

Perfluorooctane Sulfonate and Perfluorooctanoic Acid at Base Realignment and Closure Locations



June 2021

Office of the Under Secretary of Defense
for Acquisition and Sustainment

The estimated cost of this report or study for the Department of Defense is approximately \$15,000 in Fiscal Years 2020 – 2021. This includes \$2,000 in expenses and \$13,000 in DoD labor.

Generated on 20210204

RefID: 3-24201FA

TABLE OF CONTENTS

TABLE OF CONTENTS	i
FIGURES	i
APPENDICES	i
EXECUTIVE SUMMARY	ii
I. INTRODUCTION	1
II. BACKGROUND	1
III. THE CLEANUP PROCESS	1
Preliminary Assessment/Site Inspection (Initial Study Phase)	3
Remedial Investigation/Feasibility Study (Detailed Study)	4
Remedial Design/Remedial Action – Construction/Remedial Action – Operation (Cleanup)	4
Long-term Management	5
IV. TRANSPARENCY	5
V. PFOS/PFOA DETECTIONS AND SITE REMEDIATION PLANS	7
VI. ESTIMATED CURRENT AND FUTURE COSTS AND TIMELINES FOR REMEDIATION AT BRAC LOCATIONS	9
VII. CONCLUSION	10

FIGURES

Figure 1: CERCLA and DERP Phases and Milestones	2
Figure 2: Typical CERCLA Timeline.....	5
Figure 3: Status of Investigations at DoD BRAC Locations as of the end of FY 2020	9

APPENDICES

Appendix A: Base Realignment and Closure Location Websites

Appendix B: Detection Data, Phase Status, and Obligations Associated with DoD Base Realignment and Closure Locations Being Assessed for Per- and Polyfluoroalkyl Substances Use or Potential Release

EXECUTIVE SUMMARY

House Report 116-445, page 29, accompanying the Military Construction, Veterans Affairs, and Related Agencies Appropriations Bill, 2021, requests information pertaining to the progress the Department of Defense (DoD) is making on identifying and remediating perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) at Base Realignment and Closure (BRAC) locations.

- Information on DoD's existing cleanup process: The Department follows the federal cleanup law (the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), also known as "Superfund") to address DoD releases of per- and polyfluoroalkyl substances (PFAS). DoD's priority is to ensure that no one – on or off base – is drinking water above the U.S. Environmental Protection Agency's (EPA's) lifetime Health Advisories (HAs) of 70 parts per trillion (ppt) for PFOS and PFOA where DoD is the known source.
- Recommendations for improving transparency: The DoD Components are committed to transparent public engagement on this issue. Initiatives to date include maintaining websites that provide information about their efforts to address PFAS and participating in community meetings. Moving forward, the Department is working to improve its publicly available PFAS website to provide information more readily about the exposure of members of the Armed Forces, their families, and their communities to PFAS.
- Information about PFOS/PFOA detections and existing site remediation plans: As of the end of Fiscal Year (FY) 2020, investigations are complete, underway, or planned at all 108 BRAC locations that require an assessment of PFAS use or potential release. DoD has completed 39 of the 108 initial investigations. The DoD Components detected PFOS/PFOA in drinking water above EPA's lifetime HAs of 70 ppt where DoD is the known source at 12 locations. They have implemented short- and long-term actions at all 12 locations, ensuring that no one – on or off base – is drinking water above EPA's lifetime HAs.
- Estimates of current and future costs and the timelines for remediation at BRAC locations: DoD has obligated \$313.8 million through the end of FY 2020 and plans to obligate \$62.8 million in FY 2021 to conduct PFAS assessments, drinking water mitigation, investigations, and cleanup activities at BRAC locations. Based on current information, the Department estimates obligations for beyond FY 2021 to exceed \$1 billion for BRAC locations. DoD expects this estimate to increase as the initial assessments are completed and more information is known about the extent of the cleanup required. The Department will plan and program for these requirements as they are defined.

I. INTRODUCTION

House Report 116-445, page 29, accompanying the Military Construction, Veterans Affairs, and Related Agencies Appropriations Bill, 2021, requests that the Deputy Assistant Secretary of Defense for Environment submit a report to the congressional defense committees on the progress the Department of Defense (DoD) is making on identifying and remediating perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) at Base Realignment and Closure (BRAC) locations. The House Report requests and this report includes information on DoD's existing cleanup process and recommendations for improving transparency; information about PFOS/PFOA detections and existing site remediation plans; and estimates of current and future costs and the timelines for remediation.

PFOS and PFOA are two chemicals in the larger class of per- and polyfluoroalkyl substances (PFAS). DoD is taking action to reduce the risks of PFAS exposure to human health. DoD's cleanup program follows the federal cleanup law (the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), also known as "Superfund") to address DoD releases of PFAS. CERCLA provides a consistent national approach for addressing cleanup.

II. BACKGROUND

PFAS are a national issue that requires national solutions. PFAS are found in everyday consumer items, from nonstick cookware to water-resistant clothing. They are also found in a type of firefighting foam known as "aqueous film forming foam" (AFFF). DoD is one of many users of AFFF, with other major users including commercial airports, the oil and gas industry, and local fire departments.

In May 2016, the U.S. Environmental Protection Agency (EPA) issued Safe Drinking Water Act (SDWA) lifetime Health Advisories (HAs) recommending the individual or combined levels of PFOS and PFOA in drinking water be at or below 70 parts per trillion (ppt). While the lifetime HAs are only guidance under the SDWA and are not an enforceable drinking water standard, DoD began taking actions to address impacted drinking water and developed strategies to investigate and address DoD releases of PFOS and PFOA.

III. THE CLEANUP PROCESS

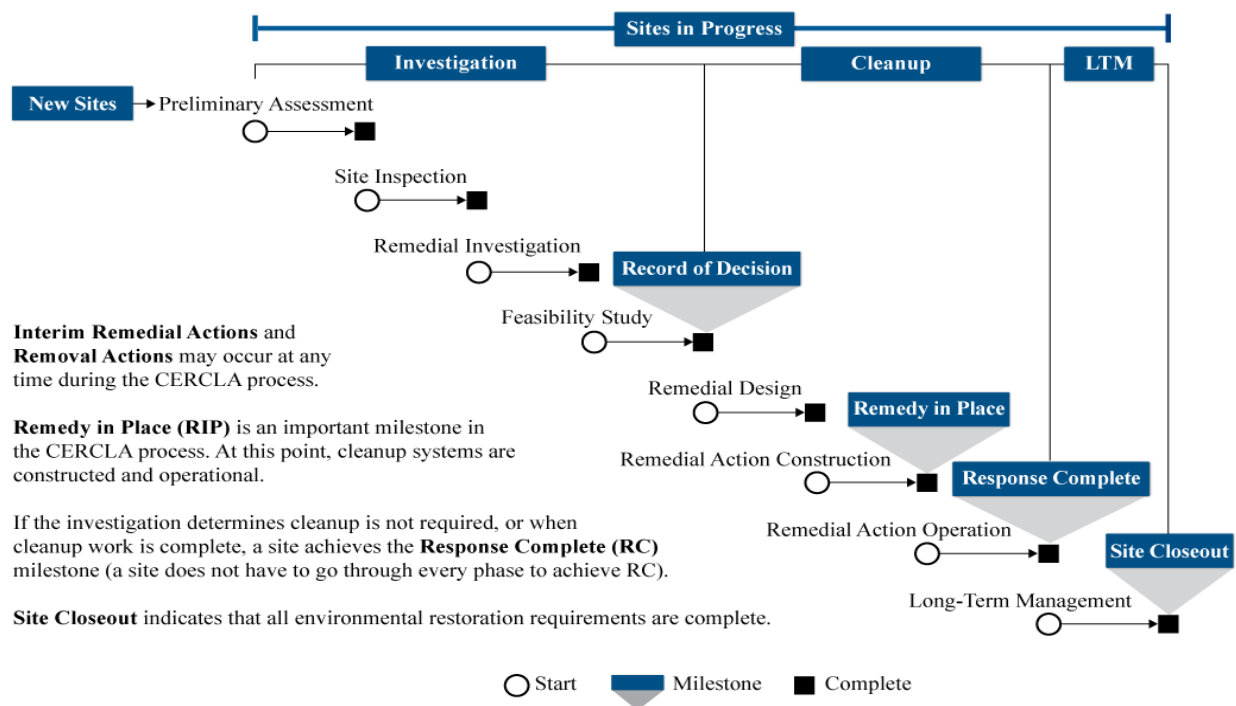
DoD conducts investigations and takes other actions under CERCLA at active military installations, BRAC locations, and National Guard facilities where there are known or suspected DoD releases of PFAS. DoD's plan for cleanup consists of following the CERCLA process to investigate releases, prioritize responses, and determine appropriate cleanup actions based on risk to human health and the environment. The Defense Environmental Restoration Program (DERP) (10 U.S. Code §§ 2700-2711) provides authorities to DoD to perform and fund these

actions, and requires that they be carried out in accordance with CERCLA. Figure 1 below shows the steps in the CERCLA process, which include the following:¹

- Preliminary Assessment (PA)/Site Inspection (SI)
- Remedial Investigation (RI)/Feasibility Study (FS)
- Remedial Design (RD)/Remedial Action – Construction (RA-C)
- Remedial Action – Operation (RA-O)
- Long-term Management (LTM)

In addition to the steps listed above, CERCLA can include short-term actions called removal or interim actions, which are conducted to address contaminants quickly to prevent, minimize, or mitigate damage to the public health or welfare or to the environment. Removal actions can occur at any time during the CERCLA process. If there is drinking water exposure to PFOS/PFOA above EPA’s lifetime HAs on or off base resulting from DoD activities, the Department initiates short-term actions (e.g., providing bottled water, point-of-use water filters) and long-term actions (e.g., municipal connections, filtration systems) so that no one – on or off base – is drinking water that is above EPA’s lifetime HAs. Typically, a removal action does not provide a final response action, and the site will continue through the CERCLA remedial process after completion of the removal action.

Figure 1: CERCLA and DERP Phases and Milestones



¹ Sites do not have to progress through all CERCLA phases. For example, no further action may be required at the end of the PA/SI or RI/FS phases. In addition, some sites may not require an RA-O or LTM phase if response actions completed during the RD/RA-C are sufficient to clean up the sites.

DoD tailors the actual sequence, timing, and scope of cleanup actions to site-specific conditions. Additionally, the Department prioritizes resources and addresses sites where risk to human health is the highest. As DoD moves through the CERCLA process, it works in collaboration with regulatory agencies, communities, and other stakeholders to ensure open and transparent information-sharing. The following sections explain in more detail DoD's plan for addressing sites impacted by PFAS from DoD activities at BRAC locations.

Preliminary Assessment/Site Inspection (Initial Study Phase)

During the PA, DoD reviews existing information to identify locations where DoD activities may have caused a PFAS release. This phase involves reviewing historical operations, documents, and maps located both on the installations and in national archives, as well as interviewing Military Service members and civilians who have historical knowledge of the operations that may have contributed to a potential PFAS release. Once completed, the PA identifies sites that may require a CERCLA response action and will continue in the CERCLA process.

The next step in the CERCLA process is to perform an SI on locations identified during the PA to confirm whether a PFAS release occurred. The SI typically involves sampling environmental media, such as soil or groundwater, and collecting and analyzing other data to determine the need for further action. DoD drafts the SI report, provides a copy to regulators for review, and makes the final report available to the public in the information repository located at or near the cleanup site. A typical PA/SI takes approximately one to three years to complete.

Through September 30, 2020, DoD has completed PAs/SIs at 39 of the 108 BRAC locations (36 percent) it has assessed or is assessing for PFAS use or potential release. Section V of this report contains additional information about the status of the PAs/SIs at the BRAC locations. The Department anticipates that it will complete PAs/SIs at 87 of these locations (81 percent) by the end of Fiscal Year (FY) 2022 and at the remaining 21 BRAC locations by the end of FY 2023.

Once the DoD Components have information from the PA/SI, they can make informed decisions about which sites need to move to the next phase (i.e., the RI/FS phase). In October 2019, the Department issued clarifying technical guidance to the Military Departments to ensure they consistently use screening levels at DoD cleanup sites to determine if advancing to the RI phase is warranted. DoD is using the same screening number as EPA provided in its December 19, 2019, "Interim Recommendations for Addressing Groundwater Contaminated with PFOA and PFOS."

For sites moving to the RI phase, DoD uses the data it gathered during the PA and SI to prioritize further action. DoD follows the federal cleanup law, which includes prioritizing sites for cleanup using a risk-based process – essentially "worst first." The Department's focus is the health and safety of its men and women in uniform, their families, its civilian workforce, and the communities surrounding its installations. Therefore, DoD addresses sites that pose a greater potential risk to human health or the environment before sites posing a lesser risk.

Remedial Investigation/Feasibility Study (Detailed Study)

During the RI, DoD collects detailed information through field investigations to characterize site conditions. This phase involves determining the nature and extent of the PFAS (e.g., the PFAS source, how widespread the PFAS are); assessing actual and potential exposure pathways; and evaluating risks to human health (e.g., conducting a human health risk assessment). The RI/FS phase typically takes approximately three to six years to complete. Through September 30, 2020, DoD has started the RI phase at 15² of the 108 BRAC locations (14 percent) being assessed for PFAS use or potential release. Section V of this report contains additional information about the status of the RIs at the BRAC locations.

Under EPA's longstanding risk assessment policies, the lifetime HA toxicity information is used to determine a site-specific risk-based cleanup level for groundwater that is a current or potential source of drinking water. Therefore, DoD considers EPA's lifetime HA toxicity information when assessing risk to human health under CERCLA during the RI. The National Defense Authorization Act (NDAA) for FY 2020 and EPA's December 19, 2019, "Interim Recommendations for Addressing Groundwater Contaminated with PFOA and PFOS" support this course of action. If PFAS at a site is below the unacceptable risk level, no further work is required.

If PFAS results in an unacceptable risk to human health and the environment based on EPA's risk assessment policies, then DoD will conduct an FS. During the FS, DoD develops, screens, and evaluates remedial cleanup alternatives in detail; assesses the potential performance of each alternative to meet site-specific cleanup goals; and works with regulators to select a permanent solution that is protective of human health and the environment. All cleanup remedy evaluations must be based on an analysis using the nine criteria found in the CERCLA regulations (i.e., National Oil and Hazardous Substances Pollution Contingency Plan (NCP)).³

CERCLA also requires a proposed plan, which summarizes the RI/FS; provides a brief description of the cleanup alternatives evaluated; discusses the rationale that supports the preferred cleanup alternative; and summarizes formal comments received from supporting agencies. After the completion of the proposed plan, and the opportunity for public comment, DoD selects the remedy in a decision document. In the decision document, DoD identifies the final selected cleanup remedy and the cleanup level it is working to achieve, and considers public comments and community concerns. DoD provides the decision document to regulators for review. For sites on EPA's National Priorities List, DoD must obtain regulatory concurrence on the decision document.

Remedial Design/Remedial Action – Construction/Remedial Action – Operation (Cleanup)

During the Cleanup phase, DoD develops the design plans and specifications of the selected cleanup remedy in the decision document, which regulators review, and constructs or

² This number includes five locations where the PA/SI phase is also underway as of September 30, 2020.

³ The NCP nine criteria include overall protection of human health and the environment; compliance with applicable or relevant and appropriate standards; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume; short-term effectiveness; implementability; cost; state acceptance; and community acceptance.

implements the selected cleanup remedy. DoD documents that it has constructed and installed the remedy and provides this documentation to the regulators. The RD/RA-C process typically takes approximately two to four years to complete.

After constructing the remedy, DoD operates, maintains, and monitors the cleanup system and site until it achieves the cleanup level(s) in the decision document. The RA-O phase may also include implementation, management, and maintenance of land use controls (LUCs), and can take anywhere from 1 to 30 or more years to complete, or in some cases it can continue in perpetuity. During this time, DoD optimizes the systems, ensures the systems are operating properly, performs sampling to monitor progress, and verifies that the sites are protective of human health and the environment.

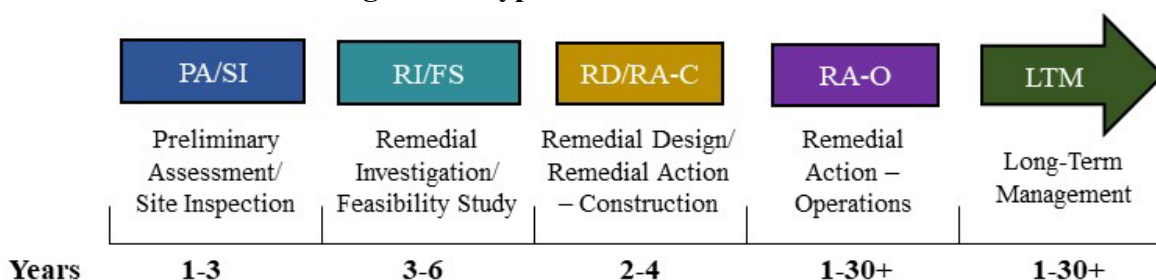
The Department measures cleanup progress against the Response Complete milestone, which occurs when cleanup activities are complete and DoD has documented this determination and sought regulatory agreement (although DoD or a subsequent landowner may continue to monitor the site).

Long-term Management

Following achievement of the Response Complete milestone, DoD may monitor the long-term protectiveness of the remedy during the LTM phase. The LTM phase is required when the cleanup levels do not allow unrestricted use of the property. Actions during this phase may involve monitoring site conditions, implementing and managing LUCs, and performing five-year reviews. DoD closes out a site only when there is no future environmental liability at the site (i.e., when cleanup goals have been achieved that allow for unlimited use and unrestricted exposure). However, not all sites can achieve unlimited use and unrestricted exposure; some may remain in the LTM phase in perpetuity.

Figure 2 below shows the typical amount of time it takes to complete the CERCLA phases described above.

Figure 2: Typical CERCLA Timeline



IV. TRANSPARENCY

DoD works in collaboration with regulatory agencies, communities, and other stakeholders throughout the CERCLA process, as discussed above. DoD is engaged in several initiatives to ensure it communicates its efforts to address PFAS in a consistent, open, and

transparent manner. For example, when DoD detects elevated levels of PFAS that may pose an unacceptable risk to human health, it uses an outreach strategy to promptly notify affected community members. Outreach efforts may include:

- Communicating to potentially affected communities;
- Partnering with local regulatory and governmental organizations to reach stakeholders;
- Hosting public meetings;
- Alerting and engaging with the media;
- Messaging through community social media; and
- Updating community leaders.

The DoD Components use a variety of methods to actively reach out to and notify the surrounding communities about the potential impacts of PFAS. For example, the Army maintains a PFAS website where it posts information about installations where it detected PFOS/PFOA in drinking water above EPA's lifetime HAs. The website also provides the public with access to DoD's and the Army's PFAS policies. Additional information can be found at <https://www.denix.osd.mil/army-pfas/the-army-addresses-pfos-pfoa/>.

The Navy develops frequently asked questions documents to help the public understand Navy-wide and installation-specific cases related to PFAS that may impact their communities. Additionally, the Navy maintains a "PFAS Reading Room" (see https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html) that provides the public with information about its PFAS policies; overviews of PFAS treatment methodologies; a fact sheet on the Navy's PFAS program status; and drinking water and groundwater sampling results for the Navy's active military installations and BRAC locations. The Navy also posts information such as PFAS sampling maps on installation-specific public websites. For more information about the Navy's policies and management strategy for addressing PFAS, see <http://www.secnav.navy.mil/eie/pages/pfc-pfas.aspx>.

The Air Force established an outreach program to provide potentially affected communities with consistent and accurate information regarding its responses to PFAS. The Air Force's community outreach efforts include participating in public community meetings (both ad hoc and Restoration Advisory Boards (RABs)⁴), providing local and social media alerts and engagement, updating community leaders and influencers, and posting pertinent information on the Air Force Civil Engineer Center website (see <https://www.afcec.af.mil/WhatWeDo/Environment/Perfluorinated-Compounds/>) and installation-specific public websites. The Air Force also develops fact sheets to inform affected residents of its efforts to prevent human exposure to PFAS. Throughout the outreach process, the Air Force collaborates with local regulatory and government organizations to reach stakeholders.

⁴ The Department encourages community involvement in the cleanup process through RABs. Since the early 1990s, DoD has established RABs at more than 125 BRAC locations in the U.S. and its territories to encourage communities and DoD personnel to identify and discuss potential cleanup issues.

The DoD Components maintain websites that provide additional information about their efforts to address PFAS. Appendix A contains a list of websites for BRAC locations that DoD has assessed or is assessing for PFAS use or potential release.

To further ensure the Department is transparent in its efforts to address PFAS, it stood up a DoD PFAS website (<https://www.defense.gov/pfas/>) to provide the public with access to PFAS-related information. On this website, DoD maintains information such as the list of active military installations and BRAC locations where it is performing an assessment of PFAS use or potential release, as well as a map of these installations and locations.

DoD also established a policy in November 2019 to promote communication between installations and their communities. In accordance with this policy, the DoD Components 1) document that their installations have conducted appropriate, measured PFAS engagements (e.g., RAB meetings, mailings) with their stakeholders; and 2) gather feedback regarding the level of outreach and report on community questions and/or concerns that require further response. Additionally, the Department established a policy in September 2020 that provides the DoD Components with guidance for complying with Section 331(a) of the NDAA for FY 2020. Section 331(a) requires the DoD Components to seek to enter into agreements with municipalities or municipal drinking water utilities adjacent to military installations to jointly share drinking water monitoring data for PFAS and other emerging contaminants of concern.

DoD is making every effort to be transparent as it addresses PFAS at its BRAC locations. Moving forward, the Department will continue to engage in the initiatives discussed above to ensure it communicates with regulatory agencies, communities, and other stakeholders in a consistent, open, and transparent manner. The DoD Components will also ensure the PFAS fact sheets they post on their websites include information about BRAC locations. In addition to these efforts, DoD is working to improve its publicly available PFAS website to provide information more readily about the exposure of members of the Armed Forces, their families, and their communities to PFAS.

V. PFOS/PFOA DETECTIONS AND SITE REMEDIATION PLANS

As of the end of FY 2020, DoD identified 108 BRAC locations requiring an assessment of PFAS use or potential release. These locations are listed in Appendix B. The Department followed a comprehensive approach to compile this list. The DoD Components searched their cleanup databases to determine where they may have used or potentially released PFAS, such as at fire training areas and aircraft crash sites. The list also includes locations where environmental regulators, the property owners, or other stakeholders presented DoD with evidence suggesting that the Department may have used or potentially released PFAS. The list is not static and may grow over time as DoD continues to assess its BRAC locations for PFAS use or potential release.

As the DoD Components identified the BRAC locations listed in Appendix B, they began conducting initial investigations to determine where they used or potentially released PFAS. These investigations involved conducting PAs/SIs to identify the locations that warrant further investigation in the RI/FS phase of the CERCLA process, as discussed previously. Appendix B

provides PFOS/PFOA sampling information for the BRAC locations DoD has assessed or is assessing for PFAS use or potential release as of the end of FY 2020. Refer to the websites provided in Appendix A for additional information.

Appendix B includes the highest validated detections of PFOS/PFOA in drinking water and groundwater for those BRAC locations where DoD detected PFOS/PFOA above the method reporting limit. Where there was PFOS/PFOA in drinking water above EPA's lifetime HAs resulting from DoD activities, the Department immediately took actions to address the drinking water exposure. These actions include providing bottled water, point-of-use water filters, municipal connections, and filtration systems. As of the end of FY 2020, the DoD Components detected PFOS/PFOA in drinking water above EPA's lifetime HAs of 70 ppt where DoD is a known source at 12 of the BRAC locations (11 percent) listed in Appendix B. The DoD Components have implemented short- and long-term actions at all 12 locations, ensuring that no one – on or off base – is drinking water above EPA's lifetime HAs where DoD is the known source.

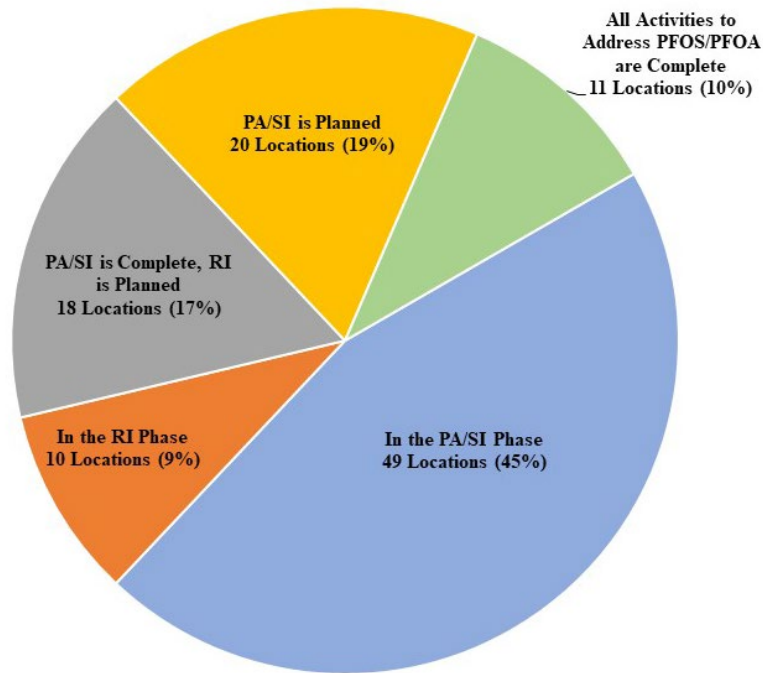
After ensuring that no one is drinking water above EPA's lifetime HAs resulting from DoD activities, sites continue through the CERCLA remedial cleanup process. Following this process, DoD fully investigates releases, prioritizes responses, and determines the appropriate cleanup actions based on risk. The Department prioritizes resources and addresses sites where risk to human health is the highest. It is important to note that locations with high detections of PFOS/PFOA may not necessarily be the highest priority locations for cleanup. As discussed above, DoD prioritizes sites for cleanup using a risk-based process. Through this approach, the Department considers the nature and extent of a site's contamination, the likelihood that contaminants will migrate, and potential impacts on human and ecological receptors when prioritizing sites. Under EPA's longstanding risk assessment policies, DoD is using the lifetime HA toxicity information to determine a site-specific risk-based cleanup level for groundwater that is a current or potential source of drinking water. Therefore, locations with high detections of PFOS/PFOA may not be the highest priority for cleanup.

Regarding site remediation plans, Appendix B includes the current investigation phase(s), actual and projected phase start date(s), and projected phase completion date(s) for the BRAC locations as of the end of FY 2020. Appendix B identifies the locations that are in the PA/SI and RI phases.⁵ It also identifies the locations where the PA/SI phase is complete and the RI phase is planned, where the PA/SI phase has not started,⁶ and where all activities to address PFOS/PFOA are complete. Figure 3 below summarizes this phase status.

⁵ Locations that are in both the PA/SI and RI phases as of the end of FY 2020 are included in the count of locations that are in the PA/SI phase in Figure 3.

⁶ Most of the locations where the PA/SI phase is planned were added to the inventory in FY 2020.

Figure 3: Status of Investigations at DoD BRAC Locations as of the end of FY 2020



Appendix B also shows where the DoD Components have implemented or plan to implement a removal action to address contaminants quickly to prevent, minimize, or mitigate damage to the public health or welfare or to the environment. As mentioned previously, a removal action typically does not provide a final response action, and the site will continue through the CERCLA remedial process following completion of the removal action.

VI. ESTIMATED CURRENT AND FUTURE COSTS AND TIMELINES FOR REMEDIATION AT BRAC LOCATIONS

The DoD Components are investigating and addressing DoD releases of PFAS at BRAC locations. Through the end of FY 2020, DoD has obligated approximately \$313.8 million to investigate and clean up PFAS, as shown in Appendix B. Appendix B also shows that DoD anticipates obligating \$62.8 million in FY 2021, and an additional \$1,198.2 million after FY 2021, to continue these efforts. DoD expects this estimate to increase as the initial assessments are completed and more information is known about the extent of the cleanup required. The Department will plan and program for these requirements as they are defined.

The funding data presented in Appendix B represents a snapshot in time of the obligations and estimated costs to investigate and clean up PFAS as of September 30, 2020. The DoD Components developed the cost estimates prior to the enactment of the FY 2021 Appropriations Act, which may affect their planned obligations. Additionally, DoD does not track funding by contaminant and, as such, the cost data presented in Appendix B represents to the best of the DoD Components' abilities their estimates of the funding obligated through FY 2020, and to be obligated in FY 2021 and beyond, for investigations and cleanup of DoD

releases of PFAS. However, the Department of Defense Base Closure Account is adequately funded to pursue all executable remediation activities in FY 2021.

As mentioned above, the Department expects the future cost estimates included in Appendix B to increase as the DoD Components complete the RI/FS phase and determine what cleanup actions are required if a PFAS release results in an unacceptable risk to human health and the environment based on EPA's risk assessment policies. Upon completion of the RI/FS phase, the DoD Components will better understand the cleanup schedules and estimated costs to complete cleanup at these locations.

Appendix B contains information about the status of investigations at the BRAC locations that DoD has assessed or is assessing for PFAS use or potential release, as discussed in the previous section. Appendix B shows the timeline for completing investigations that are underway and planned as of the end of FY 2020. As the DoD Components complete these investigations and learn more about the locations, they will update their cleanup timelines and future cost estimates.

VII. CONCLUSION

DoD is taking action to reduce the risks of PFAS to human health by following the CERCLA process to address releases to the environment resulting from DoD activities at BRAC locations. DoD is committed to ensuring that it protects the health and safety of its DoD personnel, their families, and the communities surrounding its BRAC locations. The Department identified 108 BRAC locations requiring an assessment of PFAS use or potential release to determine what future cleanup activities, if any, are required; DoD has completed all activities to address PFAS at 10 percent of these locations. DoD is partnering with stakeholders and maximizing transparency, public participation, and collaboration throughout the process to ensure the public and regulators are informed and involved. DoD has obligated \$313.8 million through the end of FY 2020 and plans to obligate \$62.8 million in FY 2021 to address its PFAS releases at BRAC locations. The Department plans to obligate an additional \$1,198.2 million after FY 2021 to address PFAS releases, based on information available as of the end of FY 2020. DoD expects this estimate to increase as the initial assessments are completed and more information is known about the extent of the cleanup required. The Department will plan and program for these requirements as they are defined.

Appendix A: Base Realignment and Closure Location Websites

This appendix contains a list of websites for Base Realignment and Closure locations where the Department of Defense has performed or is performing an assessment of per- and polyfluoroalkyl substances use or potential release.

Appendix A: Base Realignment and Closure Location Websites

Adak AK NAF: https://www.bracpmo.navy.mil/brac_bases/other_west/former_naf_adak.html

Air Force Research Laboratory Mesa: <ar.afcec-cloud.af.mil>

ALAMEDA NAS:

https://www.bracpmo.navy.mil/brac_bases/california/former_nas_alameda.html

Annapolis NSWC Carderock DIV Det:

https://www.bracpmo.navy.mil/brac_bases/northeast/Former_Naval_Surface_Warfare_Center_Annapolis.html

Barbers Point NAS:

https://www.bracpmo.navy.mil/brac_bases/other_west/former_nas_barbers_point.html

Bergstrom AFB: <ar.afcec-cloud.af.mil>

Brooks-City Base: <ar.afcec-cloud.af.mil>

Brunswick NAS:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html#TopOfPage

Buckley Annex: <ar.afcec-cloud.af.mil>

Carswell AFB: <ar.afcec-cloud.af.mil>

Castle AFB: <ar.afcec-cloud.af.mil>

Cecil Field NAS:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html#TopOfPage

Chanute AFB: <ar.afcec-cloud.af.mil>

Charleston NS:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/administrative_records.html?p_instln_id=CHARLESTON_CNC

Charleston NSY:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/administrative_records.html?p_instln_id=CHARLESTON_CNC

Concord NWS:

https://www.bracpmo.navy.mil/brac_bases/california/nws_seal_beach_concord.html

Dallas NAS:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html#TopOfPage

Appendix A: Base Realignment and Closure Location Websites

DAVISVILLE NCBC:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html#TopOfPage

Devens: <https://www.nae.usace.army.mil/missions/projects-topics/former-fort-devens-environmental-cleanup/>

Eaker AFB: <ar.afcec-cloud.af.mil>

El Toro MCAS:

https://geotracker.waterboards.ca.gov/view_documents?global_id=SLT8R2654056&document_id=6007200

England AFB: <ar.afcec-cloud.af.mil>

Four Lakes Air National Guard Station: <ar.afcec-cloud.af.mil>

Galena Forward Operating Location: <ar.afcec-cloud.af.mil>

General Mitchell Air Reserve Station: <ar.afcec-cloud.af.mil>

Gentile Air Force Station: <ar.afcec-cloud.af.mil>

George AFB: <ar.afcec-cloud.af.mil>

Glenview NAS:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/administrative_records.html?p_instln_id=GLENVIEW_NAS

Griffiss AFB: <ar.afcec-cloud.af.mil>

Grissom AFB: <ar.afcec-cloud.af.mil>

Guam Agana NAS:

https://www.bracpmo.navy.mil/brac_bases/other_west/former_nas_agana.html

Homestead AFB: <ar.afcec-cloud.af.mil>

Hunters Point Annex:

https://www.bracpmo.navy.mil/brac_bases/california/former_shipyard_hunters_point.html

Kelly AFB: <ar.afcec-cloud.af.mil>

KEY WEST FL NAS:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/administrative_records.html?p_instln_id=KEY_WEST_NAS

KI Sawyer AFB: <ar.afcec-cloud.af.mil>

Kulis Air National Guard Base: <ar.afcec-cloud.af.mil>

Appendix A: Base Realignment and Closure Location Websites

Long Beach NS:

https://www.bracpmo.navy.mil/brac_bases/california/former_long_beach_naval_complex.html

Long Beach NSY:

https://www.bracpmo.navy.mil/brac_bases/california/former_long_beach_naval_complex.html

Loring AFB: <ar.afcec-cloud.af.mil>

Louisville Crane Division Det NOS/NSWC:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/administrative_records.html?p_instln_id=LOUISVILLE_NSWC

Lowry AFB: <ar.afcec-cloud.af.mil>

March AFB: <ar.afcec-cloud.af.mil>

Mare Island NSY:

https://www.envirostor.dtsc.ca.gov/public/final_documents2?global_id=48970002&doc_id=60458576

Mather AFB: <ar.afcec-cloud.af.mil>

McClellan AFB: <ar.afcec-cloud.af.mil>

Memphis NAS (Millington):

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html#TopOfPage

Moffett Field NAS:

https://www.bracpmo.navy.mil/brac_bases/california/former_nas_moffett_field.html

Myrtle Beach AFB: <ar.afcec-cloud.af.mil>

Newark AFB: <ar.afcec-cloud.af.mil>

Norton AFB: <ar.afcec-cloud.af.mil>

O'Hare Air Reserve Station: <ar.afcec-cloud.af.mil>

Onizuka Air Force Station: <ar.afcec-cloud.af.mil>

Ontario Air Force Station: <ar.afcec-cloud.af.mil>

Orlando NTC:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html#TopOfPage

Pease AFB: <ar.afcec-cloud.af.mil>

Philadelphia NS:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/administrative_records.html?p_instln_id=PHILADELPHIA_NS

Appendix A: Base Realignment and Closure Location Websites

Plattsburgh AFB: ar.afcec-cloud.af.mil

Puerto Rico NA/NAVACT:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/installation_map/navfac_atlantic/southeast/ns_roosevelt_roads.html

Puget Sound NS Sand Point:

https://www.bracpmo.navy.mil/brac_bases/other_west/former_ns_puget_sound_sand_point.html

Reese AFB: ar.afcec-cloud.af.mil

Richards-Gebaur AFB: ar.afcec-cloud.af.mil

Rickenbacker: ar.afcec-cloud.af.mil

Roslyn Air National Guard Station: ar.afcec-cloud.af.mil

South Weymouth NAS:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html#TopOfPage

Sudbury: <https://www.nae.usace.army.mil/missions/projects-topics/former-fort-devens-environmental-cleanup/>

Treasure Island NS:

https://www.envirostor.dtsc.ca.gov/public/final_documents2?global_id=38370044&doc_id=60397370

Trenton NAWC-AD:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html#TopOfPage

Tustin MCAS:

https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=DOD100395500

Warminster NAWC AD:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html#TopOfPage

White Oak- NSWC Dahlgren DIV Det (Silver Spring):

https://www.bracpmo.navy.mil/brac_bases/northeast/former_warfare_center_white_oak.html

Williams AFB: ar.afcec-cloud.af.mil

Willow Grove NASJRB:

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/pfas_reading_room.html#TopOfPage

Wurtsmith AFB: ar.afcec-cloud.af.mil

Appendix B: Detection Data, Phase Status, and Obligations Associated with DoD Base Realignment and Closure Locations Being Assessed for Per- and Polyfluoroalkyl Substances Use or Potential Release

This appendix provides the highest detections of perfluorooctane sulfonate and perfluorooctanoic acid in drinking water and groundwater; current phase status; current and planned removal actions; and actual and planned obligations to address Department of Defense releases of per- and polyfluoroalkyl substances at Base Realignment and Closure locations as of the end of Fiscal Year 2020.

**Appendix B: Detection Data, Phase Status, and Obligations Associated with DoD Base Realignment and Closure Locations
Being Assessed for Per- and Polyfluoroalkyl Substances Use or Potential Release**

DoD Component	State/Territory	Installation Name	Highest Detection of PFOS/PFOA in Drinking Water (ppt)*	Highest Detection of PFOS/PFOA in Groundwater (ppt)*	Current Phase	Actual or Estimated Start Date (Fiscal Year and Quarter)	Estimated Completion Date (Fiscal Year and Quarter)	Removal Action	Actual Obligations Through FY 2020 (\$000)	Planned Obligations in FY 2021 (\$000)	Planned Obligations after FY 2021 (\$000)^
Army	Alabama	ALAAP	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	Alabama	Fort McClellan BRAC	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	Arkansas	Fort Chaffee	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	California	Fort Ord	PFOS/PFOA: Determination Pending	PFOS: 447 PFOA: 270	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	308	160	0
Army	California	Hamilton Airfield	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	California	Lompoc	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	California	Rio Vista	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	California	Riverbank Army Ammunition Plant	PFOS/PFOA: <2.0	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	California	Sacramento Army Depot	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	California	Sierra Army Depot BRAC	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	PA	FY 2020 Q4	FY 2022 Q4	No Removal Action Planned	13	0	0
Army	Colorado	Pueblo Army Depot BRAC	PFOS/PFOA: Not Detected	PFOS/PFOA: Not Detected	PA/SI	PA: Prior to FY 2020 SI: FY 2020 Q2	FY 2021 Q4	No Removal Action Planned	62	0	0
Army	Georgia	Fort McPherson	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0

**Appendix B: Detection Data, Phase Status, and Obligations Associated with DoD Base Realignment and Closure Locations
Being Assessed for Per- and Polyfluoroalkyl Substances Use or Potential Release**

DoD Component	State/Territory	Installation Name	Highest Detection of PFOS/PFOA in Drinking Water (ppt)*	Highest Detection of PFOS/PFOA in Groundwater (ppt)*	Current Phase	Actual or Estimated Start Date (Fiscal Year and Quarter)	Estimated Completion Date (Fiscal Year and Quarter)	Removal Action	Actual Obligations Through FY 2020 (\$000)	Planned Obligations in FY 2021 (\$000)	Planned Obligations after FY 2021 (\$000)^
Army	Illinois	Fort Sheridan	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	Illinois	Savanna Army Depot	PFOS/PFOA: Not Detected	PFOS: 530 PFOA: 470	PA/SI	Prior to FY 2020	FY 2021 Q4	No Removal Action Planned	169	0	0
Army	Indiana	Fort Benjamin Harrison	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	Kansas	Kansas Army Ammunition Plant	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	Kentucky	Bluegrass Army Depot BRAC	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	Massachusetts	Devens	PFOS: 51.7 PFOA: 65.6	PFOS: 36,000 PFOA: 3,000	RI	Prior to FY 2020	FY 2023 Q4	Initial Action	16,174	3,930	57,640
Army	Massachusetts	Sudbury	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	SI	Prior to FY 2020	FY 2021 Q4	No Removal Action Planned	743	0	0
Army	New Mexico	Fort Wingate	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	New York	Seneca Army Ammunition Plant	PFOS/PFOA: Determination Pending	PFOS: 8,300 PFOA: 89,000	PA/SI	Prior to FY 2020	FY 2023 Q1	No Removal Action Planned	638	0	0
Army	Oregon	Umatilla Chemical Depot	PFOS/PFOA: Not Detected	PFOS/PFOA: Determination Pending	PA	FY2020 Q2	FY 2021 Q2	No Removal Action Planned	0	15	0
Army	Pennsylvania	N Penn	PFOS/PFOA: Not Detected	PFOS: 33,000 PFOA: 270	PA/SI	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	207	350	0
Army	Tennessee	DDMT	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	Texas	Lone Star AAP	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	Virginia	Fort Monroe	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0

**Appendix B: Detection Data, Phase Status, and Obligations Associated with DoD Base Realignment and Closure Locations
Being Assessed for Per- and Polyfluoroalkyl Substances Use or Potential Release**

DoD Component	State/Territory	Installation Name	Highest Detection of PFOS/PFOA in Drinking Water (ppt)*	Highest Detection of PFOS/PFOA in Groundwater (ppt)*	Current Phase	Actual or Estimated Start Date (Fiscal Year and Quarter)	Estimated Completion Date (Fiscal Year and Quarter)	Removal Action	Actual Obligations Through FY 2020 (\$000)	Planned Obligations in FY 2021 (\$000)	Planned Obligations after FY 2021 (\$000)^
Army	Virginia	Fort Pickett	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	Virginia	Vint Hill Farms	PFOS: 410 PFOA: 1,200	PFOS: 450 PFOA: 1,300	PA/SI	Prior to FY 2020	FY 2021 Q2	Action Pending	753	50	0
Army	Washington	Camp Bonneville	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	No phases are currently underway; the PA/SI is planned.	FY 2021 Q1	FY 2023 Q1	No Removal Action Planned	0	15	0
Army	N/A	N/A - Program Management							0	3,280	0
Army BRAC Funding Subtotals:**									19,067	8,070	57,640
Navy	Alaska	Adak AK NAF	PFOS/PFOA: Not Sampled	PFOS: 3,630 PFOA: 716	PA/SI	PA: Prior to FY 2020 SI: FY 2020 Q3	FY 2022 Q4	No Removal Action Planned	833	1,496	0
Navy	California	ALAMEDA NAS	PFOS/PFOA: Not Sampled	PFOS: 302,000 PFOA: 35,200	PA RI	PA: Prior to FY 2020 RI: FY 2020 Q4	PA: FY 2021 Q3 RI: FY 2022 Q4	No Removal Action Planned	1,155	464	0
Navy	California	Concord NWS	PFOS/PFOA: Determination Pending	PFOS: 2 PFOA: 11	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	310	640	0
Navy	California	Crows NALF	PFOS/PFOA: Not Analyzed	PFOS/PFOA: Determination Pending	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	217	70	0
Navy	California	El Toro MCAS	PFOS/PFOA: Not Sampled	PFOS: 2,800 PFOA: 5,230	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	571	8,294	0
Navy	California	Hunters Point Annex	PFOS/PFOA: Not Sampled	PFOS: 38.2 PFOA: 21.1	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	173	354	0
Navy	California	Long Beach NS	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	30	0	0
Navy	California	Long Beach NSY	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	30	0	0
Navy	California	Mare Island NSY	PFOS/PFOA: Not Sampled	PFOS: 78.3 PFOA: 124	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	597	460	0
Navy	California	Moffett Field NAS	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	45	0	0
Navy	California	Point Molate NFD	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	PA	FY 2020 Q3	FY 2021 Q4	No Removal Action Planned	30	0	0
Navy	California	Treasure Island NS	PFOS/PFOA: Not Sampled	PFOS: 30,000 PFOA: 2,100	PA RI	PA: Prior to FY 2020 RI: FY 2020 Q4	PA: FY 2021 Q3 RI: FY 2023 Q4	No Removal Action Planned	1,846	412	1,578
Navy	California	Tustin MCAS	PFOS/PFOA: Not Sampled	PFOS: 41,900 PFOA: 1,010,000	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	1,642	859	0

**Appendix B: Detection Data, Phase Status, and Obligations Associated with DoD Base Realignment and Closure Locations
Being Assessed for Per- and Polyfluoroalkyl Substances Use or Potential Release**

DoD Component	State/Territory	Installation Name	Highest Detection of PFOS/PFOA in Drinking Water (ppt)*	Highest Detection of PFOS/PFOA in Groundwater (ppt)*	Current Phase	Actual or Estimated Start Date (Fiscal Year and Quarter)	Estimated Completion Date (Fiscal Year and Quarter)	Removal Action	Actual Obligations Through FY 2020 (\$000)	Planned Obligations in FY 2021 (\$000)	Planned Obligations after FY 2021 (\$000)^
Navy	Florida	Cecil Field NAS	PFOS: 3.92 PFOA: Not Detected	PFOS: 980,000 PFOA: 29,000	SI	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	854	0	0
Navy	Florida	KEY WEST FL NAS	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	45	0	0
Navy	Florida	Orlando NTC	PFOS/PFOA: Not Sampled	PFOS: 84.18 PFOA: 7,241	PA/SI	PA: Prior to FY 2020 SI: FY 2020 Q2	FY 2021 Q3	No Removal Action Planned	295	0	0
Navy	Guam	Guam Agana NAS	PFOS/PFOA: Not Sampled	PFOS: 45 PFOA: 330	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	172	0	0
Navy	Hawaii	Barbers Point NAS	PFOS/PFOA: Not Sampled	PFOS: 11.4 PFOA: 24.1	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	310	545	0
Navy	Illinois	Glenview NAS	PFOS/PFOA: Not Sampled	PFOS/PFOA: Determination Pending	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	310	0	0
Navy	Indiana	Indianapolis	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	200	516	0
Navy	Kentucky	Louisville Crane Division Det NOS/NSWC	PFOS/PFOA: Not Sampled	PFOS: 26.9 PFOA: 5.1	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	420	100	0
Navy	Maine	Brunswick NAS	PFOS: 10.7 PFOA: 1.9	PFOS: 24,000 PFOA: 15,000	RI	FY 2020 Q3	FY 2023 Q1	No Removal Action Planned	6,070	192	13,046
Navy	Maryland	Annapolis NSWC Carderock DIV Det	PFOS/PFOA: Not Detected	PFOS: 42,000 PFOA: 28,000	PA RI	PA: Prior to FY 2020 RI: Prior to FY 2020	PA: FY 2021 Q3 RI: FY 2024 Q4	No Removal Action Planned	916	0	0
Navy	Maryland	White Oak- NSWC Dahlgren DIV Det (Silver Spring)	PFOS/PFOA: Determination Pending	PFOS: 1,230 PFOA: 135	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	325	395	0
Navy	Massachusetts	South Weymouth NAS	PFOS/PFOA: Not Analyzed	PFOS: 195,000 PFOA: 60,700	SI RI	SI: Prior to FY 2020 RI: Prior to FY 2020	SI: FY 2021 Q4 RI: FY 2024 Q4	No Removal Action Planned	3,220	440	29,046
Navy	Midway Islands	MIDWAY ISLAND NAF	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	45	0	0
Navy	Missouri	KANSAS CITY MO	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	45	0	0
Navy	New Jersey	Trenton NAWC-AD	PFOS: 18.9 PFOA: 16.7	PFOS: 25,800 PFOA: 2,000	RI	FY 2020 Q3	FY 2024 Q4	No Removal Action Planned	2,817	80	2,890
Navy	Pennsylvania	Philadelphia NS	PFOS/PFOA: Not Sampled	PFOS: 1,500 PFOA: 27,000	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	152	0	0
Navy	Pennsylvania	Warminster NAWC AD	PFOS: 1,090 PFOA: 905	PFOS: 16,000 PFOA: 4,600	RI	Prior to FY 2020	FY 2024 Q4	Initial Action	28,396	977	30,477
Navy	Pennsylvania	Willow Grove NASJRB	PFOS: 800 PFOA: 5,000	PFOS: 99,500 PFOA: 37,700	RI	Prior to FY 2020	FY 2024 Q4	Initial Action	41,715	13,140	46,626

**Appendix B: Detection Data, Phase Status, and Obligations Associated with DoD Base Realignment and Closure Locations
Being Assessed for Per- and Polyfluoroalkyl Substances Use or Potential Release**

DoD Component	State/Territory	Installation Name	Highest Detection of PFOS/PFOA in Drinking Water (ppt)*	Highest Detection of PFOS/PFOA in Groundwater (ppt)*	Current Phase	Actual or Estimated Start Date (Fiscal Year and Quarter)	Estimated Completion Date (Fiscal Year and Quarter)	Removal Action	Actual Obligations Through FY 2020 (\$000)	Planned Obligations in FY 2021 (\$000)	Planned Obligations after FY 2021 (\$000)^
Navy	Puerto Rico	Puerto Rico NA/NAVACT	PFOS/PFOA: Determination Pending	PFOS: 491,401 PFOA: 351,375	SI	Prior to FY 2020	FY 2022 Q4	No Removal Action Planned	687	0	0
Navy	Rhode Island	DAVISVILLE NCBC	PFOS/PFOA: Not Sampled	PFOS: 15 PFOA: 970	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	66	0	0
Navy	South Carolina	Charleston NS	PFOS/PFOA: Determination Pending	PFOS: 290 PFOA: 490	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	150	0	0
Navy	South Carolina	Charleston NSY	PFOS/PFOA: Determination Pending	PFOS: 290 PFOA: 490	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	150	0	0
Navy	Tennessee	Memphis NAS (Millington)	PFOS/PFOA: Not Sampled	PFOS: 5,700 PFOA: 730	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	569	0	265
Navy	Texas	Chase Field NAS	PFOS/PFOA: Not Detected	PFOS: 230 PFOA: 9,330	SI	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	1,956	0	5,065
Navy	Texas	Dallas NAS	PFOS/PFOA: Not Sampled	PFOS: 124,331 PFOA: 296,299	RI	FY 2020 Q2	FY 2022 Q4	No Removal Action Planned	894	0	0
Navy	Virginia	Driver NRTF	PFOS/PFOA: Not Sampled	PFOS/PFOA: Not Detected	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	314	0	0
Navy	Washington	Puget Sound NS Sand Point	PFOS/PFOA: Determination Pending	PFOS/PFOA: Determination Pending	PA	Prior to FY 2020	FY 2021 Q3	No Removal Action Planned	45	0	0
Navy	N/A	N/A - Program Management							115	0	2,827
Navy BRAC Funding Subtotals:									98,734	29,435	131,821
Air Force	Alaska	Galena Forward Operating Location	PFOS/PFOA: Not Detected	PFOS: 140,000 PFOA: 253,000	No phases are currently underway; the RI is planned.	FY 2022 Q4	FY 2027 Q4	No Removal Action Planned	898	0	29,824
Air Force	Alaska	Kulis Air National Guard Base	There are no downgradient drinking water wells to sample.	PFOS: 7,600 PFOA: 8,440	No phases are currently underway; the RI is planned.	FY 2023 Q4	FY 2028 Q4	No Removal Action Planned	1,932	0	8,250
Air Force	Arizona	Air Force Research Laboratory Mesa	PFOS/PFOA: Not Sampled	PFOS/PFOA: Not Sampled	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	74	0	0
Air Force	Arizona	Williams AFB	There are no downgradient drinking water wells to sample.	PFOS: 2,440 PFOA: 322	SI	Prior to FY 2020	FY 2021 Q1	No Removal Action Planned	1,997	0	22,205
Air Force	Arkansas	Eaker AFB	There are no downgradient drinking water wells to sample.	PFOS: 149,000 PFOA: 116,000	No phases are currently underway; the RI is planned.	FY 2024 Q4	FY 2029 Q4	No Removal Action Planned	787	0	8,038
Air Force	California	Castle AFB	PFOS: 1,000 PFOA: 150	PFOS: 19,600 PFOA: 1,000	SI	Prior to FY 2020	FY 2021 Q1	Initial Action, Action Pending	2,439	4,742	22,696

**Appendix B: Detection Data, Phase Status, and Obligations Associated with DoD Base Realignment and Closure Locations
Being Assessed for Per- and Polyfluoroalkyl Substances Use or Potential Release**

DoD Component	State/Territory	Installation Name	Highest Detection of PFOS/PFOA in Drinking Water (ppt)*	Highest Detection of PFOS/PFOA in Groundwater (ppt)*	Current Phase	Actual or Estimated Start Date (Fiscal Year and Quarter)	Estimated Completion Date (Fiscal Year and Quarter)	Removal Action	Actual Obligations Through FY 2020 (\$000)	Planned Obligations in FY 2021 (\$000)	Planned Obligations after FY 2021 (\$000)^
Air Force	California	George AFB	PFOS: 1.96 PFOA: 3.84	PFOS: 1,690 PFOA: 5,210	SI	Prior to FY 2020	FY 2021 Q1	No Removal Action Planned	1,211	0	15,750
Air Force	California	March AFB	PFOS: 108 PFOA: 59.5	PFOS: 9,170 PFOA: 1,090	RI	FY 2020 Q4	FY 2025 Q4	Long-term Drinking Water Solution, Action Pending	15,614	389	10,710
Air Force	California	Mather AFB	PFOS: 107 PFOA: 65.4	PFOS: 891,000 PFOA: 19,000	SI	Prior to FY 2020	FY 2021 Q1	Initial Action, Action Pending	5,562	2,741	45,817
Air Force	California	McClellan AFB	There are no downgradient drinking water wells to sample.	PFOS: 3,000 PFOA: 2,100	SI	Prior to FY 2020	FY 2021 Q1	No Removal Action Planned	1,435	0	9,934
Air Force	California	Norton AFB	There are no downgradient drinking water wells to sample.	PFOS: 18.8 PFOA: 21.9	No phases are currently underway; the RI is planned.	FY 2025 Q4	FY 2030 Q4	No Removal Action Planned	1,337	0	16,727
Air Force	California	Onizuka Air Force Station	PFOS/PFOA: Not Sampled	PFOS/PFOA: Not Sampled	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	59	0	0
Air Force	California	Ontario Air Force Station	PFOS/PFOA: Not Sampled	PFOS/PFOA: Not Sampled	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	74	0	0
Air Force	Colorado	Buckley Annex	PFOS/PFOA: Not Sampled	PFOS/PFOA: Not Sampled	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	49	0	0
Air Force	Colorado	Lowry AFB	PFOS/PFOA: Not Sampled	PFOS: 4.17 PFOA: 5.47	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	230	0	0
Air Force	Florida	Homestead AFB	PFOS/PFOA: Not Sampled	PFOS/PFOA: Not Sampled	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	176	0	0
Air Force	Illinois	Chanute AFB	There are no downgradient drinking water wells to sample.	PFOS: 1,960,000 PFOA: 151,000	No phases are currently underway; the RI is planned.	FY 2024 Q4	FY 2029 Q4	No Removal Action Planned	1,732	64	20,302
Air Force	Illinois	O'Hare Air Reserve Station	There are no downgradient drinking water wells to sample.	PFOS: 1,520 PFOA: 13,600	No phases are currently underway; the RI is planned.	FY 2025 Q4	FY 2030 Q4	No Removal Action Planned	939	0	15,253
Air Force	Indiana	Grissom AFB	PFOS: Not Detected PFOA: 1.3	PFOS: 114,000 PFOA: 18,000	No phases are currently underway; the RI is planned.	FY 2023 Q4	FY 2028 Q4	No Removal Action Planned	584	0	4,254

**Appendix B: Detection Data, Phase Status, and Obligations Associated with DoD Base Realignment and Closure Locations
Being Assessed for Per- and Polyfluoroalkyl Substances Use or Potential Release**

DoD Component	State/Territory	Installation Name	Highest Detection of PFOS/PFOA in Drinking Water (ppt)*	Highest Detection of PFOS/PFOA in Groundwater (ppt)*	Current Phase	Actual or Estimated Start Date (Fiscal Year and Quarter)	Estimated Completion Date (Fiscal Year and Quarter)	Removal Action	Actual Obligations Through FY 2020 (\$000)	Planned Obligations in FY 2021 (\$000)	Planned Obligations after FY 2021 (\$000)^
Air Force	Louisiana	England AFB	There are no downgradient drinking water wells to sample.	PFOS: 7,150,000 PFOA: 3,820,000	No phases are currently underway; the RI is planned.	FY 2024 Q4	FY 2029 Q4	No Removal Action Planned	925	0	11,456
Air Force	Maine	Loring AFB	PFOS: 11.4 PFOA: 7.24	PFOS: 8,770 PFOA: 811	No phases are currently underway; the RI is planned.	FY 2021 Q4	FY 2026 Q4	No Removal Action Planned	1,954	1,531	61,731
Air Force	Michigan	KI Sawyer AFB	PFOS: 2.7 PFOA: 266	PFOS: 11,100 PFOA: 57,900	SI	Prior to FY 2020	FY 2021 Q1	Long-term Drinking Water Solution	3,996	3,648	40,802
Air Force	Michigan	Wurtsmith AFB	PFOS: 273 PFOA: 2,650	PFOS: 171,000,000 PFOA: 210,000	RI	FY 2020 Q4	FY 2025 Q4	Long-term Drinking Water Solution	27,730	487	158,320
Air Force	Missouri	Richards-Gebaur AFB	There are no downgradient drinking water wells to sample.	PFOS: 329,000 PFOA: 74,800	No phases are currently underway; the RI is planned.	FY 2024 Q4	FY 2029 Q4	No Removal Action Planned	733	0	4,631
Air Force	New Hampshire	Pease AFB	PFOS: 2,500 PFOA: 350	PFOS: 490,000 PFOA: 130,000	RI	FY 2020 Q4	FY 2025 Q4	Initial Action, Long-term Drinking Water Solution, Action Pending	67,762	4,516	100,435
Air Force	New York	Griffiss AFB	There are no downgradient drinking water wells to sample.	PFOS: 60,700 PFOA: 1,100	No phases are currently underway; the RI is planned.	FY 2025 Q4	FY 2030 Q4	No Removal Action Planned	1,847	0	10,438
Air Force	New York	Plattsburgh AFB	PFOS: 347 PFOA: 97.8	PFOS: 70,300 PFOA: 981,000	SI RI	SI: Prior to FY 2020 RI: FY 2020 Q4	SI: FY 2021 Q1 RI: FY 2025 Q4	Initial Action, Action Pending	7,201	255	31,928
Air Force	New York	Roslyn Air National Guard Station	PFOS/PFOA: Not Sampled	PFOS/PFOA: Not Sampled	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	53	0	0
Air Force	Ohio	Gentile Air Force Station	There are no downgradient drinking water wells to sample.	PFOS: 146 PFOA: 33.9	No phases are currently underway; the RI is planned.	FY 2025 Q4	FY 2030 Q4	No Removal Action Planned	273	0	1,630
Air Force	Ohio	Newark AFB	There are no downgradient drinking water wells to sample.	PFOS: 435 PFOA: 221	No phases are currently underway; the RI is planned.	FY 2025 Q4	FY 2030 Q4	No Removal Action Planned	302	0	1,337
Air Force	Ohio	Rickenbacker	There are no downgradient drinking water wells to sample.	PFOS: 14,400 PFOA: 45,800	No phases are currently underway; the RI is planned.	FY 2025 Q4	FY 2030 Q4	No Removal Action Planned	494	0	37,502

**Appendix B: Detection Data, Phase Status, and Obligations Associated with DoD Base Realignment and Closure Locations
Being Assessed for Per- and Polyfluoroalkyl Substances Use or Potential Release**

DoD Component	State/Territory	Installation Name	Highest Detection of PFOS/PFOA in Drinking Water (ppt)*	Highest Detection of PFOS/PFOA in Groundwater (ppt)*	Current Phase	Actual or Estimated Start Date (Fiscal Year and Quarter)	Estimated Completion Date (Fiscal Year and Quarter)	Removal Action	Actual Obligations Through FY 2020 (\$000)	Planned Obligations in FY 2021 (\$000)	Planned Obligations after FY 2021 (\$000)^
Air Force	South Carolina	Myrtle Beach AFB	PFOS: 9.6 PFOA: 31	PFOS: 2,490,000 PFOA: 150,000	No phases are currently underway; the RI is planned.	FY 2022 Q4	FY 2027 Q4	No Removal Action Planned	766	0	11,830
Air Force	Texas	Bergstrom AFB	There are no downgradient drinking water wells to sample.	PFOS: 8,860 PFOA: 2,260	No phases are currently underway; the RI is planned.	FY 2024 Q4	FY 2029 Q4	No Removal Action Planned	872	0	8,164
Air Force	Texas	Brooks-City Base	PFOS/PFOA: Not Sampled	PFOS/PFOA: Not Sampled	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	66	0	0
Air Force	Texas	Carswell AFB	PFOS/PFOA: Not Sampled	PFOS/PFOA: Not Sampled	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	66	0	0
Air Force	Texas	Kelly AFB	There are no downgradient drinking water wells to sample.	PFOS: 249,000 PFOA: 30,000	No phases are currently underway; the RI is planned.	FY 2025 Q4	FY 2030 Q4	No Removal Action Planned	1,917	182	36,695
Air Force	Texas	Reese AFB	PFOS: 1,580 PFOA: 3,250	PFOS: 1,820 PFOA: 5,460	RI	Prior to FY 2020	FY 2026 Q4	Initial Action, Action Pending	40,526	6,742	258,638
Air Force	Washington	Four Lakes Air National Guard Station	PFOS/PFOA: Not Sampled	PFOS/PFOA: Not Sampled	All activities to address PFOS/PFOA are complete.	Not Applicable	Not Applicable	No Removal Action Planned	50	0	0
Air Force	Wisconsin	General Mitchell Air Reserve Station	PFOS/PFOA: Not Detected	PFOS: 8,610 PFOA: 10,800	No phases are currently underway; the RI is planned.	FY 2023 Q4	FY 2028 Q4	No Removal Action Planned	1,294	0	3,402
Air Force	N/A	N/A - Program Management							0	0	0
Air Force BRAC Funding Subtotals:									195,956	25,297	1,008,698
DoD BRAC Funding Totals:**									313,757	62,802	1,198,158

* Where the highest detection is "Not Detected," the validated test results confirmed that there were no detections of PFOS/PFOA above the method reporting limit. Where the highest detection is "Not Sampled," the DoD Components did not sample because they determined during reviews of historic documentation that neither PFOS nor PFOA was used or potentially released. Where the highest detection is "Not Analyzed," the DoD Components either plan to conduct sampling or the validated test results are not yet available. Where the highest detection is "Determination Pending," the DoD Components have not yet determined if sampling is necessary. At some Air Force locations, there are no downgradient wells to sample.

^ These estimates are based on information available as of the end of FY 2020 and are expected to increase in the future as DoD completes investigations and defines future requirements. DoD will plan and program for future requirements at that time.

** The actual obligations through FY 2020 exclude \$41,000 in BRAC funding for sampling at locations where there are active and BRAC sites. DoD tracks phase progress at the active sites because the BRAC sites did not proceed to the PA/SI phase.