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Ser N00/20U070
12 Feb 20

From: Commander, Navy Installations Command
To: Vice Chief of Naval Operations
Via: Deputy Chief of Naval Operations, Fleet Readiness and Logistics

Subj: FISCAL YEAR 2019 NAVY SHORE DRINKING WATER QUALITY REPORT

Ref: (a) OPNAV M-5090.1

Encl: (1) Navy Shore Drinking Water Quality Report for Fiscal Year 2019

1. Per reference (a), enclosure (1) is submitted.

2. Commander, Navy Installations Command (CNIC) is designated as the Navy's Executive Agent for drinking water quality ashore and is tasked by reference (a) to provide an annual report on the status of drinking water quality at Navy Shore installations, worldwide. Enclosure (1) outlines the collaborative efforts and accomplishments of Navy Installations Command, Bureau of Medicine & Surgery and Naval Facilities Engineering Command.

3. Analysis of fiscal year 2019 drinking water quality data shows that the drinking water provided at Navy installations remains safe and has continued to improve. In all cases where health-based exceedances were not resolved, and where a health risk could exist, alternate drinking water was provided to eliminate any potential health risk.

4. CNIC point of contact is CAPT Kevin Bartoe, Director, Facilities and Environmental (N4), (202) 433-4353, kevin.bartoe@navy.mil.

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NAVY SHORE DRINKING WATER QUALITY REPORT FOR FISCAL YEAR 2019

February 2020

Prepared by:
Commander, Navy Installations Command
Navy Executive Agent for Drinking Water

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EXECUTIVE SUMMARY

The Navy is committed to safeguarding the health of its personnel and their families. Ensuring safe drinking water is a top health concern. Commander, Navy Installations Command (CNIC) is the Executive Agent for drinking water quality at all Navy shore facilities and installations worldwide and serves as the single point of contact for matters related to drinking water systems.

This report is provided in accordance with OPNAVINST 5090.1E and is comprised of an inventory of all water systems, an analysis of the exceedances of health-based standards and the identification of unresolved operational and maintenance requirements.

During FY19, CNIC, working closely with its strategic partners, the Naval Facilities Engineering Command (NAVFAC), the Navy Bureau of Medicine and Surgery (BUMED) and Naval Sea Systems Command (NAVSEA) Laboratory Quality and Accreditation Office (LQAO) providing oversight and improved accountability of the Navy's drinking water program.

Across the U.S. and its territories, the Navy manages 79 drinking water systems that fall under the jurisdiction of the Environmental Protection Agency (EPA) and state laws. The Navy also manages 47 drinking water systems overseas that are not under the jurisdiction of the EPA and, for purposes of this report, are referred to as overseas drinking water (ODW) systems. These 47 ODW systems are under the primary enforcement authority of CNIC.

To maintain visibility of the Navy's commitment to ensuring the health of its personnel and families through prevention of lead in drinking water, this report highlights Navy's Lead and Copper Rule (LCR) and Lead in Priority Areas (LIPA) sampling. In FY19, Navy systems stateside and overseas continued recurring LCR sampling as required by the Safe Drinking Water Act and Department of Defense Instruction 4715.05 respectively. LIPA sampling, per OPNAVINST 5090.1E, continued at all applicable Navy systems worldwide. Per the revised Office of the Chief of Naval Operations (OPNAV) policy issued in October 2016, for each of the LCR action level exceedances in FY19, installations consulted with local preventive medicine authorities and took appropriate remedial action. Remedial actions were also executed at all installations with LIPA sample exceedances in FY19. To align with the U.S. EPA's revised *3Ts for Reducing Lead in Drinking Water in Schools and Childcare Facilities* and subsequent updated OPNAV policy, CNIC drafted CNIC Instruction 5090.6, *Navy Sampling and Testing for Lead in Drinking Water in Priority Areas*, with expected publication in FY20. CNIC Instruction 5090.6 provides updated sampling and corrective action requirements, as well as standardization of public notification letter templates.

Navy Compliance

For the 79 systems under the jurisdiction of EPA, 75 systems (95%) met all health-based standards during FY19, the rate decreasing slightly from 96% in FY18. For the 47 ODW systems, all systems (100%) met all health-based standards, an increase from 92% of systems in FY18. Where there were exceedances of standards, corrective actions were implemented and the systems returned to compliance. No exceedances required provision of alternate drinking water.

FY19 ODW Accomplishments and FY20 ODW Plan of Action and Milestones

In FY19, the Navy continued to advance the ODW program towards full compliance with U.S. water quality standards and ODW procedures and protocols. For the first time since the ODW program's inception, no health-based water quality exceedances were reported within the fiscal year. FY19 was the seventh full year of program implementation and the start of the third cycle of sanitary surveys for ODW systems. The ODW program continues to refine policies and improve processes from lessons learned in the previous cycles of implementation.

NAVSEA LQAO, as part of the Water Quality Oversight Council (WQOC) Staff, continued the third year of on-site laboratory assessments, conducting three assessments in FY19. In FY19, NAVSEA LQAO continued to provide technical assistance and track the progress of the other on-site laboratories as they implement corrective actions to achieve official NAVSEA and CNIC approval.

As part of its continuing oversight program, the WQOC completed in-depth sanitary survey evaluations for five installations, covering 10 ODW systems, to identify deficiencies in sanitary conditions, material condition, personnel training and qualifications, safety and compliance with drinking water standards and policies. In response, installations identified corrective actions and developed a Plan of Action and Milestones to address each deficiency

In FY18, CNIC published CNIC Instruction 5090.1A, *Navy Overseas Drinking Water Program Ashore*, implementing the new ODW Program Manual (CNIC Manual 5090.1) and existing CNIC Manuals 5090.2 and 5090.3. In FY19 CNIC, in coordination with, NAVFAC and BUMED; initiated the process of consolidating the three respective manuals into one comprehensive ODW Program Manual (Draft CNIC Manual 5090.1A). When finalized, this manual will update the ODW laboratory policy and operator requirements. Final manual is expected to be out for publication in FY20. CNIC, NAVFAC and BUMED continued conducting ODW training for system operators, prospective Commanding Officers, Public Works Officers and medical professionals.

The 2020 ODW Plan of Action and Milestones builds on the 2019 accomplishments, continuing to focus on sustainable program management and providing further guidance to help resolve common sanitary survey deficiencies. Details of FY19 accomplishments and the FY20 plan are contained in the body of this report.

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Introduction

The Navy is committed to safeguarding the health of its personnel and families by ensuring their drinking water is safe and meets all health-based standards. This seventh annual report identifies the compliance posture of the Navy's drinking water program and the Navy's efforts taken to deliver safe drinking water. Commander, Navy Installations Command (CNIC), supported by its strategic partners Naval Facilities Engineering Command (NAVFAC), Navy Bureau of Medicine and Surgery (BUMED) and Naval Sea Systems Command (NAVSEA), serves as the Executive Agent for drinking water quality for all Navy shore facilities and installations worldwide and maintains oversight of both U.S. and Overseas Drinking Water (ODW) systems.

Governing Regulations

In the U.S. and its territories, the Environmental Protection Agency (EPA), under the authority of the Safe Drinking Water Act (SDWA), sets health-based standards to ensure drinking water is safe for human consumption. The EPA defines human consumption as drinking, cooking, bathing, dishwashing and maintaining oral hygiene. EPA provides requirements and guidelines, adopted by most states, to implement safe drinking water program management.

Navy public drinking water systems within the U.S. and its territories are required to comply with EPA and state drinking water requirements. In the few locations where EPA is the sole regulator, Navy public drinking water systems are required to comply with EPA requirements alone.

OPNAVINST 5090.1E, *Environmental Readiness Program*, provides implementing requirements for Navy compliance with the SDWA. OPNAVINST 5090.1E incorporated the Chief of Naval Operations, Energy and Environmental Readiness Division (OPNAV N45) policy memorandum, *Navy Policy Requirements for Drinking Water Exceedances*, which requires each installation commanding officers (ICO) to consult with local preventive medicine authority (PMA) in the event of an exceedance of a drinking water maximum contaminant level, action level, health advisory or other drinking water quality standard in the U.S. and overseas.

Overseas, where the EPA does not have jurisdiction, CNIC is the primary enforcement authority for drinking water programs, setting and enforcing Navy health-based standards. Navy shore installations in foreign countries are also required to comply with health-based standards established within country-specific Department of Defense (DoD) Final Governing Standards (FGS), or in the absence of an FGS, the DoD Overseas Environmental Baseline Guidance Document (OEBGD).

As the primary enforcement authority for ODW systems, CNIC maintains an oversight structure to ensure adequate standards are in place and that ODW systems achieve and maintain compliance with standards (Figure 1). The top tier of the management and oversight structure is the Water Quality Oversight Council (WQOC). The WQOC comprises members from CNIC, NAVFAC, BUMED and NAVSEA. Director, Facilities and Environmental (CNIC N4), chairs the WQOC on behalf of the Commander. The second tier consists of the Regional Water Quality Boards (RWQB), chaired by the Region Commander (REGCOM). The third tier consists of the

Installation Water Quality Boards (IWQB), chaired by the respective Installation Commanding Officer (ICO).

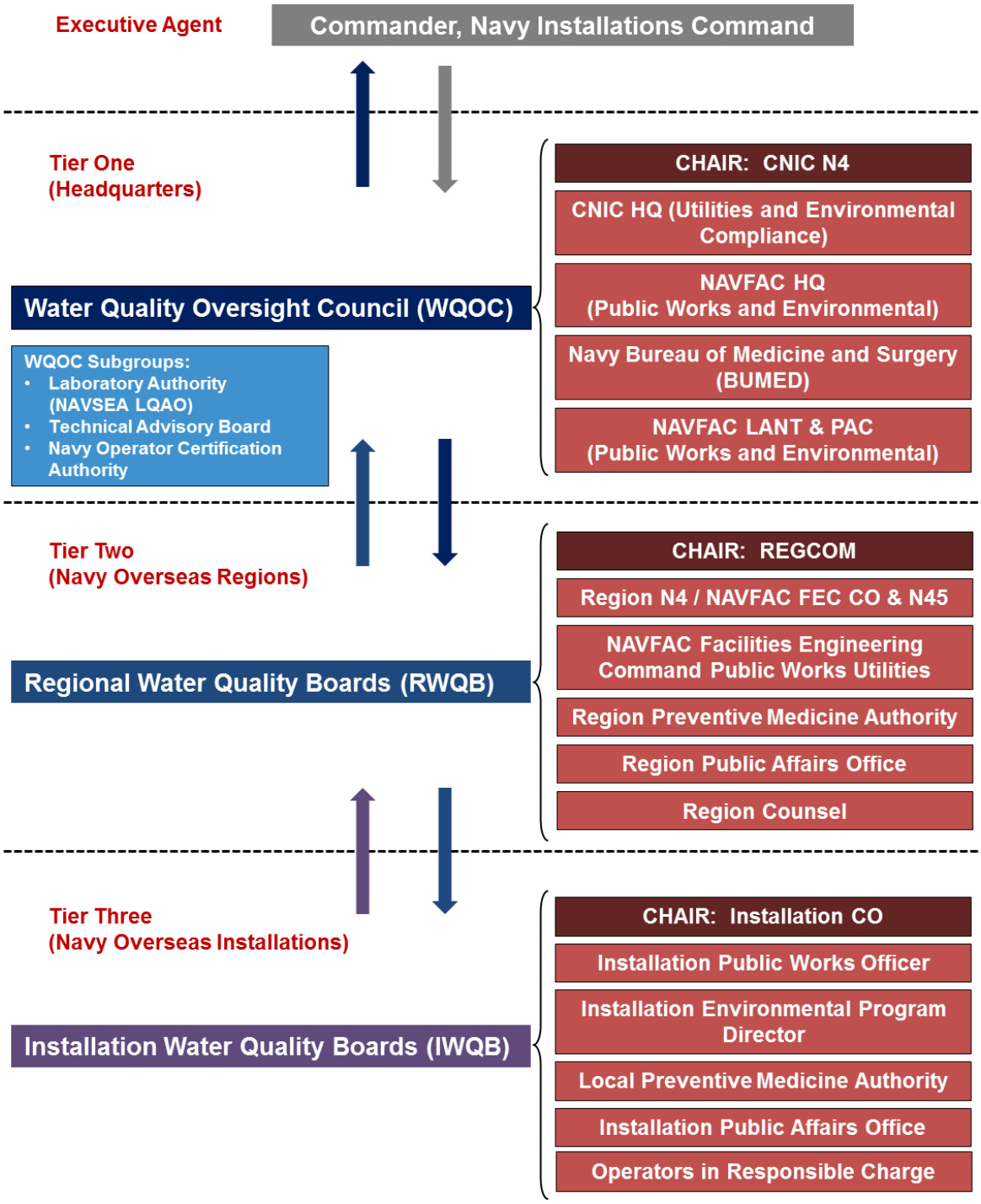

Figure 1. Navy Overseas Drinking Water Program Organization

Drinking Water Systems Inventory

In FY17, NAVFAC Engineering and Expeditionary Warfare Center (EXWC) finalized a comprehensive inventory of Navy drinking water and non-potable water systems on a worldwide basis. In FY19, this inventory was reviewed for any changes to domestic and overseas sources of drinking water (Table 1). The updated FY19 inventory reflects a U.S.-regulated inventory increase of one from 78 to 79 drinking water systems to align with the Office of the Secretary of Defense (OSD) definitions of a regulated public water system (PWS). Under the OSD definitions, a regulated PWS in the U.S. must have a unique PWS identification (PWS ID) number. In FY19, two systems were added in the Mid-Atlantic Region: NWS Yorktown Pistol Range and NWS Yorktown Rifle Range, while the Barbers Point Water System in Region Hawaii was removed from the inventory to bring the total to 79 systems for FY19. Barbers Point is no longer under Navy control since it was transferred by the General Services Administration (GSA) to the Kalaeloa Water Company in November 2017. The Navy did not privatize the system, the transaction was a GSA disposal. The Navy no longer has water/wastewater systems at Barbers Point, although the Navy still remains as a customer for a small number of Navy facilities. The Navy's 79 drinking water systems under the jurisdiction of the EPA are distributed among seven Navy Regions. Appendix A provides a complete listing of these 79 drinking water systems.

The Navy's remaining domestic systems not under the direct jurisdiction of the SDWA are listed in Appendices B and C. In FY19, OSD redefined how these remaining domestic systems are categorized. The remaining systems include both consecutive water systems (water purchased from another PWS) classified as "Exempted" and privatized systems classified as "Privatized" in accordance with the new OSD definitions. While not regulated under the SDWA, "Exempted" systems are still tracked and routinely tested as required under OPNAVINST 5090.1E. "Privatized" systems' assets have been permanently turned over to a private party and are not required to comply with OPNAVINST 5090.1E and may be regulated by the EPA.

The Navy's 47 overseas systems, under the primacy of CNIC, are distributed among four Navy Regions. Appendix D provides a complete listing of the 47 ODW systems. With the removal of two systems: CFA Chinhae (Tri-Service Hangar Pohang) due to the transfer to the U.S. Marine Corps and NAS Sigonella 585 Compound with its incorporation into the NAS Sigonella NAS II system under the hauled water policy requirements, the ODW system inventory decreased from 49 in FY18 to 47 in FY19. Region Japan inventory added the existing Singapore ODW system in FY19 following the realignment of Singapore Area Coordinator under Region Japan. The ODW inventory of systems will continue to fluctuate as closures and new systems are identified. FY20 anticipates the addition of one system at NSF Redzikowo, Poland upon construction completion. Two additional overseas systems are currently being evaluated for potential inclusion in the Navy ODW program. One location in Region Southeast (CSL Comalapa) was recommended by the WQOC for possible inclusion under the program. This location is still under evaluation by Region Southeast pending Navy Marine Corps Public Health Center site visit and health assessment with anticipated resolution in FY20. The other location in Region Japan (New Sanno Hotel) was reviewed; and preliminary results indicates that it does not meet the definition of a Navy ODW system.

Table 1. Summary of Navy Drinking Water Systems by Region

CNIC Region	Regulated PWS	Exempted	Privatized	ODW System
CNREURAFCENT	0	0	0	19
CNRH	5	0	0	0
CNRJ	0	0	0	24
CNRK	0	0	0	2
CNRMA	26	51	1	0
CNRNDW	13	6	0	0
CNRNW	7	6	0	0
CNRSE	14	55	7	2
CNRSW	12	21	0	0
JRM	2	0	0	0
Total	**79**	**139**	**8**	**47**

Summary of Water Quality and Exceedances

A system with any exceedance of a health-based standard, regardless of duration, is reported as being out of compliance for the entire reporting period (i.e., the FY). The FY19 EPA national average for drinking water system compliance with health-based standards was 94%, a slight increase from the FY18 EPA national average of 93%.

Navy Drinking Water Systems under EPA Jurisdiction

In FY19, 95% (75 of 79) of the Navy drinking water systems in the U.S. were compliant with health-based standards. This is a slight decrease from the 96% compliance reported in FY18, but still higher than the EPA national average of 94%. The following four Navy drinking water systems, under the jurisdiction of EPA, experienced exceedances in FY19.

- NSA Anderson: Unapproved treatment process; Use of Pool Time Chlorination Tabs
- Joint Base Anacostia Bolling (JBAB)-Anacostia: Non-detectable disinfection residual
- NAS Lemoore: Total Trihalomethane (TTHM)
- WPNSTA Earl Colts Neck (Main Base): Total Trihalomethane (TTHM)

In all cases, public notifications were issued and will be reported in the respective installations' annual Consumer Confidence Reports (CCR), which are distributed annually, by the first of July. The CCRs are also posted to the respective region's website and are provided to consumers. None of the exceedances required boil water notices or provision of alternate drinking water. A detailed discussion of these water system health-based exceedance and corrective action taken follows in Appendix E.

There were also two Navy exempted water systems with health-based exceedances or violations. In these instances, the water purveyor, and not the Navy, was responsible for all corrective actions and notifications, therefore they are not captured in Appendix E.

- Portsmouth Naval Shipyard (NOSC Fort Schuyler): Uncovered reservoir
- SUBASE New London (Main Base): TTHM

Navy ODW Systems

During FY19, 100% of the 47 ODW systems were compliant with health-based standards; which is an increase from the 92% compliance reported in FY18. CCRs are also distributed annually for each ODW system by July 1, 2019. The CCRs are posted to the respective region's website and are provided to consumers.

Sampling and Testing for Lead in Priority Areas

Per OPNAVINST 5090.1E, testing for lead is required for all drinking water coolers and other specified outlets in priority areas, such as schools and child development centers. On February 8, 2014, OPNAV N45 issued a policy memorandum, *Sampling and Testing for Lead in Drinking Water in Priority Areas* (LIPA), which outlines testing requirements and clarifies policy in the now updated OPNAVINST 5090.1E. On June 6, 2017, CNIC issued technical guidance to support implementation of the OPNAV policy. In FY19, CNIC drafted CNIC Instruction 5090.6 to implement CNIC LIPA policy aligning with updated OPNAV policy and the U.S. EPA's revised 3Ts guidance. Publication is expected in FY20.

Baseline sampling was conducted and reported in the FY14 annual report. Elevated lead levels were observed at outlets in the Rota Spain DoD Education Activity (DoDEA) High School during LIPA FY14 sampling and have not been completely resolved. These deficiencies were attributed to the construction contractor's inadvertent use of lead-containing solder. The procurement policy process has been initiated with the construction contractor to address the latent defect issue. Four laboratory sinks in the school remain out of service in FY19 due to the latent defect.

In FY19, the following installations performed recurring sampling per the LIPA policy:

NS Rota	NSA Bethesda	NAS Jacksonville
NSA Bahrain	NSF Indian Head	NB Ventura County
CFA Chinhae	NSWC Dahlgren	NAS Corpus Christi
CFA Sasebo	JRB New Orleans	NAS Patuxent River
NAF Atsugi	NAS Key West	NSA Mechanicsburg
NB Guam	NAS Kingsville	JB Anacostia-Bolling
NSA Anderson	NAS Pensacola	NAS Fort Worth JRB
NS Great Lakes	NAF El Centro	JB Pearl Harbor Hickam
NSA Crane	NAS Lemoore	WPNSTA Earle Colts Neck
NWS Yorktown	NB Point Loma	Singapore Area Coordinator
NS Newport	NAS Monterey	Pacific Missile Range Facility
NSA Annapolis	NSA Philadelphia	NAS North Island/NAB Coronado

Of these locations, CFA Sasebo, NS Rota, NSA Bahrain, CFA Sasebo, JRB New Orleans, NAS Jacksonville, NAS Key West, NAS Corpus Christi, NAS Kingsville, and NAS Pensacola required remedial follow-up due to elevated sample results. The Rota sampling event at a new school construction identified elevated lead levels which are attributed to the use of lead solder. This new construction event triggered the second latent defect claim to be assigned to a construction contractor in Rota. Per established CNIC guidance, all sample results were shared with the school, child-care staff and parents to directly address any questions or concerns. To date no additional concerns have been raised at any of the installations with elevated sample results.

Resampling is required by LIPA policy every five years, and to avoid a surge in funding requests, it has been distributed across FY16-FY19 so that no installation exceeds the five-year standard. Due to funding priorities, NAS Whidbey Island, NAVBASE Kitsap, and NAVSTA Everett were unable to complete LIPA sampling in FY19 and plan to conduct the required sampling in FY20. Due to the operational disruption from the July 2019 earthquakes, NAWS China Lake completed their required resampling in first quarter FY20. Only sampling associated with new construction, remodeling and fixture replacement is anticipated in the out-of-cycle years. Results from recurring LIPA sampling will be summarized in annual reports and all results are posted on region or installation webpages.

Lead and Copper Rule Testing

Per the Safe Drinking Water Act, all community water systems and non-transient non-community water systems are required to perform testing under the Lead and Copper Rule (LCR). The LCR established an action level for lead and copper levels in drinking water based on the 90th percentile testing results of water samples for system-wide corrosion potential. An action level exceedance is not a violation of a health-based standard, but instead triggers other requirements such as additional monitoring, treatment techniques and public education. In 2016, the EPA released a recommended procedure for collecting lead and copper samples in response to issues observed in Flint, Michigan. EPA is also currently reviewing the LCR to determine if revisions are necessary to better protect the public from lead and copper exposures.

For overseas installations, the OEBGD and the CNIC Instructions incorporate the same language as the SDWA. In addition, the applicable FGS for any specific country may include more protective requirements of the host nation.

While it is not the intent of this report to summarize all on-going sampling occurring at Navy installations under the LCR (as exceedances of the action level are not considered health-based violations under the current definition), due to the increased visibility of lead in drinking water issues, this report includes updates on exceedances of the action levels for the Regulated PWS and ODW systems. The exceedances listed below were reported to CNIC in FY19. Each exceedance has a unique response due to the nature of the systems and populations affected. In each case, the installation consulted with their local PMA, as required by OPNAV policy and alternate water was issued if recommended.

- **CFA Chinhae (CNFK Busan HQ).** Copper exceedance previously reported in FY16 due to corrosivity of the purchased water. The installation implemented a short-term solution of installing point-of-use filters until a corrosion control system was installed and became operational in November 2017. Adjustments to the corrosion control system chemical feed eliminated the copper exceedances effective August 2018. The temporary filters were no longer required and removed in June 2019.

- **NSF Diego Garcia (Deep Draft Wharf).** The system was secured in April 2017 when test results showed levels of lead in its distribution system exceeded the action level (AL). An assessment of the distribution system in April 2018 concluded that the lead exceedance is due to the corrosive water produced from the nanoflitration plant (since it has no capability to control pH) and non-lead free backflow prevention devices and accessories in the service lines at the Bravo Wharf. Latest test results indicated levels of lead in the distribution system still exceed AL. Alternative FFHC water is being trucked to any ships and submarines at the wharf from the Nanofiltration Hauled ODW system. Backflow preventers at wharf service lines will be replaced by early next year. Additionally, a Material Evaluation Survey will be conducted on the water distribution systems to identify potential lead and copper sources. Target date to resolve lead issue is end of FY20.

- **NAB Coronado (NALF San Clemente Island System).** Because of an FY17 lead exceedance, the installation accelerated the regulatory mandated five-year lead and copper sampling schedule at high risk locations on the base and completed by 30 September 2018. Of the 81 samples taken, only nine locations required corrective actions; two were resolved and reported in the FY18 annual report. One was resolved in FY2019. The six remaining buildings should be resolved by the end of FY20.

- **NAVSTA Newport (Main Base System).** Lead exceedance reported in FY17 is still undergoing investigation. The installation has returned to a routine monitoring schedule, as required under the Lead and Copper Rule. Additionally, as a part of the corrective action plan, a corrosion control evaluation and materials survey was submitted to the local regulatory agency in June 2019. On December 31, 2019, the Navy submitted what corrective actions are planned to the regulator and we are awaiting their response. Alternate water continues to be provided at the affected locations per installation leadership.

- **COMFLEACT Yokosuka (Nagai Water System).** Lead samples collected during August 2018 exceeded the standards at one sink, but the 90^{th} percentile action level for the water system was not exceeded. Use of the water outlet was limited to hand washing (employees were notified and a sign was posted at the sink). The water outlet was then replaced with a NSF 61 lead free certified product but high lead levels continued. Standard sampling conducted during February, April and May 2019 indicated the one outlet still exceeded the standard. The corrective action is to install a NSF 53 certified point of use filter treatment at this sink. The use of the outlet is continued to be limited to hand washing until completion of filter installation and confirmation of lead level by sampling.

Sampling and Testing for Perfluoroalkyl and Polyfluoroalkyl Substances

Per OPNAV N45 policy, *Navy Drinking Water Sampling Policy for the Perfluorochemicals (PFC) perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA),* all required drinking water sampling for Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) was completed as outlined in the FY16 annual report. Sampling included all 80 regulated Navy water systems in the U.S., the 52 ODW systems, the 171 consecutive water systems classified as other-PWS and the 33 small systems classified as non-PWS. A comprehensive review of Navy drinking water systems conducted in FY17 revised the water system inventory numbers to 79 regulated, 185 other, and 36 non-PWS. PFAS data was collected for the systems added to the inventory, with the exception of a non-operational system in Puerto Rico. All newly identified systems, except Puerto Rico, have PFAS results below the Lifetime Health Advisory (LHA) of 70 parts per trillion (ppt), or 0.070 parts per billion (ppb).

Five water systems at three installations (NALF Fentress, NSF Diego Garcia, and NRTF Dixon) identified in the 2016 annual report had PFAS identified above the 70 ppt, or 0.070 ppb, LHA level. The FY18 annual report detailed progress at the three locations and there has been no change for FY19. NALF Fentress and NSF Diego Garcia continue to provide drinking water below the LHA and NRTF Dixon will be on alternate water indefinitely.

When new Navy drinking water systems are identified, PFAS results will be obtained to document baseline conditions in accordance with Navy policy.

Additional off-installation PFAS testing of private drinking water wells is occurring as part of the Navy's Environmental Restoration and Base Realignment and Closure (BRAC) programs. As the systems being tested are privately owned, and are not Navy drinking water systems, results are not captured in this report.

Assessment, Operation and Maintenance

Compliance monitoring gives a clear picture of the current water quality and associated impacts. However, to fully assess both current and future risks to water quality, compliance monitoring is supplemented with sanitary surveys.

Navy Drinking Water Systems under EPA Jurisdiction

The U.S. EPA and states conduct sanitary surveys of public water systems, including Navy systems, every three years for surface water systems and every five years for ground water systems. In FY19, forty-one SDWA inspections were performed by a federal or state regulator at twenty-six Navy installations, of which three were sanitary surveys at three Navy installations. Upon completion of an inspection, a report is issued to the installation noting all findings. Where deficiencies are noted that may affect water quality, immediate corrective action is initiated by the installation. At the end of FY19 only three significant deficiencies identified by the local regulator this fiscal year were still unresolved: two at NSA Crane and one at NALF San Clemente Island. A cumulative total of 57 significant deficiencies were identified as open from sanitary surveys performed since 2016 at 18 water systems located at 11 installations. The

U.S. EPA, or the state delegated primacy agency, may issue a Notice of Violation or an Administrative Order for any water quality deficiencies and did so for improper treatment chemicals at NSA Anderson in FY19 which resulted in an $83,700 fine.

Navy ODW Systems

For ODW systems, the WQOC conducts sanitary surveys every three years, regardless of water source, to ensure high quality water systems are operating across the enterprise. Sanitary surveys can include visiting foreign water treatment plants servicing Navy installations for observation. The WQOC conducts surveys aligning with the eight EPA survey elements: water source; treatment; distribution; storage; pumps, pump facilities, controls; monitoring, sampling and reporting; management and operations; and operator training and certification. A WQOC sanitary survey report is published within 90 days of the site visit. Upon receipt, the installation prepares a plan of action and milestones (POAM) addressing each deficiency and identifies corrective actions in a real-time online tracking database, known as the ODW Requirements POAM. The Requirements POAM is reviewed by the RWQB and WQOC on a quarterly basis to ensure continuous planning, programming and execution of corrective actions. Installations and regions update the ODW Requirements POAM quarterly to report on progress of deficiency corrections. FY19 was the start of the third cycle of sanitary surveys. The third cycle benefited from lessons learned from the second cycle, including the analysis of common roadblocks to resolving significant deficiencies, ongoing development of solutions for enterprise data management, and refinement of policies to reflect program maturity.

In FY19 the WQOC conducted five sanitary surveys at the following installations: NUWC Det AUTEC, NAF Misawa-Hachinohe, NAS Sigonella, CFA Chinhae, and NSF Deveselu. A total of ten ODW systems were evaluated, identifying 277 deficiencies (of which 68 carried over from prior sanitary surveys): 79 significant, 94 moderate and 104 minor. All 277 deficiencies identified in FY19 are programmed for corrective action across the Future Years Defense Program.

A significant deficiency may be a contaminant exceedance or operational deficiency. A contaminant exceedance has the potential to affect human health, and therefore requires public notification. An operational deficiency is a defect in design, operation or maintenance; or a failure or malfunction of the source, treatment, storage or distribution system that has the potential to cause the introduction of contamination into the water. A significant operational deficiency, if left unaddressed, could cause a health-based exceedance and loss of confidence in in the drinking water by the fleet, fighter and family. The most commonly identified deficiencies in WQOC sanitary surveys include water treatment, finished water storage, water system management and operations and monitoring/reporting data validation. The highest percentage of significant deficiencies documented are attributed to treatment, and management and operations. An alternate compliance process for Surface Water Treatment requirements was promulgated in FY17 to assist with the compliance demonstration of purchased water within the installation fence line. Select installations in Far East have begun pursuing alternative compliance and EURAFCENT installations are scheduled to begin surface water treatment monitoring in FY20 which will provide a path forward for compliance. In FY20, the WQOC plans to develop guidance on effective cross-connection control and backflow prevention programs and

standardize operator reporting procedures to help address common management and operation deficiencies.

The ODW program requires all ODW system operators in responsible charge (ORC) and assistant operators in responsible charge (AORC) to meet specific criteria for education qualifications, training, examination and continuing education. In FY19, ODW systems with certified operators fluctuated between 77% and 91% which is attributable to staffing turnover. Appendix D contains a listing of each ODW system and its corresponding operator training requirements.

All ODW systems are required by CNIC Instruction to obtain a Certificate to Operate (CTO). The CTO is based on the overall health and readiness of the system, which must be renewed every three years. As shown in the CTO Planning Flowchart below (Figure 2), the RWQB and WQOC evaluate the latest sanitary survey report and ODW requirements POAM progress before making recommendations for a conditional, full or no CTO. The REGCOM, upon review of all aspects of a system's performance (e.g., training, certifications and system checks), and a recommendation from the WQOC, will issue the CTO.

In FY19, 10 conditional CTOs were reissued, bringing the total to 46 conditional CTOs and one full CTO (Singapore Area Coordinator) for the 47 ODW systems. Appendix D provides an inventory of the 47 ODW systems, actual or planned date of the sanitary survey and CTO issuance and level of operator training required.

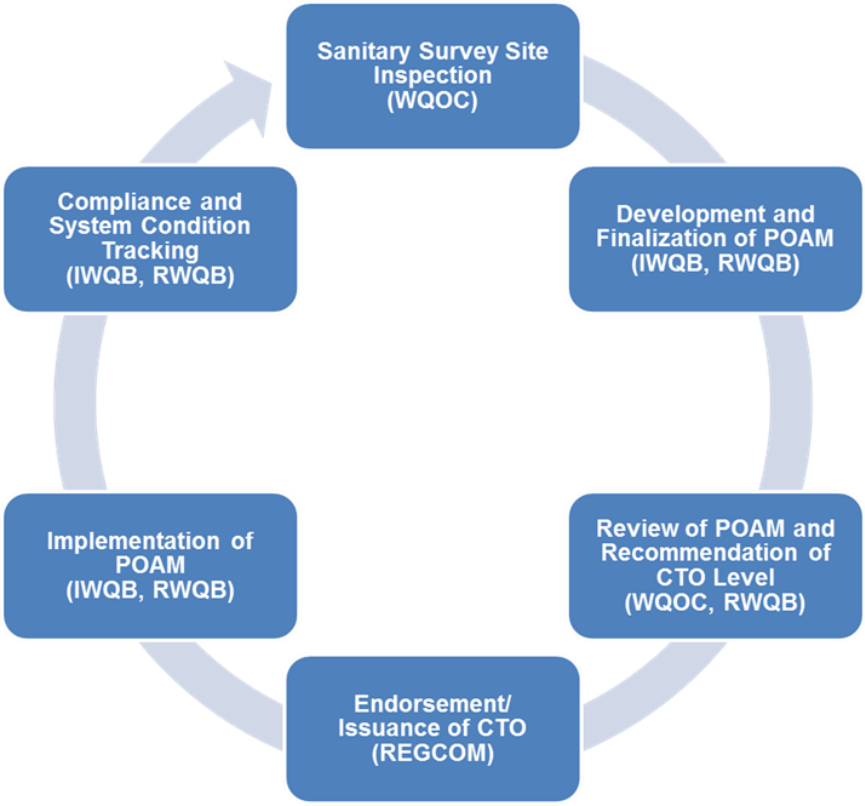

Figure 2. Certificate to Operate Planning Flowchart (Action Holder indicated in parenthesis)

FY19 Projects and Accomplishments

FY19 Projects

The value of executed projects and other investments for FY19 was comparable to the value projected in the FY18 report. Project scopes of work include minor repairs, water line replacement and repair, water treatment plant and distribution improvements, water treatment plant generator replacement, SCADA system replacement and repairs, reverse osmosis train repair, and water tank replacement and repair.

For the 79 systems under EPA jurisdiction, 29 projects totaling $78.2M were executed.

CNRH	7 projects	$14.3M
CNRMA	6 projects	$8.7M
CNRNDW	7 projects	$27.9M
CNRNW	1 project	$5.2M
CNRSW	2 projects	$6.3M
CJRM	6 projects	$11.5M
CNRSE	2 projects	$4.3M

For the 47 ODW systems, the value of the executed projects and other investments for FY19 was considerably more than the $19.2M projected in the FY18 report. Twelve projects totaling $31.2M were executed.

CNREURAFCENT	5 projects	$17.7M
CNRJ	4 projects	$5.5M
CNRSE	3 projects	$8.0M

FY19 Accomplishments

- Completed $109.4M of investments to drinking water infrastructure.
- CNIC published the sixth annual Navy Shore Drinking Water Quality Report.
- Installations issued all annual CCRs by July 1, 2019.
- CNIC and NAVFAC trained 73 individuals, including prospective ICOs, on their roles in Navy's drinking water program.
- NAVFAC trained 27 individuals, including operations and capital improvement personnel, on both the Safe Drinking Water Act and Overseas Drinking Water Program via online professional development training modules.
- BUMED trained 78 individuals (15 Environmental Health Officers, 60 Preventive Medicine Technicians, and 3 Civilian Environmental Specialists) on public health surveillance and responses to drinking water issues during four Preventive Medicine Drinking Water Training Courses.
- WQOC conducted quarterly ODW Stakeholders meetings, both in-person and virtual, to brief ODW progress to CNIC, NAVFAC and BUMED Flag Officer principals; and invited OPNAV N45 and N46, and DASN(E) participation.

- WQOC face-to-face workshop held 16-18 July 2019 at the Washington Navy Yard, 21 attendees participated.
- Achieved FY19 WQOC ODW Plan and Objectives
  - **Draft revised CNIC Manuals 5090.1, 5090.2, and 5090.3.** Consolidated all manuals into one ODW Program Manual, CNIC M-5090.1A, and updated ODW laboratory policy, operator requirements, and other standards since the June 2018 revision.
  - **CTO Case Studies.** Conducted case studies of two locations undergoing sanitary surveys in FY19 (CFA Chinhae and NAS Sigonella) and reviewed issues and identified roadblocks associated with attaining full CTO.
  - **ODW System Definition and Criteria.** Reviewed and revised the ODW System Definition and Inventory Criteria.
  - **BOS Contract Template.** In cooperation with FSC, reviewed and standardized the BOS contract specification template for Navy Overseas Drinking Water systems.
  - **Preventive Medicine Authority Training Courses**. Held four PMA training courses in Jacksonville, FL (22-25 January 2019), Bremerton, WA (1-5 April 2019), Naples, IT (17-21 June 2019), and Yokosuka, JA (19-21 August 2019) to continue to improve knowledge of the Navy medical role and responsibilities in the Navy's drinking water program.
  - **NAVMED P-5010-5**. Issued revised NAVMED P-5010-5, Water Supply Ashore to incorporate updates since the 2008 version.
  - **Three laboratory assessments**. NAVSEA Laboratory Quality and Accreditation Office (LQAO), on behalf of the WQOC Laboratory Authority, conducted two Phase-2 (Additional contaminant sampling and analysis) laboratory assessments at NS Guantanamo Bay and NSF Diego Garcia. NAVSEA LQAO also performed an onsite assessment of a contract laboratory for NSF Deveselu, Romania.
  - **Drinking Water Sampling Training Course**. Held a drinking water sampling course in NAVSTA Rota, Spain to improve installation drinking water sampling compliance.
  - **Chemical Certification**. Completed transition for the 11 remaining drinking water treatment chemicals to NSF/ANSI Standard 60. The initial 9 chemicals were included in the WQOC FY18 Plan and Objectives.
- WQOC Sanitary Surveys
  - Conducted five sanitary surveys of 10 ODW systems.
  - Re-issued conditional CTOs for 10 ODW systems.
- WQOC Technical Advisory Board
  - Performed engineering regulatory review of drinking water design, construction and process-change projects for meeting drinking water quality standards
  - Issued interim CTOs for the CNFK Busan drinking water system following the addition of a soda ash system for corrosion control and for the NSF Diego Garcia Main Water Treatment Plant following the addition of a raw water aerator.
  - Coordinated with EURAFCENT and U.S. Army Corps of Engineers to evaluate and provide feedback on water treatment system designs for NSF Deveselu and NSF Redzikowo.

- WQOC Laboratory Authority
  - NAVSEA LQAO, on behalf of the WQOC Laboratory Authority conducted drinking water sampling training from 3-7 June 2019 in Rota, Spain.
  - Conducted two onsite laboratory assessments at NSF Diego Garcia (April 8-12, 2019) and NS Guantanamo Bay (February 2-8, 2019) and one contract laboratory assessment for NSF Deveselu, Romania (September 18-20, 2019).
  - Continued to provide technical assistance to NS Guantanamo Bay and NSF Diego Garcia to resolve findings identified during onsite laboratory assessments.
  - Continued coordination with U.S. Army Public Health Command to resolve drinking water sampling compliance challenges in EURAFCENT.
  - Reviewed and validated third-party accredited laboratories as requested.
- WQOC Navy Operator Certification Authority Board
  - Held Annual NOCA Board Face to Face Workshop from August 5-8, 2019 at NAVFAC Southeast.
  - Administered Navy operator certification exams to 58 potential drinking water operators.
  - Recommended 65 drinking water operators for Navy certification.

FY20 Projects and Planned Actions

FY20 Projects

For the projected 79 systems under EPA jurisdiction, 29 projects totaling $123.8M are planned for execution. Project scopes of work include minor repairs, water line replacement and repair, water treatment plant and distribution improvements, backflow prevention repairs, pump station repairs, water meter installation, well repair water system security upgrades, reverse osmosis train repair, and water tank repair. These projects will help address existing deficiencies and reduce exceedances.

CNRH	9 projects	$40.8M
CNRMA	4 projects	$11.1M
CNRNDW	2 projects	$25.4M
CNRNW	2 projects	$0.6M
CNRSW	3 projects	$28.8M
CJRM	9 projects	$16.0M
CNRSE	2 projects	$1.1M

For the projected 47 ODW systems, the value of planned projects and other investments for FY20 is considerably more than the $19.2M projected in the FY19 report. Fourteen projects totaling $36.3M are planned for execution.

CNREURAFCENT	3 projects	$17.7M
CNRJ	6 projects	$1.0M
CNRSE	5 projects	$17.6M

FY20 Planned Actions

Building on the previous year's accomplishments, the ODW program continues its momentum towards program sustainability. The program will continue to increase program management capacity to establish sustainment, with a focus on training and outreach to the regions and installations. The WQOC will progressively and incrementally accomplish goals and objectives. The following are discrete objectives for FY20:

- **PMA Drinking Drinking Water Training Course.** Organize and hold five Preventive Medicine Authority (PMA) Drinking Water Training Courses.
- **PMA Drinking Water Course Modules.** Revise Preventive Medicine Authority (PMA) Drinking Water Course modules and lesson training guides.
- **Laboratory Visits.** Conduct three laboratory visits. Two under routine biennial assessments, and one moving through Phase 2 for additional contaminant sampling and analysis.
- **Effective Cross-Connection Control and Backflow Prevention.** Provide guidance to region and installation water quality boards on "effective" cross-connection control and backflow prevention programs.
- **Standardize Operator Reporting Procedures.** Review and revise standard operating procedures for overseas drinking water operator reporting requirements.
- **Regional Outreach Workshops**. Hold three regional face-to-face workshops to foster collaboration and communication between headquarters and region/installation staff and expand scope and workshop audience to- include Facilities and Housing representatives. Workshops to be held in Jacksonville, Florida (February 19-20, 2020), Naples, Italy (March 17-19, 2020), and Yokosuka, Japan (April 21-23, 2020).
- **Database Improvements**. Implement database improvements to the ODW Requirements POAM; incorporating new data management functionality and visualization.
- **Sanitary Survey Request for Information.** Provide an organized, easily managed, online folder structure for sanitary survey request for information (RFI) data; provide training and assistance to installations; check files periodically.

Appendix A: Inventory of Drinking Water Systems under EPA Jurisdiction

Installation Name	*Water System*	*Source Type*[1]	*Population Served*
NAVY REGION HAWAII			
JOINT BASE PEARL HARBOR-HICKAM HI	Camp Stover Water System	Consecutive	595
JOINT BASE PEARL HARBOR-HICKAM HI	NAVMAG PH (Lualualei) Water System	Primary Groundwater	114
JOINT BASE PEARL HARBOR-HICKAM HI	NCTAMS PACIFIC Water System	Primary Groundwater	6,470
JOINT BASE PEARL HARBOR-HICKAM HI	Joint Base Pearl Harbor Hickam Water System	Primary Groundwater	65,230
PACIFIC MISSILE RANGE FACILITY BARKING SANDS HI	Pacific Missile Range Facility Barking Sands Water System	Primary Groundwater	1,200
NAVY REGION MID-ATLANTIC			
ABL ROCKET CENTER WV	NIROP Allegany Ballistics Laboratory	Groundwater Under Direct Influence of Surface Water	1,600
JEB LITTLE CREEK-FORT STORY VA	JEB Little Creek Fort Story VA (Little Creek)	Consecutive	9,782
NAS OCEANA VA	Dam Neck	Consecutive	3,000
NAS OCEANA VA	NAS Oceana Fentress VA (OLF Fentress)	Primary Groundwater	40
NAS OCEANA VA	NAS Oceana (COMNAV MIDLANT)	Consecutive	7,900
NAVSTA GREAT LAKES IL	NTC Great Lakes IL NAVSTA Great Lakes	Primary Surface Water	21,253
NAVSTA NEWPORT RI	NAVSTA Newport – RI (Fort Adams)	Consecutive	319
NAVSTA NEWPORT RI	NAVSTA Newport – RI (Main Base)	Consecutive	7,871
NAVSTA NORFOLK VA	DFSC Craney Island	Consecutive	100
NAVSTA NORFOLK VA	Naval Station Norfolk	Consecutive	48,300
NSS NORFOLK NAVAL SHIPYARD VA	NSA Norfolk Naval Shipyard	Consecutive	17,000
NSS NORFOLK NAVAL SHIPYARD VA	St. Juliens Creek Annex Drinking Water (East and West)	Consecutive	1,500
NSA CRANE IN	NSA Crane	Primary Surface Water	5,543
NSA HAMPTON ROADS VA	NMC Portsmouth (NSA Hampton Roads) VA Consecutive Water System	Consecutive	6,350
NSA HAMPTON ROADS VA	NSA Northwest (NSA Northwest Annex)	Primary Groundwater	2,397
NSY BOS PORTSMOUTH NH	NSY Portsmouth ME (Great Pond Cabins 1-5)	Primary Groundwater	30
NSY BOS PORTSMOUTH NH	NSY Portsmouth NH (Great Pond Campground)	Primary Groundwater	36
NSY BOS PORTSMOUTH NH	NSY Portsmouth ME (Great Pond REC Hall)	Primary Groundwater	25

Installation Name	*Water System*	*Source Type*[1]	*Population Served*
NSY BOS PORTSMOUTH NH	NSY Portsmouth ME Rangely Multipurpose (wells #1 and #2)	Primary Groundwater	33
NSY BOS PORTSMOUTH NH	NSY Portsmouth ME Rangely Training Lab	Primary Groundwater	33
WPNSTA EARLE COLTS NECK NJ	WPNSTA EARLE COLTS NECK – MSC Fire School	Primary Groundwater	25
WPNSTA EARLE COLTS NECK NJ	WPNSTA EARLE COLTS NECK – NJ Consecutive System Main Base	Consecutive	1,200
WPNSTA YORKTOWN VA	COMNAVREG MIDLANT (NWS Yorktown)	Consecutive	2,100
WPNSTA YORKTOWN VA	Cheatham Annex Water System	Consecutive	800
WPNSTA YORKTOWN VA	NWS Yorktown Pistol Range	Groundwater	50
WPNSTA YORKTOWN VA	NWS Yorktown Rifle Range	Groundwater	98
NAVAL DISTRICT WASHINGTON			
JB ANACOSTIA-BOLLING DC	JBAB - Anacostia	Consecutive	16,559
NAS PATUXENT RIVER MD	NAS Patuxent River	Groundwater	23,000
NAS PATUXENT RIVER MD	NAS Patuxent River, Solomons	Groundwater	600
NAS PATUXENT RIVER MD	NAS Patuxent River, Webster Field	Groundwater	1,200
NSA ANNAPOLIS MD	NRL Chesapeake Beach Detachment	Primary Groundwater	60
NSA ANNAPOLIS MD	USNA Annapolis (NSA Annapolis)	Primary Groundwater	8,700
NSA SOUTH POTOMAC MD	NSF Indian Head (NSA South Potomac)	Primary Groundwater	3,321
NSA SOUTH POTOMAC MD	NSF Indian Head (NSA South Potomac) Stump Neck Annex	Primary Groundwater	495
NSA SOUTH POTOMAC MD	NSWC Dahlgren Mainside (NSA South Potomac)	Primary Groundwater	11,224
NSA SOUTH POTOMAC MD	NSWC Dahlgren Pumpkin Neck (NSA South Potomac)	Primary Groundwater	25
NSA WASHINGTON DC	NSA Washington – Washington Navy Yard	Consecutive	15,700
NSA WASHINGTON DC	NRL – Blossom Point	Primary Groundwater	125
NSA WASHINGTON DC	U.S. Naval Observatory	Consecutive	250
NAVY REGION NORTHWEST			
NAS WHIDBEY ISLAND WA	Naval Air Station/Whidbey Island	Consecutive	13,867
NAVBASE KITSAP BREMERTON WA	Jackson Park Naval Hospital	Consecutive	2,277
NAVBASE KITSAP BREMERTON WA	Naval Base Kitsap at Bangor	Primary Groundwater	16,828
NAVBASE KITSAP BREMERTON WA	Naval Base Kitsap at Bremerton	Consecutive	12,078
NAVBASE KITSAP BREMERTON WA	Naval Base Kitsap at Keyport	Primary Groundwater	1,540
NAVMAG INDIAN ISLAND	Naval Magazine Indian Island	Consecutive	180

Installation Name	*Water System*	*Source Type*[1]	*Population Served*
NAVSTA EVERETT WA	US Naval Radio Station (T) Jim Creek	Primary Groundwater	200
NAVY REGION SOUTHEAST			
NAS CORPUS CHRISTI TX	NAS Corpus Christi	Consecutive	8,656
NAS JACKSONVILLE FL	NAS Jacksonville Water System	Primary Groundwater	22,000
NAS JRB FORT WORTH TX	NAS JRB Fort Worth Water System	Consecutive	9,000
NAS KINGSVILLE TX	NAS Kingsville	Consecutive	1,520
NAS KINGSVILLE TX	NALF Orange Grove	Primary Groundwater	36
NAS MERIDIAN MS	NAS Meridian	Primary Groundwater	2,800
NAS PENSACOLA FL	Pensacola - NTTC Corry/NAS Pensacola	Primary Groundwater	22,600
NAS PENSACOLA FL	Saufley Field	Consecutive	1,728
NAS WHITING FIELD FL	NAS Whiting Field	Primary Groundwater	3,094
NAS WHITING FIELD FL	NOLF Choctaw	Primary Groundwater	25
NAVSTA MAYPORT FL	Mayport Water System	Primary Groundwater	20,500
NCBC GULFPORT MS	NCBC Gulfport Water System	Primary Groundwater	3,553
NSA MID-SOUTH TN	NSA Mid-South	Primary Groundwater	6,300
SUBASE KINGS BAY GA	SUBASE Kings Bay	Primary Groundwater	9,730
NAVY REGION SOUTHWEST			
NAVBASE CORONADO CA	NALF San Clemente Island	Consecutive	670
NAVBASE CORONADO CA	NAS North Island and NAB Coronado	Consecutive	36,000
NAVBASE CORONADO CA	SERE Camp (Warner Springs RTS)	Primary Groundwater	52
NAF EL CENTRO CA	NAF El Centro	Primary Surface Water	2,063
NAS FALLON NV	NAS Fallon	Primary Groundwater	3,000
NAS FALLON NV	NAS Fallon Centroid	Primary Groundwater	80
NAS LEMOORE CA	NAS Lemoore	Primary Surface Water	12,000
NAVBASE VENTURA CA	NAS Point Mugu (NAVBASE Ventura CO)	Consecutive	5,700
NAVBASE VENTURA CA	NCBC Port Hueneme (NAVBASE Ventura CO)	Consecutive	11,500
NAVBASE VENTURA CA	San Nicolas Island	Primary Surface Water	187
NAWS CHINA LAKE CA	NAWS China Lake Water System (North Range FKA Harvey Field Area)	Primary Groundwater	5,000
NAWS CHINA LAKE CA	South Range (NAWS China Lake FKA Randsburg Wash Area)	Primary Groundwater	150

Installation Name	*Water System*	*Source Type*[1]	*Population Served*
JOINT REGION MARIANAS			
NAVBASE GUAM GU	Navy Water System, Guam	Primary Surface Water	12,500
NSA ANDERSEN GU	Andersen Water System	Primary Groundwater	7,700

1 SOURCE TYPE DEFINITIONS

Groundwater: Groundwater wells isolated from surface water sources
Surface Water: Rivers, lakes, streams
Groundwater Under Direct Influence: Shallow groundwater wells connected with surface water sources
Primary: Navy produced water
Consecutive: Navy purchased water

Appendix B: Inventory of Exempted Drinking Water Systems (U.S. and Territories)

Installation Name	*Water System*	*Source Type*[1]	*Population Served*[2]
NAVY REGION MID-ATLANTIC			
JOINT EXPEDITIONARY BASE LITTLE CREEK FORT STORY VA	JEBLCFS Housing South of Shore Drive (Wellings Ct, Sandpiper Crescent, Port Lyautey)	Consecutive	1,380
JOINT EXPEDITIONARY BASE LITTLE CREEK FORT STORY VA	JEBLCFS Atlantic Beach	Consecutive	120
NAS OCEANA VA	Midway Manor	Consecutive	1,480
NAS OCEANA VA	NEXCOM Headquarters	Consecutive	850
NAS OCEANA VA	NOSC Baltimore MD	Consecutive	950
NAS OCEANA VA	NOSC Greensboro NC	Consecutive	50
NAS OCEANA VA	NOSC MCRC Charlotte NC	Consecutive	50
NAS OCEANA VA	NOSC Raleigh NC	Consecutive	50
NAS OCEANA VA	NOSC Richmond VA	Consecutive	50
NAS OCEANA VA	NOSC Roanoke VA	Consecutive	50
NAS OCEANA VA	Oceana Booth Moore	Consecutive	500
NAVSTA GREAT LAKES IL	Akron Canton AFRC	Consecutive	345
NAVSTA GREAT LAKES IL	Ft Sheridan PPV Housing Area	Consecutive	886
NAVSTA GREAT LAKES IL	Glenview PPV Housing Area	Consecutive	364
NAVSTA GREAT LAKES IL	NOSC Cincinnati	Consecutive	234
NAVSTA GREAT LAKES IL	NOSC Columbus OH	Consecutive	576
NAVSTA GREAT LAKES IL	NOSC Decatur IL	Consecutive	99
NAVSTA GREAT LAKES IL	NOSC Green Bay WI	Consecutive	134
NAVSTA GREAT LAKES IL	NOSC Louisville KY	Consecutive	286
NAVSTA GREAT LAKES IL	NOSC Milwaukee	Consecutive	148
NAVSTA GREAT LAKES IL	NOSC Peoria IL	Consecutive	85
NAVSTA GREAT LAKES IL	NOSC Saginaw MI	Consecutive	103
NAVY MEDICINE EAST	TRICARE Outpatient Clinic Chesapeake, VA	Consecutive	25
NAVY MEDICINE EAST	TRICARE Outpatient Clinic Virginia Beach, VA	Consecutive	25

Installation Name	*Water System*	*Source Type*[1]	*Population Served*[2]
NORFOLK NAVAL SHIPYARD VA	NNSY New Gosport	Consecutive	25
NORFOLK NAVAL SHIPYARD VA	Stanley Ct	Consecutive	279
NSA MECHANICSBURG PA	Naval Support Activity, Mechanicsburg	Consecutive	4,200
NSA MECHANICSBURG PA	Naval Support Activity Philadelphia	Consecutive	6,000
NSA MECHANICSBURG PA	Philadelphia Navy Yard Annex	Consecutive	3,000
NSA MECHANICSBURG PA	NOSC Avoca PA	Consecutive	25
NSA MECHANICSBURG PA	NOSC Ebensburg	Consecutive	25
NSA MECHANICSBURG PA	NOSC Erie PA	Consecutive	25
NSA MECHANICSBURG PA	NOSC Lehigh Valley PA	Consecutive	25
PORTSMOUTH NAVAL SHIPYARD NH	NOSC Buffalo NY	Consecutive	72
PORTSMOUTH NAVAL SHIPYARD NH	NOSC Fort Schuyler NY	Consecutive	85
PORTSMOUTH NAVAL SHIPYARD NH	NOSC Plainville CT	Consecutive	51
PORTSMOUTH NAVAL SHIPYARD NH	NOSC Quincy MA	Consecutive	92
PORTSMOUTH NAVAL SHIPYARD NH	NOSC Schenectady	Consecutive	70
PORTSMOUTH NAVAL SHIPYARD NH	NOSC Syracuse NY	Consecutive	33
PORTSMOUTH NAVAL SHIPYARD NH	NSY Portsmouth ME (Main Base)	Consecutive	6,000
PORTSMOUTH NAVAL SHIPYARD NH	USS Constitution	Consecutive	25
SUBASE NEW LONDON CT	Mitchel Field NY	Consecutive	30
SUBASE NEW LONDON CT	Mitchel Manor 1 NY	Consecutive	500
SUBASE NEW LONDON CT	Saratoga Springs	Consecutive	35
SUBASE NEW LONDON CT	SUBASE NEW LONDON - CT Conning Towers Housing	Consecutive	1,000
SUBASE NEW LONDON CT	SUBASE NEW LONDON - CT Nautilus Park 1, 2, and 3 South Housing	Consecutive	3,700
SUBASE NEW LONDON CT	SUBASE NEW LONDON - CT Polaris Park Housing	Consecutive	300
SUBASE NEW LONDON CT	SUBASENLON Main Base	Consecutive	9,800
SUBASE NEW LONDON CT	SUBASENLON Trident Park Housing	Consecutive	1,100
WPNSTA EARLE COLTS NECK NJ	WPNSTA Earle Colts Neck - NJ Waterfront - Admin Area	Consecutive	47
WPNSTA EARLE COLTS NECK NJ	WPNSTA Earle Colts Neck - NJ Waterfront - Industrial Area	Consecutive	80

Installation Name	*Water System*	*Source Type*[1]	*Population Served*[2]
NAVAL DISTRICT WASHINGTON			
NSA ANNAPOLIS MD	NSA Annapolis North Severn Water System	Consecutive	2,600
NSA BETHESDA MD	NSA Bethesda	Consecutive	12,056
NSA WASHINGTON DC	Arlington Service Center	Consecutive	250
NSA WASHINGTON DC	Naval Maritime Intelligence Center	Consecutive	25
NSA WASHINGTON DC	NSWCCD Carderock Site	Consecutive	2,184
NSA WASHINGTON DC	Washington DC – NRL Main Site Water System	Consecutive	4,144
NAVY REGION NORTHWEST			
NAVAL BASE KITSAP - BANGOR WA	Manchester WA	Consecutive	37
NAVAL STATION EVERETT WA	Bayview ID	Consecutive	94
NAVAL STATION EVERETT WA	NAVSTA Everett	Consecutive	4,000
NAVAL STATION EVERETT WA	NOSC Minneapolis	Consecutive	65
NAVAL STATION EVERETT WA	Pacific Beach	Consecutive	35
NAVAL STATION EVERETT WA	Smokey Point (Family Service Center) Marysville	Consecutive	500
NAVY REGION SOUTHEAST			
CBC GULFPORT MS	Lakeside Housing	Consecutive	300
CBC GULFPORT MS	Woolmarket (De Soto)	Consecutive	100
NAS CORPUS CHRISTI TX	NOSC Harlingen	Consecutive	149
NAS CORPUS CHRISTI TX	NOSC Houston	Consecutive	1,052
NAS CORPUS CHRISTI TX	NOSC San Antonio	Consecutive	710
NAS CORPUS CHRISTI TX	Peary Place Trans Site	Consecutive	25
NAS JACKSONVILLE FL	DLA – DRMS	Consecutive	25
NAS JRB FORT WORTH TX	NOSC Amarillo	Consecutive	97
NAS JRB FORT WORTH TX	NOSC Austin	Consecutive	269
NAS JRB FORT WORTH TX	NOSC El Paso	Consecutive	269
NAS JRB FORT WORTH TX	NOSC Oklahoma City OK	Consecutive	319
NAS JRB FORT WORTH TX	NOSC Tulsa	Consecutive	182
NAS JRB FORT WORTH TX	NOSC Waco	Consecutive	102

Installation Name	*Water System*	*Source Type*[1]	*Population Served*[2]
NAS JRB FORT WORTH TX	NOSC Wichita	Consecutive	119
NAS PENSACOLA	Blue Angels Recreation Area (Bronson Field)	Consecutive	50
NAS JRB NEW ORLEANS LA	NOSC MCRC Shreveport	Consecutive	200
NAS JRB NEW ORLEANS LA	SPAWAR New Orleans, LA	Consecutive	300
NAS JRB NEW ORLEANS LA	NAS JRB New Orleans Plaquemines Parish Govt	Consecutive	9,500
NAS KEY WEST FL	NOSC Miami FL	Consecutive	40
NAS KEY WEST FL	NOSC W Palm Beach	Consecutive	40
NAS KEY WEST FL	NUWC Autec	Consecutive	155
NAS KEY WEST FL	Fleming Key Magazine	Consecutive	54
NAS MERIDIAN MS	OLF Bravo	Consecutive	25
NAVSTA MAYPORT FL	Commissary Site Mayport	Consecutive	500
NAVSTA MAYPORT FL	MAYPORT FISC Jacksonville (Fuel Depot)	Consecutive	25
NAVSTA MAYPORT FL	Mayport Off-Base Housing	Consecutive	2,000
NAVSUPPACT MID-SOUTH TN	NOSC Chattanooga	Consecutive	310
NAVSUPPACT MID-SOUTH TN	NOSC Kansas City MO	Consecutive	307
NAVSUPPACT MID-SOUTH TN	NOSC Knoxville	Consecutive	374
NAVSUPPACT MID-SOUTH TN	NOSC Little Rock	Consecutive	161
NAVSUPPACT MID-SOUTH TN	NOSC Nashville (Smyrna)	Consecutive	285
NAVSUPPACT MID-SOUTH TN	NOSC Springfield	Consecutive	201
NAVSUPPACT MID-SOUTH TN	NOSC St. Louis	Consecutive	201
NAVSUPPACT MID-SOUTH TN	Weldon Spring Training Area	Consecutive	125
NAVSUPPACT PANAMA CITY FL	NOSC NMRC Tallahassee	Consecutive	118
NAVSUPPACT PANAMA CITY FL	NSA Panama City - Consecutive System	Consecutive	4,305
NAWCTSD ORLANDO FL	NOSC Orlando FL	Consecutive	95
NAWCTSD ORLANDO FL	NOSC Tampa FL	Consecutive	180
NAWCTSD ORLANDO FL	NSA Orlando	Consecutive	1,300
SUBASE KINGS BAY GA	Lake Allatoona Area	Consecutive	40
SUBASE KINGS BAY GA	NOSC – MCRC Atlanta	Consecutive	244

Installation Name	*Water System*	*Source Type*[1]	*Population Served*[2]
NAS WHITING FIELD	NOLF Brewton	Consecutive	25
NAS WHITING FIELD	NOLF Evergreen	Consecutive	25
NAS WHITING FIELD	NOLF Harold	Consecutive	25
NAS WHITING FIELD	NOLF Holley	Consecutive	25
NAS WHITING FIELD	NOLF Pace	Consecutive	25
NAS WHITING FIELD	NOLF Santa Rosa	Consecutive	25
NAS WHITING FIELD	NOLF Silverhill	Consecutive	25
NAS WHITING FIELD	NOLF Site 8	Consecutive	25
NAS WHITING FIELD	NOLF Spencer	Consecutive	25
NAS WHITING FIELD	NOLF Wolf	Consecutive	25
NAS WHITING FIELD	OLF Barin	Consecutive	25
NAS WHITING FIELD	Whiting Park	Consecutive	25
NAS WHITING FIELD	Whiting Pines	Consecutive	25
SPACE AND NAVAL WARFARE SYSTEMS CENTER SC	SPAWARSYSCEN Atlantic: North Charleston, SC	Consecutive	1,750
NAVY REGION SOUTHWEST			
NAS FALLON NV	NOSC Reno	Consecutive	125
NAS LEMOORE CA	NOSC Alameda	Consecutive	227
NAS LEMOORE CA	NOSC Sacramento	Consecutive	117
NAS LEMOORE CA	NOSC San Jose	Consecutive	87
NAVSUPPACT MONTEREY	Navy School Annex	Consecutive	400
NAVSUPPACT MONTEREY	NSA Monterey	Consecutive	3,100
NAVBASE CORONADO CA	Imperial Beach OLF	Consecutive	1,415
NAVBASE POINT LOMA CA	Balboa Ave	Consecutive	50
NAVBASE POINT LOMA CA	Lindberg Field	Consecutive	200
NAVBASE POINT LOMA CA	SUBASE San Diego (NAVBASE Point Loma)	Consecutive	14,000
NAVBASE SAN DIEGO CA	1220 Pacific Hwy	Consecutive	513
NAVBASE SAN DIEGO CA	Balboa Hospital	Consecutive	2,981
NAVBASE SAN DIEGO CA	Bayview Hills Housing	Consecutive	2,203

Installation Name	*Water System*	*Source Type*[1]	*Population Served*[2]
NAVBASE SAN DIEGO CA	Broadway complex	Consecutive	1,400
NAVBASE SAN DIEGO CA	Mission Gorge Rec Area	Consecutive	98
NAVBASE SAN DIEGO CA	NAVBASE San Diego	Consecutive	50,000
NAVWPNSTA SEAL BEACH CA	NOSC Moreno	Consecutive	112
NAVWPNSTA SEAL BEACH CA	NWPNSTA Seal Beach – CA	Consecutive	167
NAVWPNSTA SEAL BEACH CA	NWPNSTA Seal Beach Der Norco – CA	Consecutive	1,305
NAVWPNSTA SEAL BEACH CA	NWPNSTA Seal Beach Det Fallbrook – CA	Consecutive	350
NAVWPNSTA SEAL BEACH CA	San Pedro Fuel Depot	Consecutive	50

1 **SOURCE TYPE DEFINITIONS.** All exempted drinking water systems are consecutive systems. Consecutive systems are those where water is purchased from a regulated PWS and distributed through the installation.

Appendix C: Inventory of Privatized Systems (U.S. and Territories)

Installation Name	*Water System*	*Source Type*[1]	*Population Served*[2]
NAVY REGION MID-ATLANTIC			
JEB LITTLE CREEK-FORT STORY VA	Fort Story	Consecutive	2,642
NAVY REGION SOUTHEAST			
NAS KEY WEST	Dredgers Key - Sigsbee	Consecutive	71
NAS KEY WEST	NAS Key West	Consecutive	3,500
NAS KEY WEST	Truman Annex	Consecutive	84
NAS KEY WEST	Trumbo Point Annex	Consecutive	37
NAS KEY WEST	BRMCL (Branch Health Clinic Key West)	Consecutive	83
NAS KEY WEST	NRTF Saddlebunch	Consecutive	2
NSF BEAUFORT	NH Beaufort SC	Consecutive	200

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Appendix D: Inventory of ODW Systems, CTO and Operator Training Requirements

Installation Name	*Water System*	*Source Type*[1]	*Population Served*	*CTO Actual / Planned Dates*		*Operator Training Requirement*[3]
				Most Recent Cert. to Operate[2]	*WQOC Sanitary Survey Site Visit*	
NAVY REGION EUROPE, AFRICA, CENTRAL						
NSA NAPLES ITALY	NSA Naples Capodichino	Consecutive	3,000	Jan-18	Jul-20	T3, D2
NSA NAPLES ITALY	NSA Naples Support Site	Consecutive	4,000	Jan-18	Jul-20	D1
NSA NAPLES ITALY	NSA Naples Olde Mill Inn Gaeta	Consecutive	200	Jan-18	Jul-20	T1, D1
NSA NAPLES ITALY	NSA Naples Carney Park	Consecutive	200	Jan-18	Jul-20	T1, D1
NSA NAPLES ITALY	NAS Naples Lago Patria SATCOM	Consecutive	45	Jan-18	Jul-20	T1, D1
NAVSTA ROTA SPAIN	NAVSTA ROTA	Consecutive	12,141	Dec-18	FY21	T1, D3
NAS SIGONELLA ITALY	NAS Sigonella - NAS I	Groundwater	900	Oct-16	May-19	T3, D1
NAS SIGONELLA ITALY	NAS Sigonella - NAS II	Groundwater	2,600	Oct-16	May-19	T3, D1
NAS SIGONELLA ITALY	NAS Sigonella - Marinai Housing	Groundwater	1,500	Oct-16	May-19	T3, D1
NAS SIGONELLA ITALY	NAS Sigonella - NRTF Niscemi	Consecutive	35	Oct-16	May-19	D1
NSA SOUDA BAY GREECE	NSA Souda Bay	Consecutive	1,300	Apr-18	May-20	T1, D1
NSA BAHRAIN BAHRAIN	NSA – Bahrain (NSA I)	Consecutive	4,000	Mar-19	FY21	T3, D2
NSA BAHRAIN BAHRAIN	NSA – Bahrain (NSA II)	Consecutive	2,000	Mar-19	FY21	T3, D1
NSA BAHRAIN BAHRAIN	NSA – Bahrain (BANZ)	Consecutive	400	Mar-19	FY21	D1
NSA BAHRAIN BAHRAIN	NSA – Bahrain (AV Unit)	Consecutive	300	Mar-19	FY21	D1
SHAIKH ISA AIR BASE (NSA BAHRAIN) BAHRAIN	ISA Air Base	Consecutive	2,200	Mar-19	FY21	T3, D3
CAMP LEMONIER DJIBOUTI	Camp Lemonier, Djibouti	Groundwater	5,300	Apr-18	Mar-20	T3, D2
NSF DEVESELU, ROMANIA	Deveselu, Activation Camp	Groundwater	50	May-17	Sep-19	T1, D1
NSF DEVESELU, ROMANIA	Deveselu, Main Site	Groundwater	250	May-17	Sep-19	T1, D1
NAVY REGION KOREA						
CFA CHINHAE KOREA	COMFLEACT Chinhae	Groundwater	414	Jun-17	Jun-19	T2, D2
CFA CHINHAE KOREA	CNFK HQ Busan	Consecutive	80	Nov-16	Jun-19	T1, D1

Installation Name	*Water System*	*Source Type*[1]	*Population Served*	*CTO Actual / Planned Dates*		*Operator Training Requirement*[3]
				Most Recent Cert. to Operate[2]	*WQOC Sanitary Survey Site Visit*	
NAVY REGION JAPAN						
NSF DIEGO GARCIA BRITISH INDIAN OCEAN TERRITORY (BIOT)	Main Water System	Groundwater Under Direct Influence	3,000	Feb-18	Jun-20	T3, D3
NSF DIEGO GARCIA BIOT	Nanofiltration Hauled Water	Groundwater Under Direct Influence	3,000	Feb-18	Jun-20	T3, D2
NSF DIEGO GARCIA BIOT	Deep Draft Wharf	Groundwater Under Direct Influence	100	Feb-18	Jun-20	T3, D1
CFA YOKOSUKA JAPAN	Fleet Mail Center Water System	Consecutive	18	Oct-17	Apr-20	D1
CFA YOKOSUKA JAPAN	Azuma/Hakozaki Fuel Terminal	Consecutive	180	Oct-17	Apr-20	D1
CFA YOKOSUKA JAPAN	Ikego Housing	Consecutive	3,100	Oct-17	Apr-20	T1, D1
CFA YOKOSUKA JAPAN	Nagai Communication Facility	Consecutive	1	Oct-17	Apr-20	D1
CFA YOKOSUKA JAPAN	Tsurumi OU1/OU2 Fuel Terminal	Consecutive	75	Oct-17	Apr-20	D1
CFA YOKOSUKA JAPAN	Urago Ordinance Munitions	Consecutive	39	Oct-17	Apr-20	D1
CFA YOKOSUKA JAPAN	Yokosuka Base Water System	Consecutive	30,000	Oct-17	Apr-20	T2, D3
CFA OKINAWA JAPAN	Camp Shields Facility Water System	Consecutive	613	Dec-18	FY21	D1
CFA OKINAWA JAPAN	White Beach Facility Water System	Consecutive	644	Dec-18	FY21	D2
CFA OKINAWA JAPAN	Awase Water System	Consecutive	15	Dec-18	FY21	D1
CFA OKINAWA JAPAN	Tengan Pier	Consecutive	0	Dec-18	FY21	D1
NAF ATSUGI JAPAN	NAF Atsugi	Groundwater	6,700	Oct-18	FY21	T2, D2
NAF MISAWA JAPAN	FLC Yokosuka, Hachinohe Fuel Terminal	Consecutive	23	Dec-19	Mar-19	D1
CFA SASEBO JAPAN	Main Base	Consecutive	6,000	May-19	FY21	D3
CFA SASEBO JAPAN	Akasaki	Consecutive	114	May-19	FY21	D1
CFA SASEBO JAPAN	Iorizaki POL	Consecutive	25	May-19	FY21	D1
CFA SASEBO JAPAN	Yokose	Consecutive	218	May-19	FY21	T1, D1
CFA SASEBO JAPAN	Hario Village	Consecutive	972	May-19	FY21	D1
CFA SASEBO JAPAN	Hario Shima	Consecutive	25	May-19	FY21	D1
CFA SASEBO JAPAN	Maebata	Consecutive	105	May-19	FY21	D1

Installation Name	*Water System*	*Source Type*[1]	*Population Served*	*CTO Actual / Planned Dates*		*Operator Training Requirement*[3]
				Most Recent Cert. to Operate[2]	*WQOC Sanitary Survey Site Visit*	
SINGAPORE AREA COORDINATOR SINGAPORE	Sembawang Water System	Consecutive	500	**Feb-18**	Aug-20	D1
NAVY REGION SOUTHEAST						
NAVSTA GUANTANAMO BAY CUBA	Desalination Plant	Surface Water	5,848	Jun-19	FY21	T3, D3
AUTEC ANDROS ISLAND BAHAMAS	NUWCDETAUTEC	Groundwater Under Direct Influence	800	May-17	Dec-18	T3, D1

1 SOURCE TYPE DEFINITIONS.
Groundwater: Groundwater wells isolated from surface water sources
Surface Water: Rivers, lakes, streams
Groundwater Under Direct Influence: Shallow groundwater wells connected with surface water sources
Consecutive: Navy purchased water

2 CERTIFICATE TO OPERATE STATUS. Bolded date indicates full certificate to operate. All other dates indicate conditional certificate to operate.

3 OPERATOR REQUIREMENT DEFINITIONS. Each system has a letter indicating system type and a number indicating complexity, requiring varying degrees of training.
D: Drinking water Distribution system as defined by RWQB inventory.
T: Drinking water Treatment system as defined by RWQB inventory.
1: Low system complexity.
2: Medium system complexity.
3: High system complexity.

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Appendix E: Drinking Water Systems under EPA Jurisdiction with Exceedances

Exceedance #1
Installation (System): NSA Andersen- Anderson Water Systems
Exceedance: Unapproved treatment process; Pool Time Chlorination Tabs
Notification Date: 03 January 2019
Duration: 45 days
Population Served: 200
Description of Exceedance: The operators of the water system introduced a new treatment process in lieu of the approved Hypochlorite Generator system (MIOX) without first obtaining approval from Guam EPA in violation of 22 GAR §6141.S(c). Operators used "Pool Time Chlorination Tabs (3-in-1 Formula)" which contains pesticide products. Guam EPA issued an $83,700 fine for use of the chemicals.
Plan of Action and Milestones: CLOSED Feb 2019. The operators immediately stopped using the "Pool Time Chlorination Tabs (3-in1 Formula)" upon the inspection on 28 Dec 2018. The water system tanks were cleaned and lines flushed, the MIOX system repaired and treatment resumed using sodium hypochlorite. Public notice was issued to customers 16 Jan 2019.
Contingency Plans to Provide Alternate Water Supplies: Contingency plans were not applicable.

Exceedance #2
Installation (System): Joint Base Anacostia Bolling (JBAB) – Anacostia
Exceedance: Undetectable disinfection residual
Notification Date: 12 February 2019 and 17 September 2019
Duration: 60 days
Population Served: 50
Description of Exceedance: January and August 2019 routine sampling results for JBAB showed greater than 5% of distribution system samples with an undetectable disinfectant residual. This marked the second consecutive month with greater than 5% of distribution system samples having an undetectable disinfectant residual. Per 40 CFR 141.72, this is a treatment technique violation triggering a Tier 2 public notification.
Plan of Action and Milestones: CLOSED on 24 Sep 2019. The hydrant that was previously used to flush the building in question was the incorrect one (maps inaccurate). The correct hydrant has since been identified allowing the building chlorine levels to rise once rigorous flushing was conducted.
Contingency Plans to Provide Alternate Water Supplies: Contingency plans were not applicable.

Exceedance #3
Installation (System): NAS Lemoore
Exceedance: Total Trihalomethane (TTHM)
Notification Date: 23 August 2018 & 09 October 2018
Duration: 180 days
Population Served: >10,000
Description of Exceedance: Exceeded the locational running annual average (LRAA) MCL limit for TTHM (80 parts per billion (ppb)) in the 4th Quarter FY18 at one location on the operations side of the base. The LRAA was 80.6 ppb. This exceedance is a continuation from 4th Quarter FY2018.
Plan of Action and Milestones: CLOSED on 6 Feb 2019. Operational Tanks 52 & 53 were drained and cleaned in October 2018. Additionally, turnover rates were altered and automatic flushers implemented in the affected areas to increase turnover. Monitoring will continue as required. Compliance with the MCL is required for four consecutive quarterly events; of a target of 2nd quarter FY2019.
Contingency Plans to Provide Alternate Water Supplies: Contingency plans were not applicable.

Exceedance #4
Installation (System): WPNSTA Earle Colts Neck Main Base
Exceedance: Total Trihalomethane (TTHM)
Notification Date: December 5, 2018
Duration: 137 days
Population Served: 1,200
Description of Exceedance: Exceeded the locational running annual average (LRAA) MCL limit for TTHM (80 parts per billion (ppb)) at both sampling locations during the 4th quarter of calendar year 2018. The running annual average returned to compliance based on samples collected in the 2nd quarter of 2019.
Plan of Action and Milestones: CLOSED on 14 Feb 2019. The water supplier, New Jersey American Water (NJAW) installed a ventilation system in their Asbury Avenue Storage tank located just outside the NW Earle fence-line, in an effort to reduce TTHM concentration in their distribution system. Additionally, NWS Earle has installed automatic flushing devices in its distribution system and is installing an aeration system in its water storage tank to supplement the NJAW Asbury Avenue storage tank ventilation system for TTHM removal.
Contingency Plans to Provide Alternate Water Supplies: Contingency plans were not applicable.