

**Calendar No. 493**

116TH CONGRESS }  
2d Session }

SENATE

{ REPORT  
{ 116-252

GUARANTEEING EQUIPMENT SAFETY FOR  
FIREFIGHTERS ACT OF 2019

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R E P O R T

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND  
TRANSPORTATION

ON

S. 2525



AUGUST 12, 2020.—Ordered to be printed

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED SIXTEENTH CONGRESS

SECOND SESSION

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### GUARANTEEING EQUIPMENT SAFETY FOR FIREFIGHTERS ACT OF 2019

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AUGUST 12, 2020.—Ordered to be printed  
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Mr. WICKER, from the Committee on Commerce, Science, and  
Transportation, submitted the following

### R E P O R T

[To accompany S. 2525]

[Including cost estimate of the Congressional Budget Office]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 2525) to require the Director of the National Institute of Standards and Technology to conduct a study of personal protective equipment worn by firefighters to determine the prevalence and concentration of per- and polyfluoroalkyl substances, and for other purposes, having considered the same, reports favorably thereon with an amendment (in the nature of a substitute) and recommends that the bill (as amended) do pass.

#### PURPOSE OF THE BILL

S. 2525 requires the Director of the National Institute of Standards and Technology (NIST), in consultation with the Director of the National Institute for Occupational Safety and Health, to conduct a study on the adverse effects of per- and polyfluoroalkyl substances (PFAS), contained in personal protective equipment, on firefighters.

#### BACKGROUND AND NEEDS

PFAS are a group of more than 5,000 synthetic chemicals that have been in use since the early 1940s.<sup>1</sup> The two most extensively

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<sup>1</sup> U.S. Food and Drug Administration, “Per and Polyfluoroalkyl Substances (PFAS),” Dec. 20, 2019 (<https://www.fda.gov/food/chemicals-and-polyfluoroalkyl-substances-pfas>) (accessed May 11, 2020).

studied and produced chemicals that make up PFAS are perfluorooctanoic acid (PFOA) and perfluorooctane sulfate (PFOS).<sup>2</sup>

In 1967, a deadly fire destroyed a U.S. Navy aircraft carrier, the USS *Forrestal*, killing more than 130 people.<sup>3</sup> Following the incident, the military developed an aqueous film-forming foam (AFFF) containing PFAS to extinguish liquid fires.<sup>4</sup> PFAS allows AFFF to quickly extinguish fires by rapidly spreading across surfaces to form a foam barrier, suffocating the fire and preventing vapors from combusting. AFFF is highly effective against petroleum fires.<sup>5</sup>

There are two types of firefighting foams, class A and class B. Class A foams are used to extinguish fires fueled by solid materials such as wood and paper. Class A firefighting foams are free of PFAS. Class B foams, which contain PFAS, are used for fires fueled by liquids, such as gasoline, oil, or jet fuel.<sup>6</sup> The properties of class B foams make them ideal for quickly extinguishing fires on ships and airplanes, and these foams are used in both military and civilian settings. The Department of Defense requires class B firefighting foams used on military platforms to contain fluorine (i.e., PFAS).<sup>7</sup>

In the early 2000s, Ted Schafer developed the first PFAS-free class B foam. Class B PFAS-free foams have been proven to show similar performance levels of class B foams that contain PFAS but do not contain fluorine, which is specifically required by the military specification (mil-spec). Until recently, all U.S. Federal Aviation Administration (FAA) certified airports were also mandated to use mil-spec approved firefighting foams which contain PFAS.<sup>8</sup>

PFAS do not degrade, so when released into the environment the chemicals are persistent and can contaminate soil, air, and water supplies.<sup>9</sup> According to the U.S. Environmental Protection Agency (EPA), PFAS has been proven to cause adverse side effects such as reproductive, developmental, liver, kidney, and immunological issues.<sup>10</sup> PFAS has been detected in the blood of 97 percent of the U.S. population and has been associated with tumors and increased cholesterol levels.<sup>11</sup>

<sup>2</sup> U.S. Environmental Protection Agency, "PFOA, PFOS and Other PFASs" (<https://www.epa.gov/pfas/basic-information-pfas>) (accessed May 11, 2020).

<sup>3</sup> David Vergun, "Naval Research Lab Chemists Search for PFAS-Free Firefighting Foam, Nov. 15, 2019, U.S. Department of Defense" (<https://www.defense.gov/explore/story/Article/2017249/naval-research-lab-chemists-search-for-pfas-free-firefighting-foam/>) (accessed May 11, 2020).

<sup>4</sup> Luis Martinez, "Navy Researchers Hopeful New Firefighting Foams Will Reduce Health Risks," *ABC News*, Nov. 16, 2019 (<https://abcnews.go.com/US/navy-researchers-working-pfas-free-firefighting-foams-pose/story?id=67052773>) (accessed May 11, 2020).

<sup>5</sup> David Vergun, "Naval Research Lab Chemists Search for PFAS-Free Firefighting Foam, U.S. Department of Defense, Nov. 15, 2019" (<https://www.defense.gov/explore/story/Article/2017249/naval-research-lab-chemists-search-for-pfas-free-firefighting-foam/>) (accessed May 11, 2020).

<sup>6</sup> Michigan Department of Environment, Great Lakes, and Energy, "Firefighting Foam and PFAS" (<https://www.michigan.gov/pfasresponse/0,9038,7-365-86514-496805--,00.html>) (accessed May 11, 2020).

<sup>7</sup> Military Specification MIL-F-24385F.

<sup>8</sup> IPEN/POPRC-14, "Fluorine-free Firefighting Foams (3F) Viable Alternatives to Fluorinated Aqueous Film-Forming Foams (AFFF)," Sep. 2018 ([https://ipen.org/sites/default/files/documents/IPEN\\_F3\\_Position\\_Paper\\_POPRC-14\\_12September2018d.pdf](https://ipen.org/sites/default/files/documents/IPEN_F3_Position_Paper_POPRC-14_12September2018d.pdf)) (accessed May 11, 2020).

<sup>9</sup> National Institute of Environmental Health Sciences, "Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)" (<https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm>) (accessed May 11, 2020).

<sup>10</sup> U.S. Environmental Protection Agency, "PFOA, PFOS and Other PFASs" (<https://www.epa.gov/pfas/basic-information-pfas>) (accessed May 11, 2020).

<sup>11</sup> National Institute of Environmental Health Sciences, "Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)" (<https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm>) (accessed May 11, 2020).

Despite these known health effects and the higher incidence of cancer among firefighters when compared to the general population,<sup>12</sup> there is currently no published, peer-reviewed research on the prevalence and effects of PFAS in firefighter turnout gear.<sup>13</sup> This situation is starting to change. Researchers at the University of Notre Dame are studying the prevalence of PFAS in firefighter turnout gear.<sup>14</sup> Their initial tests found PFAS on the vast majority of fabric swatches of unused turnout gear.<sup>15</sup> Additionally, the Federal Emergency Management Agency (FEMA) is funding a study at the University of Arizona analyzing firefighters' PFAS exposure and toxicity.<sup>16</sup>

#### *PFOA Stewardship Program*

In January 2006, the EPA launched the PFOA Stewardship Program due to concerns about the impact PFOA has had on human health and the environment.<sup>17</sup> The main goals of the PFOA Stewardship Program were to achieve a 95 percent reduction of PFOA emissions no later than 2010 and to eliminate the use of PFOA by 2015.<sup>18</sup> A total of eight chemical companies, including Arkema, Asahi, BASF, Clariant, Daikin, DuPont, Dyneon/3M, and Solvay Solexis, participated in the program.<sup>19</sup> Every company reached the 2015 goal.<sup>20</sup>

#### *Department of Defense Programs*

The Department of Defense (DOD) has implemented two programs that address PFAS, the Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP).<sup>21</sup> SERDP is a partnership between the DOD, EPA, and Department of Energy that develops technologies to remediate PFAS contamination and avoid future contamination.<sup>22</sup> ESTCP deploys these technologies to military installations.<sup>23</sup> Since 2011, the DOD has put \$10 million into the SERDP/ESTCP programs.<sup>24</sup> Additionally, since fiscal year

<sup>12</sup>International Association of Fire Fighters, "Taking Action Against Occupational Cancer," Mar. 27, 2019 (<https://www.iaff.org/news/taking-action-against-occupational-cancer/>) (accessed May 11, 2020).

<sup>13</sup>Patrick J. Morrison, "Managing Chemical Risks: EPA's Failure to Protect Workers," prepared statement submitted to the Subcommittee on Environment and Climate Change of the U.S. House of Representatives, Mar. 13, 2019 (<https://docs.house.gov/meetings/IF/IF18/20190313/109117/HHRG-116-IF18-Wstate-MorrisonP-20190313.pdf>) (accessed May 11, 2020).

<sup>14</sup>Jessica Sieff, "Researchers Study Presence of Fluorinated Chemicals in Firefighter Clothing," *Notre Dame News*, Sep. 24, 2018 (<https://news.nd.edu/news/researchers-study-presence-of-fluorinated-chemicals-in-firefighter-clothing/>) (accessed May 11, 2020).

<sup>15</sup>*Id.*

<sup>16</sup>Federal Emergency Management Agency, "Fire Prevention and Safety (FP&S) Research and Development (R&D), Grant Projects and Abstract Summaries," Nov. 2019 ([https://www.fema.gov/media-library-data/1579094878195-f2fc564c35a9eff52a6fcdbebd86b1f9/RD\\_Abstracts.pdf](https://www.fema.gov/media-library-data/1579094878195-f2fc564c35a9eff52a6fcdbebd86b1f9/RD_Abstracts.pdf)) (accessed May 11, 2020).

<sup>17</sup>U.S. Environmental Protection Agency, "Fact Sheet: 2010/2015 PFOA Stewardship Program" (<https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/fact-sheet-20102015-pfoa-stewardship-program>) (accessed May 11, 2020).

<sup>18</sup>*Id.*

<sup>19</sup>*Id.*

<sup>20</sup>*Id.*

<sup>21</sup>David Vergun, "DOD Funds Firefighting Foam Research for a PFAS-Free Alternative," U.S. Department of Defense, Nov. 15, 2019 (<https://www.defense.gov/explore/story/Article/2018096/dod-funds-firefighting-foam-research-for-a-pfas-free-alternative/>) (accessed May 11, 2020).

<sup>22</sup>*Id.*

<sup>23</sup>*Id.*

<sup>24</sup>*Id.*

2017, the DOD has committed \$11 million toward alternative firefighting technology research and development.<sup>25</sup>

The National Defense Authorization Act for Fiscal Year 2018 authorized the DOD to fund a nationwide health study on the implications of PFAS in drinking water, which will be conducted by the Agency for Toxic Substances and Disease Registry (ATSDR).<sup>26</sup> ATSDR has announced that this study will not include firefighters.<sup>27</sup>

#### *National Institutes of Health Programs*

The National Institute of Environmental Health Sciences (NIEHS), part of the National Institutes of Health (NIH), supports an active research program on PFAS' impact on human health.<sup>28</sup> NIEHS facilitates this research through National Toxicology Program studies, millions of dollars in grants annually to institutions studying PFAS, and hosting and/or supporting meetings on the subject.<sup>29</sup>

#### *National Institute of Standards and Technology Programs*

The National Institute of Standards and Technology (NIST) is currently working to develop reference materials and data resources for PFAS researchers.<sup>30</sup> PFAS can be difficult to measure, which has created issues for researchers.<sup>31</sup> NIST is working on establishing quality control materials for laboratories to use when studying PFAS in AFFF specifically, and have postdoctoral research opportunities for recent graduates interested in this work.<sup>32</sup>

Additionally, in the fiscal year 2020 appropriations bill, Congress directed NIST to conduct a study of new and unused personal protective equipment worn by firefighters to determine the prevalence and concentration of PFAS in the equipment, as well as the rate at which PFAS may be released from the gear during normal wear and in what conditions. That bill appropriated \$2 million for the study.<sup>33</sup>

#### *National Institute for Occupational Safety and Health Programs*

The National Institute of Occupational Safety and Health (NIOSH) is participating in a multi-city, multi-agency research effort focused on firefighter exposure to carcinogenic substances, including PFAS, called the Fire Fighter Cancer Cohort Study.<sup>34</sup>

<sup>25</sup> Miranda Paley, "5 Things to Know About DOD's Research on 'Fluorine-Free' Firefighting Foam," U.S. Department of Defense, Sep. 6, 2019 (<https://www.defense.gov/explore/story/Article/1953510/5-things-to-know-about-dods-research-on-fluorine-free-firefighting-foam/>) (accessed May 11, 2020).

<sup>26</sup> National Defense Authorization Act for Fiscal Year 2018; Pub. L. 115–91.

<sup>27</sup> Jeff McMenemy, "Senators Want PFAS Studies to Include Firefighters," *Seacoast Online*, Dec. 13, 2018 (<https://www.fosters.com/news/20181213/senators-want-pfas-studies-to-include-firefighters>) (accessed May 11, 2020).

<sup>28</sup> National Institute of Environmental Health Sciences, "PFAS Research" (<https://www.niehs.nih.gov/research/programs/pfas/index.cfm>) (accessed May 11, 2020).

<sup>29</sup> *Id.*

<sup>30</sup> NIST, "Measurement Science of Per- and Polyfluoroalkyl Substances (PFAS)" (<https://www.nist.gov/programs-projects/measurement-science-and-polyfluoroalkyl-substances-pfas>) (accessed May 11, 2020).

<sup>31</sup> *Id.*

<sup>32</sup> *Id.*

<sup>33</sup> Consolidated Appropriations Act, 2020; Pub. L. 116–93.

<sup>34</sup> Fire Fighter Cancer Cohort Study, "About the FFCCS" (<https://www.ffccs.org/about>) (accessed May 11, 2020).

NIOSH's mission is to study worker exposure to harmful substances and recommend prevention strategies.<sup>35</sup>

#### SUMMARY OF PROVISIONS

S. 2525, the Guaranteeing Equipment Safety for Firefighters Act of 2019, would do the following:

- Require NIST, in partnership with NIOSH, to conduct a study on the prevalence and effects of the various per- and polyfluoroalkyl substances found in the personal protective equipment worn by firefighters.
- Require NIST to report to Congress on findings of the research and recommendations for additional research or technical improvements needed to avoid unnecessary PFAS exposure for firefighters.
- Establish a NIST grant program to carry out the research identified in the congressional report.

#### LEGISLATIVE HISTORY

S. 2525, the Guaranteeing Equipment Safety for Firefighters Act of 2019, was introduced on September 19, 2019, by Senator Shaheen (for herself and Senator Gardner) and was referred to the Committee on Commerce, Science, and Transportation of the Senate. On November 13, 2019, the Committee met in open Executive Session and, by voice vote, ordered S. 2525 reported favorably with an amendment (in the nature of a substitute).

There have been several other bills relating to PFAS introduced in the 116th Congress, including S. 2353, the Protecting Firefighters from Adverse Substances Act of 2019, which was introduced on July 31, 2019, by Senator Peters (for himself and Senators Gardner, Hassan, and Sullivan) and was referred to the Committee on Homeland Security and Governmental Affairs of the Senate. On February 3, 2020, that Committee reported S. 2353 favorably without amendment.

#### ESTIMATED COSTS

In accordance with paragraph 11(a) of rule XXVI of the Standing Rules of the Senate and section 403 of the Congressional Budget Act of 1974, the Committee provides the following cost estimate, prepared by the Congressional Budget Office:

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<sup>35</sup>National Institute for Occupational Safety and Health, "Public Safety Program." Sep. 2019 (<https://www.cdc.gov/niosh/docs/2019-169/pdfs/2019-169.pdf>) (accessed May 11, 2020).

| <b>S. 2525, Guaranteeing Equipment Safety for Firefighters Act of 2019</b>                                |      |                                     |               |
|---|------|-------------------------------------|---------------|
| As ordered reported by the Senate Committee on Commerce, Science, and Transportation on November 13, 2019 |      |                                     |               |
| By Fiscal Year, Millions of Dollars   | 2020 | 2020-2025                           | 2020-2030     |
| Direct Spending (Outlays)   | 0    | 0                                   | 0             |
| Revenues  | 0    | 0                                   | 0             |
| Increase or Decrease (-) in the Deficit   | 0    | 0                                   | 0             |
| Spending Subject to Appropriation (Outlays)   | *    | 14                                  | not estimated |
| Statutory pay-as-you-go procedures apply?   | No   | <b>Mandate Effects</b>              |               |
| Increases on-budget deficits in any of the four consecutive 10-year periods beginning in 2031?            | No   | Contains intergovernmental mandate? | No            |
|   |      | Contains private-sector mandate?    | No            |
| * = between zero and \$500,000.   |      |                                     |               |

S. 2525 would require the National Institute of Standards and Technology (NIST) and the National Institute for Occupational Safety and Health (NIOSH) to study the prevalence and concentrations of per- and polyfluoroalkyl substances (PFAS) in personal protective equipment worn by firefighters, releases of those substances into the environment, and firefighters' risk of PFAS exposure. The study would need to be completed within three years of enactment. The bill also would require NIST to award grants for research on safe alternatives to the use of PFAS in personal protective equipment.

For this estimate, CBO assumes that the bill will be enacted in fiscal year 2020. The bill would authorize the appropriation of whatever amounts are necessary.

Using information from NIST and NIOSH, CBO estimates that it would cost the two agencies \$7 million over the 2020–2023 period for the required study. Over the 2024–2025 period, CBO estimates that it would cost NIST \$7 million for the required grants and related administrative costs. Thus, the total cost would be \$14 million over the 2020–2025 period, assuming appropriation of the necessary amounts.

The CBO staff contact for this estimate is David Hughes. The estimate was reviewed by H. Samuel Papenfuss, Deputy Director of Budget Analysis.

#### REGULATORY IMPACT STATEMENT

In accordance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee provides the following evaluation of the regulatory impact of the legislation, as reported:

##### *Number of persons covered*

S. 2525, as reported, does not create any new programs or impose any new regulatory requirements, and therefore will not subject any individuals or businesses to new regulations.

*Economic impact*

S. 2525 is not expected to have a negative impact on the Nation's economy.

*Privacy*

S. 2525 would have no impact on the personal privacy of individuals.

*Paperwork*

S. 2525 would require the Director of the National Institute of Standards and Technology to complete a report, to be submitted to Congress, relating to the findings of the conducted study and recommendations for additional research or technical improvements for firefighter's personal protective equipment.

## CONGRESSIONALLY DIRECTED SPENDING

In compliance with paragraph 4(b) of rule XLIV of the Standing Rules of the Senate, the Committee provides that no provisions contained in the bill, as reported, meet the definition of congressionally directed spending items under the rule.

## SECTION-BY-SECTION ANALYSIS

*Section 1. Short title*

This section would provide that the bill may be cited as the "Guaranteeing Equipment Safety for Firefighters Act of 2019".

*Section 2. National Institute of Standards and Technology study on per- and polyfluoroalkyl substances in personal protective equipment worn by firefighters*

This section would require the Director of the NIST, in partnership with the Director of NIOSH, to study the identity, prevalence, and concentration of PFAS in the personal protective equipment worn by firefighters; the conditions and extent to which PFAS are released over time as personal protective equipment degrades through normal use; and the PFAS exposure risk faced by firefighters. This study would be required to be completed within 3 years of enactment of this Act.

NIST would be required to submit to Congress annual progress reports on the study. A final report detailing the study's findings along with recommendations on additional research needed or technical improvements to personal protective equipment to avoid unnecessary occupational exposure to PFAS for firefighters would be required to be submitted to Congress no later than 90 days after the study is completed.

*Section 3. Research on per- and polyfluoroalkyl substances in personal protective equipment worn by firefighters*

Not later than 180 days after the date of submission of the report described in section 2, NIST would be required to issue a solicitation for research proposals and to award grants on the basis of merit to applicants whose research proposals would carry out the research recommendations outlined in the study described in section 2.

Any entity or group of two or more entities would be eligible to apply for these grants, including State and local agencies, public institutions, private corporations, and nonprofit organizations. This section would authorize such sums as may be necessary to carry out the study for NIST. These funds shall supplement and not supplant funds made available to NIST for other purposes.

*Section 4. Authority for the Director of the National Institute of Standards and Technology to consult with experts on matters relating to per- and polyfluoroalkyl substances*

This section would authorize NIST to consult with Federal agencies, nongovernmental organizations, State and local governments, and science and research institutions that have scientific or material interest in the occupational exposure of PFAS chemicals to firefighters as it carries out this Act.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, the Committee states that the bill as reported would make no change to existing law.

