-up decisions at contaminated Superfund, Brownfields, and hazardous waste sites.
- HHRA will enhance the resources and workflow in its technical support centers to provide localized and tailored technical assistance and scientific expertise on human and ecological risk assessments to states, tribes, and EPA regions and programs. This includes direct support in cases of emergencies and other rapid response situations.
- HHRA, in cooperation with the Chemical Safety for Sustainability (CSS) research program, is working to apply new and alternative approaches, methods and data to risk assessment products and technical support to better respond to the needs of the states, tribes, and EPA regions and programs.
- Provide technical support required for TSCA implementation.

In addition to the activities listed above, EPA also conducts research across programs in areas such as Per- and polyfluoroalkyl substances and lead.

Per- and polyfluoroalkyl substances (PFAS): PFAS are a class of chemicals of growing concern in the environment, and EPA has committed to taking action to support states, tribes and local communities in understanding and managing risks associated with these chemicals. Decision making at the state and local level is hindered by the lack of standard toxicity values (such as

Reference Doses and cancer risk estimates) for many PFAS chemicals of interest. Toxicity values currently exist for PFOA and PFOS. The Agency will soon finalize toxicity assessments for GenX chemicals, PFBS, but there are many other PFAS of high interest to stakeholders which currently have no federal published, peer reviewed toxicity values. Within the HHRA Program, EPA is prioritizing additional PFAS for development of peer reviewed toxicity values. This will result in an expanded set of peer reviewed, toxicity values for use by federal, state, and tribal decision makers in making risk assessment and management decisions.

Lead: EPA, CDC, and the Academy of Pediatrics unanimously agree that there is no safe level of lead in a child's blood, and that even low levels can result in behavior and learning problems, lower IQ, and other health effects. In response to overwhelming scientific consensus and continued public health concerns, and federal coordination efforts, reducing childhood lead exposure is one of the highest priorities for EPA. To advance lead exposure and biokinetic models used in EPA regulatory decisions and site assessments, research focuses on enhancing, evaluating, and applying lead exposure and biokinetic models used for estimating potential blood lead levels and related analyses for regulatory determinations. Additionally, the Exposure Factors Handbook[85] provides up-to-date data on various human factors, including soil and dust ingestion rates, used by risk assessors.

Research Planning: EPA's Board of Scientific Counselors (BOSC) will be utilized to evaluate its performance and provide feedback to the HHRA Program for the Chemical Safety for Sustainability and Human Health Risk Assessment National Research programs. The BOSC will meet regularly to seek input on topics related to research program design, science quality, innovation, relevance and impact. This includes advising EPA on developing its strategic research direction and StRAPs for FY 2019-2022.

EPA collaborates with several science agencies and the research community to assess our research performance, such as the National Institutes of Health, the National Science Foundation, the Department of Energy, and the United States Department of Agriculture. EPA's state engagement program is designed to inform states about EPA's research programs and role within EPA, and to enable the Agency to better understand the science needs of state environmental agencies.

Key partners at the state level include the Environmental Council of the States, with its Environmental Research Institute of the States and the Interstate Technology and Regulatory Council, the Association of State and Territorial Health Officials as well as state media associations such as the Association of State and Territorial Solid Waste Management Officials.

[85] For more information, please see: https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252.

Performance Measure Targets:

(PM RD1) Percentage of Office of Research and Development (ORD) research products meeting customer needs.

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Units
Target						No Target Established	77	80	Percent
Actual						77			
Numerator						171			Products
Denominator						222			

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$285.0) This net change to fixed and other costs is an increase due to the recalculation of base workforce costs due to adjustments in salary, essential workforce support, and benefit costs.

- (-$11,611.0 / -38.6 FTE) This program change reduces the HHRA Research Program's ability to develop assessments to support Agency decisions, which will not only impact the number of FTEs but also the composition of the multidisciplinary teams assembled to address the needs of complex Agency decisions. It also reduces the HHRA Research Program's ability to provide daily technical support to program and regional offices, and states and Tribes, including during emergencies and urgent circumstances.

- (-$2,508.0 / -15.2 FTE) Resources are being rebalanced to the Superfund appropriation within this program for IRIS.

Statutory Authority:

Clean Air Act §§ 103, 108, 109, and 112; Clean Water Act §§ 101(a)(6), 104, 105; Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) § 3(c)(2)(A); Safe Drinking Water Act (SDWA) § 1458; Toxic Substances Control Act (TSCA).

Water: Human Health Protection

Drinking Water Programs

Program Area: Water: Human Health Protection
Goal: Core Mission
Objective(s): Provide for Clean and Safe Water

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$91,494.4	$96,493.0	$89,808.0	-$6,685.0
Science & Technology	***$3,458.2***	***$3,519.0***	***$4,094.0***	***$575.0***
Total Budget Authority	$94,952.6	$100,012.0	$93,902.0	-$6,110.0
Total Workyears	459.0	466.0	457.1	-8.9

Program Project Description:

The Drinking Water Technical Support Center: leads the collection of national occurrence data for unregulated contaminants in drinking water; develops and evaluates analytical methods that are used to monitor drinking water contaminants accurately and reliably; leads the national program under which laboratories are certified to conduct the analyses of water contaminants with designated analytical methods; and works with states and public water systems collaboratively to implement tools that help systems achieve performance and optimization practices that maximize technical capacity while reducing operational costs.

FY 2020 Activities and Performance Plan:

Work in this program directly supports Goal 1/Objective 1.2, Provide for Clean and Safe Water in the *FY 2018 - 2022 EPA Strategic Plan*. In FY 2020, EPA will continue to carry out the following activities:

- Lead the development, revision, evaluation, and approval of chemical and microbiological analytical methods for unregulated and regulated contaminants to assess and ensure protection of public health from contaminants in drinking water (e.g., Polyfluoroalkyl substances [PFAS], and toxins resulting from harmful algal blooms). Emphasis is placed on method development for chemicals on the Safe Drinking Water Act [SDWA]-mandated Contaminant Candidate List.
- Implement EPA's Drinking Water Laboratory Certification Program,[86] which sets direction for oversight of municipal and commercial laboratories that analyze drinking water samples. Conduct three regional program reviews during FY 2020 and deliver two laboratory certification officer training courses (for chemistry and microbiology) for state and regional representatives to ensure the quality of the analytical results.

[86] For more information, please see: https://www.epa.gov/dwlabcert.

- Partner with states and water systems to optimize their treatment technology and distribution systems under the drinking water Area Wide Optimization Program (AWOP).[87] The AWOP is a highly successful technical/compliance assistance and training program that enhances the ability of small systems to meet existing microbial, disinfectant, and disinfection byproduct standards, and addresses distribution system integrity and water quality issues.
- During FY 2020, EPA expects to work with states and tribes to further help them identify performance limiting factors at public water systems and develop and apply tailored tools to help these public water systems overcome operational challenges, achieve performance and optimization levels, and reduce health-based compliance challenges. Specifically, the AWOP program within the S&T appropriation complements other drinking water activities to decrease the number of community water systems out of compliance with health-based standards. Over the 5-year period of the *FY 2018–2022 EPA Strategic Plan*, EPA is pursuing a 25 percent reduction in the number systems that have health-based violations from 3,508 in FY 2017 to 2,700 by FY 2022.
- Continue monitoring under the fourth Unregulated Contaminant Monitoring Rule (UCMR 4). The UCMR 4 was published in December 2016, and addresses collection of data on occurrence of 30 contaminants of interest (e.g., cyanotoxins, PFAS compounds, disinfection by-products (DBPs), pesticides) to assess the frequency and levels at which these contaminants are found in public water systems. The UCMR 4 is a federal direct implementation program coordinated by EPA, as directed by the Safe Drinking Water Act. The data collected are used by EPA as part of the Agency's determination of whether to establish health-based standards to protect public health. Monitoring activities for UCMR 4 will occur between FY 2018 and FY 2021. Key activities for EPA include ensuring laboratories are available to perform the required analyses, managing the field sample collection and sample analysis for small systems, and managing data reporting by large systems. In addition, EPA makes the data available to our state and tribal partners and to the public. In FY 2020, EPA expects to develop and publish a proposed rule for the next cycle of monitoring (UCMR 5) and will be evaluating PFAS and other priority candidates for inclusion.

In addition, EPA will be initiating actions to fulfill a new America's Water Infrastructure Act (AWIA) requirement requiring all drinking water systems serving between 3,300 and 10,000 persons to monitor for unregulated contaminants in the next cycle of monitoring under UCMR 5. Prior to AWIA and in previous UCMR monitoring cycles, only systems serving greater than 10,000 persons were required to monitor. Specific actions in FY 2020 include: drafting the UCMR preamble and rule and performing pre-monitoring implementation activities such as: designing and executing an expanded laboratory-approval program; developing expanded state monitoring plans; developing solicitations for an implementation support contract; and codifying the web-based data-reporting system to accommodate the expanded program scope.

[87] For more information, please see: https://www.epa.gov/dwstandardsregulations/optimization-program-drinking-water-systems.

Performance Measure Targets:

(PM DW-01) Number of community water systems out of compliance with health-based standards.

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Units
Target						3,510	3,380	3,280	CWSs
Actual						3,480			

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (+$143.0) This change to fixed and other costs is an increase due to the recalculation of base workforce costs for existing FTE due to adjustments in salary, essential workforce support, and benefit costs.

- (+$350.0 / +2.2 FTE) This change provides resources and FTE for the implementation and administration of the requirements of AWIA.

- (+$82.0 / +0.1 FTE) This increase is to help the Agency support other supplementary provisions necessary for the implementation and administration of AWIA.

Statutory Authority:

Safe Drinking Water Act (SDWA).

Congressional Priorities

Water Quality Research and Support Grants

Program Area: Congressional Priorities
Goal: Core Mission
Objective(s): Provide for Clean and Safe Water

(Dollars in Thousands)

	FY 2018 Actuals	FY 2019 Annualized CR	FY 2020 Pres Budget	FY 2020 Pres Budget v. FY 2019 Annualized CR
Environmental Programs & Management	$25,400.0	$12,700.0	$0.0	-$12,700.0
Science & Technology	***$4,094.0***	***$4,100.0***	***$0.0***	***-$4,100.0***
Total Budget Authority	$29,494.0	$16,800.0	$0.0	-$16,800.0

Program Project Description:

In FY 2018, Congress appropriated $4.1 million in the Science and Technology appropriation to fund high priority water quality and water availability research. EPA was instructed to award grants on a competitive basis, independent of the Science to Achieve Results (STAR) program, and give priority to not-for-profit organizations that: conduct activities that are national in scope; can provide a 25 percent match, including in-kind contributions; and often partner with the Agency.

FY 2020 Activities and Performance Plan:

Resources and FTE have been proposed for elimination for this program in FY 2020.

Performance Measure Targets:

EPA's FY 2020 Annual Performance Plan does not include annual performance goals specific to this program.

FY 2020 Change from FY 2019 Annualized Continuing Resolution (Dollars in Thousands):

- (-$4,100.0) This eliminates this program as part of the effort to limit federal investment in lower priority activities and to focus resources on core environmental work.

Statutory Authority:

CAA 42 U.S.C. 7401 et seq. Title 1, Part A – Sec. 103 (a) and (d) and Sec. 104 (c); CAA 42 U.S.C. 7402(b) Section 102; CAA 42 U.S.C. 7403(b)(2) Section 103(b)(2); Clinger Cohen Act, 40 U.S.C. 11318; CERCLA (Superfund, 1980) Section 209(a) of Public Law 99-499; Children's Health Act; CWA, Sec. 101 - 121; CWPPRA; CZARA; CZMA 16 U.S.C. 1451 - Section 302; Economy Act, 31 U.S.C. 1535; EISA, Title II Subtitle B; ERDDA, 33 U.S.C. 1251 – Section 2(a); ESA, 16 U.S.C. 1531 - Section 2; FFDCA, 21 U.S.C. Sec. 346; FIFRA (7 U.S.C. s/s 136 et seq. (1996), as

amended), Sec. 3(c)(2)(A); FQPA PL 104-170; Intergovernmental Cooperation Act, 31 U.S.C. 6502; MPRSA Sec. 203, 33 U.S.C. 1443; NAWCA; NCPA; National Environmental Education Act, 20 U.S.C. 5503(b)(3) and (b)(11); NEPA of 1969, Section 102; NISA; ODBA Title II; PPA, 42 U.S.C. 13103; RCRA; SDWA (1996) 42 U.S.C. Section 300j-18; SDWA Part E, Sec. 1442 (a)(1); TSCA, Section 10, 15, 26, U.S.C. 2609; USGCRA 15 U.S.C. 2921; WRDA; WRRA; and WWWQA.