

**CERTIFICATE TO OPERATE
CRITERIA AND REQUIREMENTS**

for

**United States Navy Overseas
Navy Drinking Water Systems**

Prepared for

Commander, Navy Installations Command (CNIC) and
Commander, Naval Facilities Engineering Command
(COMNAVFACENGCOM)

Prepared by

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Oversight Council (WQOC)

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Table of Contents

ACRONYMS	ii
1 INTRODUCTION	1-1
1.1 BACKGROUND	1-1
1.2 PURPOSE	1-3
1.3 APPLICABILITY TO US NAVY OVERSEAS DRINKING WATER SYSTEMS	1-3
1.4 CTO PROGRAM OVERVIEW	1-3
2 APPLICABLE REGULATIONS AND POLICIES	2-7
3 CTO PROGRAM AND IMPLEMENTATION PROCESS	3-7
3.1 CTO PROGRAM AND IMPLEMENTATION	3-1
3.2 CTO PROGRAM IMPLEMENTATION PROCESS	3-2
3.3 IMPLEMENTATION TIMELINE	3-5
3.4 CTO LEVELS AND CONFORMANCE	3-5
3.5 ROLES AND RESPONSIBILITIES	3-6
4 THE SANITARY SURVEY	4-1
4.1 OVERVIEW	4-1
4.2 DEFICIENCIES	4-3
4.3 CORRECTIVE ACTIONS	4-6
5 REFERENCES	5-1

FIGURES

Figure 3-1 CTO Program Implementation	3-4
Figure 3-2 Roles and Responsibilities	3-8

APPENDICES

- A. DEFINITIONS**
- B. WATER SYSTEM DESCRIPTION FORM**
- C. WATER SYSTEM SANITARY SURVEY CHECKLIST**
- D. ADDITIONAL EXAMPLES OF SANITARY SURVEY DEFICIENCIES**

ACRONYMS

AWWA	American Water Works Association
BOS Contract	Base Operating Support Contract
BUMED	Bureau of Medicine and Surgery
BUMEDINST	Bureau of Medicine and Surgery Instruction
CCR	Consumer Confidence Report
CNIC	Commander, Navy Installations Command
CNO	Chief of Naval Operations
CNR EURAFSWA	Commander, Navy Region Europe, Africa, Southwest Asia
CNRJ	Commander, Navy Region Japan
CNRK	Commander, Navy Region Korea
CNRSE	Commander, Navy Region Southeast
CTO	Certificate to Operate
CT	Concentration Time
DoD	Department of Defense
DoN	Department of the Navy
DW	Drinking Water
EHO	Environmental Health Officer
EA	Executive Agent
EMS	Environmental Management System
FEC	Facilities Engineering Command
FGS	Final Governing Standards
FSC	Facility Support Contract
GAC	Granular Activated Carbon
GREP	Generally Recommended Engineering Practices
GWUDI	Ground Water Under Direct Influence
HN	Host Nation
NAVIG	United States Navy Inspector General

ICO	Installation Commanding Officer
IWQB	Installation Water Quality Board
MCL	Maximum Contaminant Level
MIL-HDBK	Military Handbook
MSDS	Material Safety Data Sheet
NAVFAC HQ	Naval Facilities Engineering Command Headquarters
NAVFAC LANT	Naval Facilities Engineering Command Atlantic
NAVFAC PAC	Naval Facilities Engineering Command Pacific
NCWS	Non-Community Water System
NMCPHC	Navy and Marine Corps Public Health Center
NRCS	Navy Region Center Singapore
NTNCWS	Non-Transient Non-Community Water System
CO	Commanding Officer
OEBGD	Overseas Environmental Baseline Guidance Document
OPNAVINST	Naval Operations Instruction
PAO	Public Affairs Officer
PMA	Preventive Medicine Authority
POA&M	Plan of Action and Milestones
POC	Point of Contact
PPE	Personal Protection Equipment
PWO	Public Works Officer
PWS	Public Water System
PW UEM	Public Works Utilities Energy Management
REGCOM	Regional Commander
RO	Reverse Osmosis

RWQB	Regional Water Quality Board
SOP	Standard Operating Procedures
SDWA	Safe Drinking Water Act
SECNAV	Secretary of the Navy
SS	Sanitary Survey
TNCWS	Transient Non-Community Water System
UDF	Unidirectional Flushing
UFC	Unified Facilities Criteria
UG	User's Guide
US	United States
USEPA	United States Environmental Protection Agency
VCNO	Vice Chief of Naval Operations
WTP	Water Treatment Pump
WQOC	Navy Overseas Water Quality Oversight Council

**CERTIFICATE TO OPERATE CRITERIA AND REQUIREMENTS
FOR U.S. NAVY OVERSEAS DRINKING WATER SYSTEMS**

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1.0 INTRODUCTION

1.1 BACKGROUND

A significant potential threat to human health and safety can be related to the purity and quality of the water consumed by the public. Drinking water quality standards for Navy overseas drinking water systems have been established. Water fit for human consumption shall meet primary drinking water quality standards. In the event a maximum contaminant level water quality standard is exceeded or other violations occur, public notification to consumers is required. This notification is essential due to the fact that waterborne diseases with widespread cases of illness have been associated with contaminated drinking water, drinking water ownership and operation of a Navy drinking water system constitutes a significant force protection and public health responsibility, and notification to the public is the responsibility of the Navy. To protect public health, drinking water treatment systems must be properly operated, maintained, monitored, and the system operators must be certified as being competent and able to perform all operation and maintenance duties.

In the United States (US), the Commonwealth of Puerto Rico, Guam, American Samoa, the U.S. Virgin Islands, the Northern Mariana Islands, and any other territory or possession over which the US has jurisdiction, many federal and/or state laws and regulations have been developed and adopted to assure that public Navy drinking water system provide safe

drinking water for human consumption. The backbone of the drinking water laws in the U.S. is the Federal Safe Drinking Water Act (SDWA) of 1974 and its amendments of 1986 and 1996. The SDWA regulations promulgated by the U.S. Environmental Protection Agency (USEPA) include provisions that require public drinking water systems be classified and operators be certified by competent authorities. To operate drinking water systems within U.S. jurisdictions, the Navy drinking water systems must comply with all federal and state drinking water regulations, including maintaining applicable permits and operators' certifications in good standing. However, overseas Navy installations are subject to a blend of US and Host Nation (HN) regulations that do not specifically address drinking water systems operator or system certification.

1.2 PURPOSE

The Navy Overseas Water Quality Oversight Council (WQOC) is responsible for developing Certificate to Operate (CTO) criteria and requirements applicable to overseas water systems as described in this document. The Navy Executive Agent (EA) for Drinking Water Ashore, Commander, Navy Installations Command (CNIC), has endorsed the appointment of the WQOC to provide overall management and oversight for the overseas drinking water program, evaluate system performance, and recommend CTO for each system. The main purpose of the CTO Program is to ensure the Navy has implemented an oversight program overseas that results in drinking water system operations that meet or exceed water quality standards in the U.S. This CTO program will fulfill the Secretary of the Navy (SECNAV) directive and CNO imperative as defined in SECNAV memo, Overseas Potable Water Systems, 28 January 2008 and CNO memo, Overseas Potable Water Systems, 1 April 2009 respectively.

1.3 APPLICABILITY TO US NAVY OVERSEAS DRINKING WATER SYSTEMS

This CTO criteria applies to systems on installations only, which includes systems on non-contiguous and/or leased property that is considered to be a part of the installation.

1.4 CTO PROGRAM OVERVIEW

The CTO Program primarily involves the work of the WQOC, Regional Water Quality Boards (RWQBs), and Installation Water Quality Boards (IWQBs). The CTO process includes Sanitary Surveys (SSs) under the direction of the WQOC, development of Plan Of Action and Milestones (POA&M), corrective action implementation, issuance of CTO, and continued Navy drinking water system water quality, and tracking and evaluation efforts to ensure applicable drinking water quality standards are met. The WQOC will provide recommendation for a CTO level based on its review of results of SS and POA&M for each overseas drinking water system, along with water quality compliance monitoring results, water operator and training certification, and documented correction actions to address the POA&M. The final CTO will be issued by the accountable Regional Commander (REGCOM).

Section 2.0 provides a summary of applicable requirements and policies. Section 3.0 discusses the CTO Program and implementation. Section 4.0 discusses SSs as a key step in implementing the CTO Program. Useful information is

provided in the appendices, including definitions (Appendix A), a form for collecting water system information (Appendix B), a Sanitary Survey checklist (Appendix C), and examples of deficiencies identified in Sanitary Surveys (Appendix D).

The CTO Program will be reviewed annually by the WQOC, in coordination with RWQBs, to ensure consistency with new applicable regulatory standards and Department of Defense /Department of Navy (DoD/DON) policies.

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2.0 APPLICABLE REGULATIONS AND POLICIES

Drinking water systems at US Navy overseas installations are subject to requirements that are derived from a comparison of U.S. and host nation (HN) standards and are required to use the more protective of the two. These standards are written in HN-specific Final Governing Standards (FGS), which serve as the primary DoD requirements for water quality and system management regulations. For HNs where FGS have not been established, the Overseas Environmental Baseline Guidance Document (OEBGD, DoD 4715.05-G) serves as the regulation by which compliance status of a Navy drinking water system is determined. The current OEBGD dated May 2007 contains SDWA standards promulgated up to that date. U.S. Navy overseas drinking water systems are also subject to applicable requirements found in the Navy Environmental Readiness Manual (Naval Operations Instruction (OPNAVINST) 5090.1, Bureau of Medicine Instruction (BUMEDINST) 6240.10A, and U.S. Drinking Water Quality Standards for U.S. Navy Installations Overseas (CNICINST 5090.1). Additionally, Environmental Management System (EMS), environmental training and water quality monitoring and testing are among many other requirements that U.S. Navy overseas drinking water systems are subject to. OPNAVINST 5090.1 reinforces the training requirement in requiring that all overseas drinking water treatment and distribution system operators be trained as required by FGS and be provided basic training needed to comply with all applicable federal,

state, and local safe drinking water regulations; Executive Orders; and Navy policies.

There are other standards and guidance documents that govern drinking water facility design, construction, operation, and management. Recognizing that the standards and guidance documents undergo periodic reviews and updates, these documents currently include, but are not limited to, the following:

- NAVMED P-5010 "Manual of Naval Preventive Medicine" Chapter 5 - Water Supply Ashore (23 June 2008)
- User's Guide (UG)-2029-ENV "User's Guide: Cross Connection and Backflow Prevention Program Implementation at Navy Shore Facilities" (May 1998)
- UG-2077-ENV "Potable Water Quality Management Guidance Document"
- Unified Facilities Criteria (UFC) 3-230-02 "Operations and Maintenance: Water Supply Systems" (10 July 2001)
- UFC 3-600-01 "Fire Protection for Facilities Engineering, Design, and Construction" (26 September 2006) (superseded Military Handbook (MIL-HDBK)-1008C)
- UFC 3-230-19N "Water Supply Systems" (7 June 2005) (superseded Military Handbook (MIL-HDBK)-1005/7A)
- Department of Defense (DoD) 4715.05-G, Chapter 3, "Drinking Water" (1 May 2007)
- Department of Navy, Operator in Responsible Charge Training and Certification Program

The above mentioned documents contain information on industry standards and Generally Recommended Engineering Practices (GREPs) which are useful in evaluating Navy drinking water system performance, especially when such information is not found in FGS or the applicable DoD/DON policy documents. For example, UFC 3-230-19N references

useful system operations found in the American Water Works Association manuals (AWWA-M2, M14, and M21) and the USEPA manuals (e.g., USEPA 570/9-91-003 Manual of Public Water Supply Systems and USEPA 570/9-75-001 Manual of Water Well Construction Practices).

Further, with the involvement of multiple Navy echelons responsible for providing drinking water fit for human consumption, Naval Facilities Engineering Command (NAVFAC) issued the Annual Overseas Navy drinking water systems Consumer Confidence Report (CCR) Policy Letter 5090 Ser EV/10011 of 6 July 2010 to better coordinate the efforts of organizations involved in providing safe water at Navy installations. It requires all Navy installations, including outlying facilities and leased government properties (including Navy Housing), to develop and provide to their consumers annual reports on the quality of the water delivered by their systems. Each report must contain data collected during the previous calendar year. The policy, which was developed through the coordination of Chief of Naval Operations (CNO) and CNIC, also provides guidance and requirements for preparation of CCRs, including translation into HN language and identifying requirements contained in the applicable FGS. All overseas activities had to initially distribute the CCR by 1 November 2010 and must distribute new CCRs by 1 July of each year. A copy of the CCRs must be retained by the installation in its respective section of the Overseas Navy drinking water system Database.

While Navy overseas regulations aim at having drinking water systems with competent operators and managers, these

regulations currently do not have specific provisions including criteria and requirements for system CTO.

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3.0 CTO PROGRAM AND IMPLEMENTATION

3.1 CTO Requirements and Criteria

Main requirements and criteria of the CTO Program are listed in Table 3-1. Detailed information on the requirements, criteria, and program implementation are discussed in the subsequent subsections.

Table 3-1 Summary of Requirements and Criteria of the CTO Program

Requirements
➤ Conduct SSs to determine compliance with applicable requirements
➤ Develop and implement the POA&M in a timely manner
➤ Review POA&M and Recommend CTO level
➤ Endorse/ Issue CTO
➤ Conduct system tracking
➤ Obtain CTO by operating drinking water systems to meet applicable requirements and demonstrating conformance with the CTO Program
Criteria
Full CTO
• No significant deficiency; OR
• Timely corrective action taken
Conditional CTO
• One open significant deficiency identified during a previous sanitary survey; OR
• Downgrade from the Full CTO due to moderate/minor deficiencies not being timely corrected (levels of deficiencies are discussed in Section 4.2.)
Revoked CTO
• Failure to resolve or correct all outstanding significant deficiencies in a timely manner; OR
• Downgrade from the Conditional CTO status due to moderate/minor deficiencies not being timely corrected

Information on the implementation of these activities, implementation timeline, CTO levels, and roles and responsibilities is provided in the following sections. SS is discussed in detail in Section 4.0.

3.2 CTO PROGRAM IMPLEMENTATION PROCESS

Once the CTO Program has been established, implementation includes the following essential steps:

- **SS Site Inspection** - An initial SS for Navy overseas drinking water systems at each overseas installation is conducted under the direction of the WQOC to assess existing conditions and water quality status of the system. Through this survey, a list of deficiencies is prepared. The initial and subsequent SSs for Navy drinking water systems are considered the most essential tool used in determining CTO for that facility. A SS Report shall be published. Where a SS has previously been conducted at an installation, a new SS will be completed on a three year cycle. Existing deficiencies will be placed in a POA&M and addressed in accordance with this guidance. Future surveys will follow all requirements in this guidance including utilizing the checklist in Appendix C.

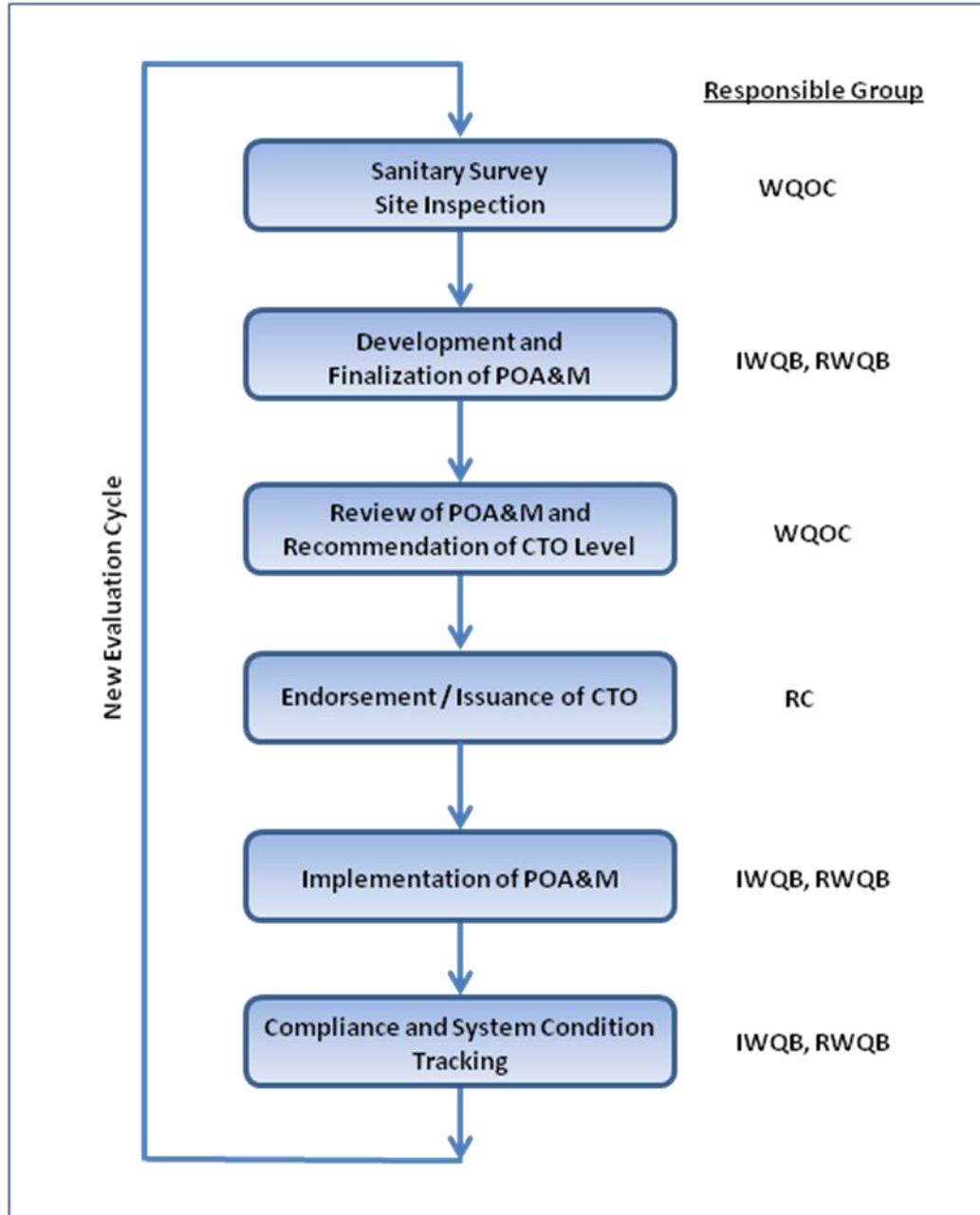
- **Development and Finalization of POA&M** - A POA&M is prepared by the (IWQB) and (RWQB) based on the list of findings provided by the WQOC as a result of the SS. The POA&M establishes corrective action methods

and timelines committed by the installation to address deficiencies.

- **Review of POA&M and Recommendation of CTO Level** - The WQOC will review the POA&M approved and submitted by the RWQB and IWQB. Based on the POA&M, the WQOC will provide recommendation for CTO level (either full CTO, conditional CTO, or revoked CTO). These CTO levels are discussed in Section 3.4.
- **Endorsement, Issuance and Revocation of CTO** - The final CTO is endorsed and issued by the REGCOM, who chairs the RWQB. The REGCOM also has the authority to revoke a CTO as needed, based on a recommendation from the WQOC when there is an immediate threat to the public health and safety or if the installation fails to renegotiate an existing expired milestone date, or refuses to comply with the POA&M submitted to the WQOC to correct SS-identified deficiencies.
- **Implementation of POA&M** - Proper implementation of POA&M in a timely manner is necessary to satisfy conditions of a CTO. This effort, which includes corrective actions and documentation of such work, is performed primarily by the installation personnel and IWQB with the support of the RWQB, if necessary in the form of reach back.
- **Compliance and System Condition Tracking** - This work is performed at the installation level with the support of RWQB. The work needs to be documented in the Navy Overseas Drinking Water database for review by the WQOC.

The above steps are summarized in Figure 3-1 along with the responsible groups.

Figure 3-1 CTO Program Implementation



3.3 IMPLEMENTATION TIMELINE

At least five and a half months are needed from the date of the SS inspection until CTO issuance. Following are key steps in the implementation timeline:

- SS Inspection Report - 90 calendar days after the site visit, including 60 days for preparing a draft report, 15 days for reviewing the draft report, and 15 days for finalizing the report.
- Development and finalization of POA&M - 30 calendar days after issuance of the SS Inspection Report
- Recommendation of CTO Level - 14 calendar days after submission of the final POA&M
- Issuance of CTO - 30 calendar days after receipt of the CTO level recommendation

3.4 CTO LEVELS AND CONFORMANCE

There are three levels of CTO certification as described below:

Full CTO Level

This level of certification will be granted for the following cases:

- a. No significant deficiencies, as defined in Section 4.2; or

- b. The commitment to resolve or correct moderate and minor deficiencies in a timely manner in accordance with the terms of the POA&M as approved by the RQWB and WQOC.

Conditional CTO Level

This level of certification will be provided for the following cases:

- a. One or more outstanding significant deficiencies waiting to be corrected within the agreed upon POA&M timeframe, as approved by the RQWB and WQOC; or
- b. Downgrade from the Full CTO status because moderate and minor deficiencies are not corrected within the allotted time required under the terms of the POA&M.

Revoked CTO Level

A current CTO will be revoked for the following cases:

- a. Failure to resolve or correct all outstanding significant deficiencies within the approved POA&M timeframe; or
- b. Downgrade from the Conditional CTO status because moderate and minor deficiencies are not corrected within the allotted time required under the terms of the POA&M.

Not obtaining the full CTO would potentially compromise public confidence in the Navy drinking water system quality, subject the impacted installation to political pressures to resolve outstanding issues to achieve the full

CTO, and indicate a nonconformance with the SECNAV Memorandum dated 28 January 2008 regarding improvement of water system management and quality based on SDWA standards.

3.5 ROLES AND RESPONSIBILITIES

Specific roles and responsibilities of the WQOC, RWQB, and IWQB are listed in Figure 3-2. The membership of the WQOC includes those from CNIC, NAVFAC HQ, NAVFAC Atlantic (NAVFAC LANT), NAVFAC Pacific (NAVFAC PAC), BUMED , and Naval and Marine Corps Public Health Center (NMCPHC). The primary responsibility of the WQOC is to provide water quality oversight for the United States Navy drinking water systems at overseas installations similar to that provided by the USEPA and State regulatory agencies for drinking water systems in the United States. This Council is chaired by the CNIC N4, and reports to the Navy Executive Agent for Drinking Water Ashore, CNIC.

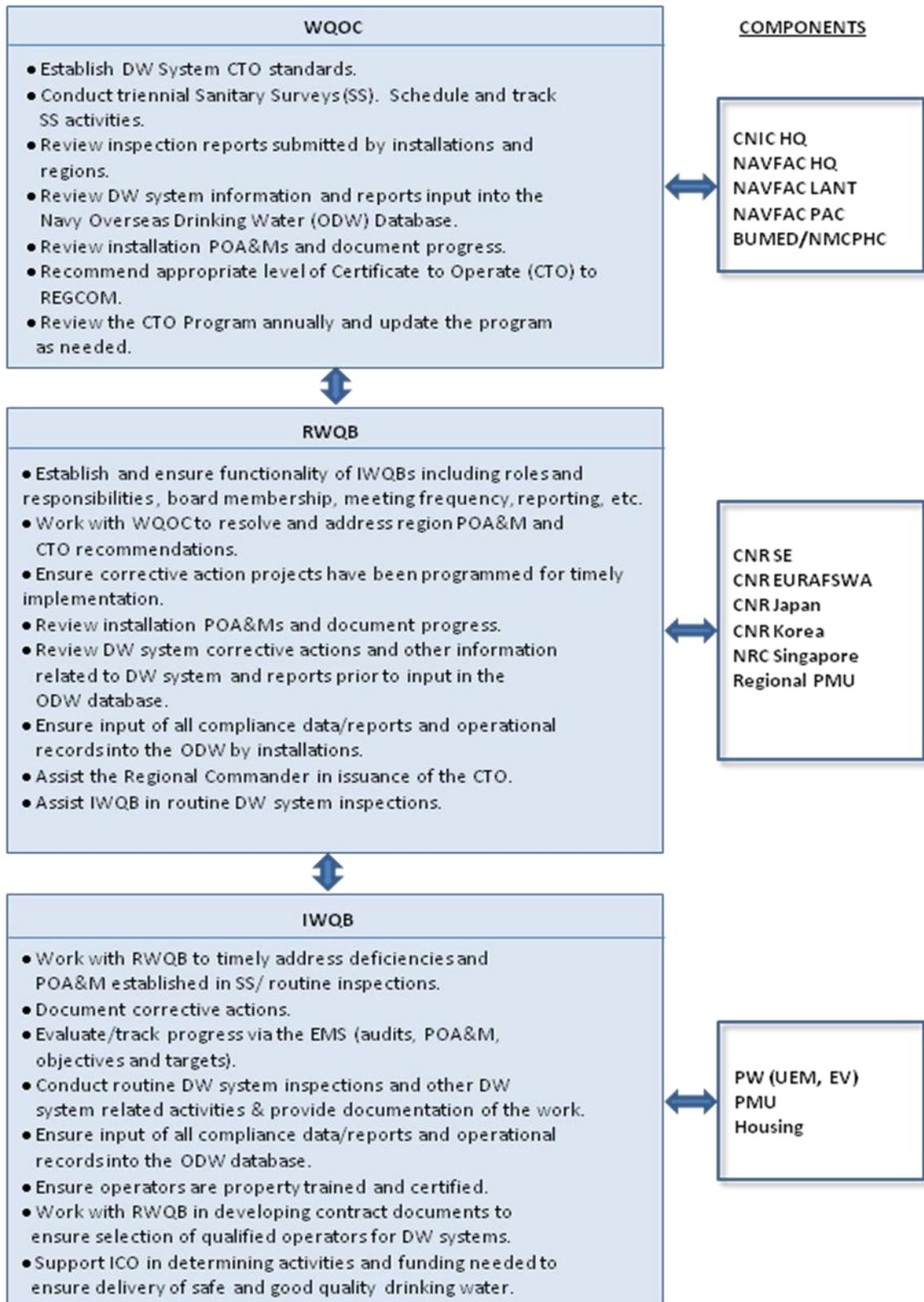
Other responsibilities of the WQOC include:

- Centrally manage funding for, schedule, oversee, and track SS activities.
- Report progress of the CTO Program implementation to CNIC annually.
- Conduct annual reviews of the CTO Program and update the program as needed.
- Manage software updates for the Overseas Navy drinking water system Database per CNIC and NAVFAC HQ directions.

The membership of the RWQB includes the REGCOM as the board chair; the region N45, the FEC Public Works (PW) Business Line Coordinator, FEC Environmental Business Line Coordinator (EV), the regional in-theater medical authority, and other ad hoc members as appropriate, generally including Region Public Affairs Officer (PAO), Region Housing, and FEC Asset Management (AM)/Real Estate. The Navy Regions required to organize and operate an RWQB include Commander, Navy Region Europe, Africa, Southwest Asia (CNR EURAFSWA), Commander, Navy Region South East (CNRSE), Commander, Navy Region Japan (CNRJ), Commander, Navy Region Korea (CNRK), and Naval Region Center Singapore (NRCS). The Board develops strategy and oversees the process to provide compliant potable drinking water at affected installations and facilities. The Board is also responsible for working with the WQOC to negotiate and address POA&M and CTO recommendations. Each RWQB is lead by the REGCOM, who is responsible for issuing the CTOs for Navy drinking water systems in his/her region and supporting IWQBs in implementation of their POA&Ms.

The IWQB members include, at a minimum, the ICO as chairperson, the Public Works Officer (PWO), Public Works Department Environmental (PWD EV), Public Works Department Utilities Environmental Manager (PWD UEM), Preventive Medicine Authority (PMA), and Housing (where applicable), and Real Estate (where applicable). The RWQB executes the various strategies and different processes to achieve compliant drinking water fit for human consumption at their installation. Each IWQB is led by the ICO. The IWQB plays a key role in timely addressing and correcting deficiencies.

Figure 3-2 Roles and Responsibilities



4.0 THE SANITARY SURVEY

4.1 OVERVIEW

An SS evaluates the adequacy and compliance status of the drinking water sources, facilities, equipment, operation and maintenance, and management for producing and distributing safe drinking water. This survey is considered the central element of the CTO Program. As part of the survey, the surveyor must evaluate, address, and document the safety, reliability and/or capability of the following:

- Water Source(s)
- Potable Water Treatment System(s)
- Distribution System(s)
- Finished Water Storage(s)
- Pumps, Pump Facilities, and Controls
- Disinfection Practices
- Water Quality Monitoring Plan/Sampling Procedures
- Water Quality Monitoring/Reporting/Data Verification
- Water System Management and Operations
- Operator Compliance with Navy Requirements

OPNAVINST 5090.1 and OEBGD/FGS require that the SS of water treatment facilities include the following:

- Verification and reevaluation of vulnerability assessments, watershed protection programs and wellhead protection programs, as applicable.
- Examination of the source water physical components and condition.
- Schematic diagrams of the treatment process and examination and evaluation of the adequacy and

appropriateness of all elements of the current treatment process.

- Examination and evaluation of the operation and maintenance of the treatment facility including the condition and reliability of equipment, operator qualifications, use of approved chemicals, record keeping, process control, and safety programs.
- Evaluation of the ability of the treatment plant to respond to changes in raw water fluctuations.
- Evaluation of the treatment plant's emergency power supply and security measures.
- Review of operations, water quality monitoring and compliance records.

In addition, OPNAVINST 5090.1 requires that the distribution system SS inspection include a review of the operations and maintenance program to ensure attention to the following areas of concern:

- Elimination of unneeded or excess storage.
- Adequate turnover of storage tanks.
- Storage tank cleaning and maintenance.
- Adequate disinfection practices during all main repairs and replacement.
- If applicable, an effective corrosion control program.
- A comprehensive cross connection control program.
- An aggressive valve and hydrant exercise program.
- An adequate water quality monitoring program that achieves compliance with the appropriate regulations and provides for effective water quality control.
- An adequate flushing program, preferably a Unidirectional Flushing (UDF) program implemented on a yearly basis.

SSs shall be conducted every three years on overseas Navy drinking water systems to verify the on-going function and overall condition of the water supply system, regardless of the source water classification. This frequency may be increased following source or treated water contamination, reports of illness that may be from water-borne sources, an extended interruption in service resulting in loss of pressure in the distribution system, repeated Maximum Contaminant Level (MCL) exceedances or other incidents that may compromise the water system or water quality.

Appendix B contains a standardized form that must be used during the SS to obtain descriptive information on each water system. Appendix C contains a standardized SS checklist.

4.2 DEFICIENCIES

Deficiencies noted during the SS may be classified as significant, moderate, or minor depending on the risk to public health, system operations or other concerns. Note: Refer to Section 3.3 for discussion on what level of deficiencies will be accepted and the CTO recommended. The following definitions of these deficiencies are based on the guidance and examples provided in the USEPA's Guidance Manual for Conducting Sanitary Surveys of Public Water Systems; Surface Water and Ground Water Under Direct Influence (GWUDI) (USEPA 815-R-99-016, April 1999) and Sanitary Survey Guidance Manual for Ground Water Systems (USEPA 815-R-08-015, October 2008).

- A significant deficiency is defined as (1) sampling results exceeding regulatory standards for which public notice is required or (2) a defect in design, operation, or maintenance, or (3) a failure or malfunction of the sources, treatment, storage, or distribution system that is causing, or has the potential to cause, the introduction of contamination into the water delivered to consumers.
- Moderate deficiencies are defined as any one of following: (1) sampling results exceeding regulatory standards for which public notice is not required, (2) any failure to physically operate the system in accordance with Standard Operating Procedures and Plans, or (3) any failure to develop Standard Operating Procedures and Plans. Examples of such plans include the Operations Plan, Master Plan, O&M Manual, Emergency Contingency Plan, and Bacteria Monitoring Plan.
- Minor deficiencies are defined as any failure to satisfy established administrative requirements such as failure to maintain required records, updating of system drawings, etc.

For illustrative purposes, the following are examples of deficiencies that fall into each of the above categories:

Significant deficiencies:

- Activities or pollution sources in the immediate wellhead area that will cause sanitary risks (source water related)
- System is not in compliance with applicable treatment technique requirements (treatment related)
- Customers are receiving raw water from the raw water transmission main without treatment or the raw water is bypassed around the treatment plant (distribution and transmission related)
- The tank's vents or overflows are not screened or protected (finished water storage related)

- The air/water relief valves provides a cross connection to the floor drains (pumps, pump facilities, and controls related)
- The system has been found to be out of compliance with applicable standards for one or more contaminants (monitoring, reporting and data verification related), for which public notice is required.
- System security is inadequate (system management and operation related)
- The operator is not certified at the level/grade required for the Navy drinking water system (operator compliance related)
- No formal backflow prevention program for the distribution system established

Moderate Deficiencies:

- Not maintaining backflow prevention program for the distribution system
- Inadequate pumping capacity (may be significant depending on the risk)
- Lack of approved water system management plan
- Raw water supply, Water Treatment Plant(WTP), and distribution system drawings need updating

Minor Deficiencies:

- Exterior storage tanks need to be painted
- Inadequate mapping for valve locations
- No vents on storage tanks
- Inadequate record keeping

Appendix D provides additional examples of significant, moderate, and minor deficiencies that have been found at Navy drinking water systems.

4.3 CORRECTIVE ACTIONS

Significant deficiencies require immediate action and shall be given a specific timeline for correction. Systems with significant deficiencies will be notified by the WQOC in writing, with a draft report, within **60** days after the SS and must complete the corrective action(s) or be in compliance with a WQOC and RWQB-approved POA&M no later than **120** days of receiving written notice of a significant deficiency. Significant deficiencies deemed by the WQOC not to be an immediate threat to public health that require budgeting, planning, or construction time to accomplish will be given additional time to correct. Likewise, moderate or minor deficiencies that are less critical and require budgeting, planning, or construction time to accomplish will also be given additional time to correct.

Failure to comply with the CTO corrective actions under the terms of the POA&M, in the Full CTO, is considered to be a significant deficiency. Such failure will automatically lead to the downgrade of the full CTO to Conditional CTO, whether or not the WQOC is notified of such failure. To avoid such downgrade, it is important that the RWQB inform the WQOC within **45** days prior to the expiration of any POA&M deadlines in order to establish new deadlines as appropriate.

Likewise, a failure to comply with the CTO corrective actions under the terms of the POA&M in the Conditional CTO will lead to a WQOC recommendation to revoke the Conditional CTO and possible revocation of the CTO status by the RC. To avoid such revocation, it is important that

the RWQB resolve the POA&M with the WQOC within **45** days prior to the expiration of any POA&M deadlines in order to establish new deadlines as appropriate.

If new deficiencies are identified outside the SS, the IWQB is required to report the information to the RWQB within **30** days of the identification or discovery of the deficiencies. The IWQB and RWQG will review this information for concurrence and develop corrective actions and proposed POA&M for those deficiencies. Within **60** days, the REGCOM will negotiate a revised POA&M and CTO level with the WQOC. The revised CTO will be issued by the REGCOM.

All correspondence and written records pertaining to identified deficiencies and corrective actions in the POA&M under terms of the approved CTO agreement shall be retained by the installation in its Navy drinking water system section of the Navy Overseas Drinking Water database for a period of 5 years.

5.0 RESOURCES

AWWA M5 (2005), Water Utility Management, Second Edition

AWWA M14 (2004), Recommended Practice for Backflow Prevention & Cross-Connection Control, Third Edition

AWWA M21 (2003), Groundwater, Third Edition

AWWA G100-05, Water Treatment Plant Operation and Management, First Edition

AWWA G200-04, Distribution Systems Operation and Management

BUMEDINST 6240.10 Series, Standards for Potable Water

Department of Defense (DoD) 4715.05-G (1 May 2007), "Overseas Environmental Baseline Guidance Document", Chapter 3, Drinking Water

EPA Revised Public Notification Handbook", "USEPA 816-R-09-013 (March 2010)

Operator In Responsible Charge/Assistant Operator In Responsible Charge Training and Certification Program for U.S. Navy Overseas Drinking Water Systems

First Endorsement on NAVFAC Washington DC Letter 5090 Ser 11002 of 28 February 2011 from CNIC about Overseas Drinking Water - Water Quality Oversight Council

SECNAV Memorandum for the Chief of Naval Operations dated 28 January 2008.

NAVFAC UG-2077-ENV, (10 July 2001), "Potable Water Quality Management Guidance Document"

NAVMED P-5010, (23 June 2008), "Manual of Naval Preventive Medicine," Chapter 5, Water Supply Ashore

Naval Inspection General Report to the Secretary of the Navy - Summary Report Overseas Potable Water Systems, dated January 2009.

NFESC UG-2029-ENV, (May 1998), Cross-Connection Control and Backflow Prevention Program Implementation at Navy Shore Facilities

OPNAVINST 5090.1C, (30 October 2007), Navy Environmental and Natural Resources Program Manual

Unified Facilities Criteria (UFC) 3-230-02, (10 July 2001), "Operations and Maintenance: Water Supply Systems"

UFC 3-230-19N, (7 June 2005), "Water Supply Systems" (superseded Military Handbook (MIL-HDBK)-1005/7A)

UFC 3-600-01, (26 September 2006), "Fire Protection for Facilities Engineering, Design and Construction" (superseded MIL-HDBK-1008C)

USEPA 570/9-75-001 (1977), Manual of Water Well Construction Practices

USEPA 570/9-91-003 (1991), Manual of Small Public Water Supply Systems

USEPA 815-R-99-016 (April 1999), Guidance Manual for Conducting Sanitary Surveys of Public Water Systems; Surface Water and Ground Water Under the Direct Influence (GWUDI) of Surface Water

USEPA 815-R-08-015 (October 2008), Sanitary Survey Guidance Manual for Ground Water Systems

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APPENDIX A
DEFINITIONS

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APPENDIX A

DEFINITIONS

"Approved Certificate to Operate (CTO) Agreement" pertains to the SS-identified deficiencies and corrective actions recommended and approved by the WQOC under terms of the POA&M negotiated with and endorsed by the Regional Commander.

"Fit for Human Consumption" is water that meets primary drinking water standards as defined by Final Governing Standards, Overseas Environmental Baseline Guidance Documents, and CNICINST 5090.1, and is safe for drinking, cooking, bathing, and other oral hygiene uses.

"Human Consumption" - water for human consumption includes drinking, bathing, and showering, cooking, dishwashing, and maintaining oral hygiene.

"Installation Water Quality Board (IWQB)" - Per CNIC direction, IWQB is chaired by each overseas Navy installation Commanding Officer. The Board executes the various strategies and different processes to achieve compliant drinking water fit for human consumption at their installation.

"Maximum Contaminant Level" the highest level of a contaminant allowed in drinking water.

"Navy Drinking Water System" is a public water system or non-public water system that is operated by the US Navy or operated under a US Navy (FSC) or (BOS Contract)

"Operator" means a person who operates or maintains water treatment or distribution facilities.

"Preventive Medicine Authority" at installation level is generally the Navy Environmental Health Officer (EHO) or Navy Preventive Medicine Technician (PMT) when an EHO is not assigned.

"Public Notification" an advisory requirement for a water system purveyor to distribute to affected consumers when the drinking water system has violated Maximum Containment Level (MCLs) or other regulations. This notice advises the consumer what precautions, if any, they should take to protect their health.

"Public Water System" means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals at least 60 days out of the year.

"Regional Water Quality Board (RWQB)" - Per CNIC direction, the RWQB is chaired by the CNIC Regional Commander at each overseas Navy Regions. The Board develops strategy and oversees process to provide compliant drinking water at CNIC installations and facilities that is fit for human consumption.

"Water Distribution System" refers to any combination of pipes, tanks, pumps, etc. that delivers water from the sources and/or treatment facility (ies) to the consumers. It specifically excludes treatment of any type.

"Water Quality Oversight Council (WQOC)" - Per CNIC direction, NAVFAC WQOC or simply WQOC is composed of representatives from NAVFAC HQ, NAVFAC LANT/PAC Environmental & Public Works, Bureau of Medicine and Surgery, Navy & Marine Corps Public Health Center and the ad hoc representatives from Asset Management, Capital Improvements and Counsel. The responsibility of the WQOC is to provide water quality oversight for the United States Navy drinking water systems at overseas installations

similar to that provided by the USEPA and State regulatory agencies for Navy drinking water systems in the United States.

"Water Treatment System" means any facility or facilities used or available for use in the collection, treatment, testing, storage, or pumping of water for a public water system. It specifically excludes distribution.

APPENDIX B

WATER SYSTEM DESCRIPTION FORM

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**WATER SYSTEM
DESCRIPTION FORM**

DATE : _____

SYSTEM NAME :

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WATER SYSTEM DESCRIPTION FORM

Date: ____/____/____

Country: _____

Facilities Water Program Manager: _____

System Name: _____

Phone: (____) _____

Plant Location

Treatment Type

1. _____
2. _____
3. _____

CWS: _____ NCWS: _____ NTNCWS: _____ TNCWS: _____
Seasonal From: ____/____ to ____/____

DOD PRODUCED PLANT

DOD PURCHASED PLANT

Permitted Operating Capacity: _____ MGD

Plant Design Capacity: _____ MGD

Max. Day: _____ MGD

Monthly Avg.: _____ MGD

Monthly Avg.: _____ MGD

Annual Avg.: _____ MGD

PURCHASED WATER SOURCES

<u>Name of Water System</u>	<u>Purchase Meter Location</u>	<u>GPM Available</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

Describe Any Special Conditions:

WATER PLANT OPERATORS

Plant Classification for operator certification level:

Name of Operator in Responsible Charge: _____
Certification Level: _____

Name of Assistant Operator in Responsible Charge: _____
Certification Level: _____

Names of other Plant Operators:

_____	Certification Class: _____
_____	Expires: ____ / ____ / ____
_____	Certification Class: _____
_____	Expires: ____ / ____ / ____
_____	Certification Class: _____
_____	Expires: ____ / ____ / ____

Distribution Operator:

Certification Expiration: ____ / ____ / ____

(List additional personnel on back)

Certified Laboratory: Required: Y/N

Permit No.: _____

Name of Chief Lab Analyst: _____

Laboratory Certifying Authority: _____

WATER DISTRIBUTION SYSTEM OPERATORS

Distribution System Classification for Operator: Certification Level

Name of Operator in Responsible Charge: _____

Certification Level _____ Expires ____ / ____ / ____

Name of Assistant Operator in Responsible Charge:

Certification Level _____ Expires ____ / ____ / ____

Name of Other Distribution System Operators:

_____	Certification Class: _____
_____	Expires: ____ / ____ / ____
_____	Certification Class: _____
_____	Expires: ____ / ____ / ____
_____	Certification Class: _____
_____	Expires: ____ / ____ / ____

	Certification Class: _____
	Expires: ____ / ____ / ____
	Certification Class: _____
	Expires: ____ / ____ / ____
	Certification Class: _____
	Expires: ____ / ____ / ____

WATER SYSTEM MAPS

Water Treatment Plant Map Last updated: ____ / ____ / ____
 Water Distribution System Maps Last updated: ____ / ____ / ____

GROUND WATER SOURCES

How Many Wells: _____

Well No.	Yield, gpm	Date Drilled	Location	Sanitary Y/N	Protection Adequate	GWUDI

Well Head Protection: Y/N

SPRING WATER SOURCES

How Many: _____	Infiltration Gallery: Y/N
<u>Spring No.</u>	<u>Yield, gpm</u>
_____	_____
_____	_____
_____	_____
	<u>Location Subject to Flooding</u>
	Yes/No
	Yes/No
	Yes/No

Is the Spring Area? Owned: ___ Fenced and Posted: ___
 Is the Spring Source? Enclosed: ___ Box Covered: ___ -
 Locked: ___

Surface Water Diversion Channel Satisfactory: Y/N
Surface Water Run-off Satisfactory: Y/N
Contact Chamber Provided: Y/N Volume: _gal.
Contact Time: ___ min.

CONSERVATION PROGRAM

Plan: Y/N Date: _____

CROSS-CONNECTION CONTROL PROGRAM

Plan: Y/N Date: _____

BACKFLOW PREVENTION PROGRAM

Plan: Y/N Date: _____

POPULATION & PRODUCTION DATA

Describe Service Area: _____

Total Service Connections: _____

Residential#: _____

Industrial#: _____

Other#: _____

Metered: Y/N _____

Total Population Served: _____

Meter Replacement Program: Y/N How Frequent: _____

Meter Calibration Program: Y/N

How Frequent: _____

During Last 12 Month Period (From _____ to _____)

Total Water Produced and/or Purchased:

_____ MG

Leak survey conducted: Y/N Date: _____

I. CHEMICAL STORAGE FACILITIES

STORAGE AREA	Y/N		BULK STORAGE TANKS	Volume (gal)
Separate Storage Area			Alum	
Dry Chemicals on Pallets			Sodium Hydroxide	
Ventilation Adequate			Sodium Chlorite	
Forced Draft Ventilation			Hydrofluorosilic Acid	
Mechanical Handling Equipment			Phosphate	
Drainage Around Bulk			Polymers	
Emergency Containment Area Provided			Lime Slurry	
Liquid Storage Tank Enclosed			Other	
Tank Contents Labeled at Refill Connections				
Tank Fill Connections Secured				

II. CHEMICAL FEED EQUIPMENT

DISINFECTION SYSTEMS								
Type	No.	Capacity lbs/day	Operable Y/N	Flow Pacing Y/N	NSF- 60, HN or Equi vale	Separate Room: Y/N	Disinfection System Checklist	Y/N Need
Gas, Cl ₂							Adequate Ventilation	
Ammonia							Separate Cylinder Storage Room	
NaOCl							Cylinders Secured	
ClO ₂							Protected From Sun Rays	
HTH*							Ton Cylinders	
Ozone							150 lbs. Cylinders	
SO ₂							Scales	
Other							Evaporator	
							Leak Repair Kit/Spill Kit	
							Chlorine Leak Detector	
							Ammonium Hydroxide	
							Gas Mask: Type: Serviced Date:	
							Automatic Change Over	
							Secondary Containment	

*High Test Hypochlorite (HTH)

II. DRY CHEMICAL SYSTEMS

Feeders	No.	Type	Adequate Capacity: Y/N	Auto Flow Proportioning: Y/N	Operable Y/N	Other	Comments
Alum							
Lime/Soda Ash (Pre)							
Lime/Soda Ash (Post)							
Carbon							
Fluoride							
Potassium Permanganate							
Corrosion Inhibitors							
Other							

IV. LIQUID CHEMICAL SYSTEMS

Feeders	No.	Type	Adequate Capacity: Y/N	Auto Flow Proportioning: Y/N	Operable Y/N	Other	Comments
Alum							
Sodium Hydroxide							
Hydrofluorosilic Acid							
Sodium Chlorite							
Potassium Permanganate							
Corrosion Inhibitor							
Polymer							

Other							
-------	--	--	--	--	--	--	--

V. UNIT PROCESSES

VI. FILTRATION

Filter Number:	1	2	3	4
Type Filter Units				
Gravity				
Pressure				
Last Inspection Date				
Other				
Total Filter Area (ft²)				
Permitted Filter Rate (GPM/SFFA)				
Filter Media Configuration				
Mono (Sand, Anthracite or synthetic)				
Dual (Sand, Anthracite)				
Mixed (Sand, Anthracite, Garnet)				
Diatomaceous Earth				
Precoat Satisfactory				
Body Feed Satisfactory				
Material Specifications				
Effective Size/ Uniformity Coefficient				
Sand				
Anthracite				
Garnet				
Media Depth Satisfactory				
Last Date Installed				
Troughs				
Restrained				
Leveled				
Free Board (inches)				
Filter Agitator Type				
Air Scrubber				
Surface/Sub Surface Sweeps				
Last Inspection Date				
Backflow Preventer Provided				
Underdrain Type				
Date Installed				

Flow Rate Control System				
Mechanical				
Type				
Range to MGD				
Last Calibration Date				
Inlet Flow Control				
Declining Rate				
Head Loss Gage operable				
Flow Rate Gage Operable				
Pressure Loss				
Filter Level Control Device				
Filters Operated Intermittently				
Filter to Waste Provided (Rewash)				
No. Minutes Rewashed				

Filter Number:	1	2	3	4
Turbidimeter				
Continuous Recorder				
Calibration Frequency				

VII. CORROSION CONTROL PROGRAM (Y/N)

Describe: _____

Distribution System Flushing Program: Y/N Frequency: _____

Person(s) responsible for flushing: _____

Distribution System Corrosion Evaluation Studies Conducted: Y/N

Date : _____

Describe type and length of study:

Describe Corrosion Study Results:

Red Water & other corrosion related complaints: Y/N

Corrosion Inhibitors used: _____

Finished Water pH Value Maintained _____ units

Application rate: _____ mg/l

VIII. CLEARWELL & PLANT STORAGE

No.	Clearwell (s) / Storage Capacity (MG)	Pump Suction Well Capacity	Baffled Y/N	Drain Valve Y/N	Screened Overflow Satisfactory Y/N	Screened Vent Satisfactory Y/N	Access Cover Secured Y/N	Comments
1								
2								
3								
4								

Clearwell operated on fill & draw: Y/N Clearwell floats on system: Y/N

High Service Pumps	Type	Capacity gpm/mgd	Auxiliary Power available Y/N
1			
2			
3			
4			
5			

Maximum Pump Capacity: _____ MGD High Service Pumps Water
Lubricated: Y/N
Finished Water Meter: Y/N Type: _____
Last Date Calibrated: _____
Number of Finished Water Mains: _____ inches
Distance to first customer: _____ feet
Size(s): _____ inches

IX. DISTRIBUTION SYSTEM

Current Distribution System Map Available: Y/N

Location: _____

Standard Material & Construction Specifications Filed
 with EPD: Y/N

Construction Projects Receive Prior Approval From EPD:
 Y/N, If NO, Explain: _____

Total miles/feet/meters

in Distribution System

(approx.): Percentage of

Pipe Material:

DI: _____ CI: _____ PVC: _____ AC: _____ Galvanized: __

Concrete: __

OTHER: _____

A. LIST PRESSURE ZONES (give elevations)

1. _____
2. _____
3. _____

B. BOOSTER PUMP STATIONS

Location	Number Pumps	Capacity (MGD)	Auxiliary Power Avail
----------	--------------	----------------	-----------------------

_____	Y/N
-------	-----

_____	Y/N
-------	-----

C. STORAGE FACILITIES

Location	Type	Material	Volume	Fenced	Over flow Scre ened	Drain	Altit ude Valve	Coating Condi tion	Comments

D. BOOSTER DISINFECTION FACILITIES

Locations:

1. _____
2. _____

E. DISTRIBUTION SYSTEM MONITORING

Cl₂ Residual:___ Flow: Y/N Pressure: Y/N
 Tank levels monitored: Y/N
 Other:

F. SAMPLING PLAN

Microbiological sample plan reviewed
 and approved: Y/N
 Number of sampling sites required:_____
 Adequate: Y/N
 Sites representative of the distribution
 system: Y/N
 Sites regularly used: Y/N

X. LABORATORY CONTROL

YES/NO		NEED
	Separate space for lab	
	HVAC adequate	
	Lab protected from direct	
	Lab clean	
	Adequate storage	
	Adequate glassware	
	Balance	
	Refrigerator	
	Colorimeter / Spectrophotometer	
	Jar test equip. with lighted	

Fresh Reagent Solutions available for all test procedures? Y/N

ALKALINITY

Buret
Sulfuric acid (0.02N, 1/50N or N/50)
Methyl purple

pH

Electric pH meter Type: _____
Standardization Frequency: _____

Buffer solutions: _____

Colorimeter comparator: Y/N
Bromomethyl Blue
Phenol
Red
Thymol
Blue
Sodium Thiosulfate, 0.1 N

Cl₂ RESIDUAL COMPARATOR / COLORIMETER

Model: _____
Type: Orthotolidine
DPD
Amperometric Titration

CHLORINE DIOXIDE

Test Method: _____

TOC

Test Method: _____

Specific Ultraviolet Absorbance (SUVA)

Test method: _____

TURBIDITY

Standards: Type: _____
Meter: _____ Model: _____ Serviced: _____ Calibration

MANGANESE

Test method: _____ Reagent: _____

IRON

Test Method: _____ Reagent: _____

FLUORIDE

Test Method: _____ Reagent: _____

HARDNESS

Test Method: _____ Reagent: _____

Test Method: _____ Reagent: _____

Test Method: _____ Reagent: _____

XI. CONTINUOUS MONITORING

	Raw	Treated	Filtered	Finished
pH Value				
Chlorine Res.				
Particle Counter				
Turbidity, NTU				
Fluoride				
Pilot Filter				
Other Parameters:				

XII. RECORD KEEPING

Operational Reports Available at Plant: Y/N

Number of Years: _____

Microbiological Reports Available at Plant: Y/N

Number of Years: _____

Chemical Reports Available at Plant: Y/N

Number of Years: _____

Inorganic: _____ Organic: _____ Radiological: _____

THMs: _____ VOCs: _____ Turbidity: _____

Corrosion Control Data: _____

Violation Records: _____

Other: _____

XIII. SAFETY

Does the water treatment plant have a safety program? Y/N

Fire Extinguishers: Y/N; First Aid Kits: Y/N

Emergency Eyewash Stations: Y/N

Safety rails around basin: Y/N

Appropriate warning signs on equipment: Y/N

Does the Plant have a written Chemical Delivery
Policy? Y/N

Does the Plant have an Emergency Contingency Plan for
accidents, malfunctions and natural disasters resulting in
service interruptions? Y/N

Does the Plan identify alternative water supply? Y/N

XIII. DATABASE RECORDS

Water Treatment Plant O&M Manual Date Prepared: _____

Water Treatment Plant SOP Date Prepared: _____

Sanitary Survey Report Date Prepared: _____

Consumer Confidence Report Date Prepared: _____

Water Treatment Plant Daily Operating Log

Electronically Recorded

Manually Recorded

Water Distribution System O&M Manual Date Prepared: _____

Water Distribution System SOP Date Prepared: _____

Water Distribution System Daily Operating Log

- Electronically Recorded
- Manually Recorded

- Treated Raw Water Daily Records
 - Electronically Recorded
 - Manually Recorded

- Finished Water Sent to Distribution System Daily Records
 - Electronically Recorded
 - Manually Recorded

- Monthly Chemical Usage Records
 - Electronically Recorded
 - Manually Recorded

- Storm Water Pollution Prevention Plan Date
Prepared: _____

- Customer Complaint Records

- Operators' Training and Certification Records

- Plan of Action and Milestones (POA&M) documents

- POA&M implementation and corrective action records

- Certificate to Operate records

- Other records required by the CTO Program

Specialized Potable Water Treatment and Distribution System Unique Problems/Issues: Please Explain and Provide Detailed information.

- Unique Water Quality Issues On Base

- Off Base Leased Housing Water Quality Issues

- Off Base Office Building/Other Leased Facilities Water Quality Issues

- Facility Maintenance Issues

- Language Barriers

- Others

Drinking Water Quality Documents. If applicable, please provide a copy of the following.

- Drinking Water Services Lease Contract
 - Yes
 - No

- Housing Inspection Checklist
 - Yes
 - No

Observation of outstanding practices that deserve recognition:

COMMENTS :

COMMENTS :

APPENDIX C

WATER SYSTEM SANITARY SURVEY CHECKLIST

WATER SYSTEM SANITARY SURVEY CHECKLIST

Current Survey Date: _____

Date of the Last Sanitary Survey: _____

Facility: _____

Inspected by: _____

2 WATER SOURCE

- Have there been any changes in the areas surrounding each of the sources that could impact water quality (e.g., changes in land use, construction, spills, etc.)?
- Have any efforts been made to assess the vulnerability of each supply to microbial and/or chemical contaminants?
- Has any effort been made to develop and implement a wellhead or watershed protection program?
- Has there been any change in the quantity of water that was and will be available to the facility?
- Have there been any changes in the quality of the water that was or is being supplied to the facility?
- Have there been any known or suspected occurrences of microbial, chemical or radiological contaminants in any of the facility's water supplies? (OEBGD C.3.3.1.3 or applicable FGS requirements).
- Have any efforts been made to verify and re-evaluate whether or not the raw water supplies are subject to surface water influence (Groundwater under direct influence of surface water, GWUDI) as defined in the OEBGD (C.3.3.1.12 or applicable FGS requirements).

- Was microscopic particulate analyses (MPA) conducted?
If yes, how long ago?
- Has there been, or is there any anticipated change to the management of the water supply?
- For each well:
 - Is there a sanitary seal on the well, and is it properly installed?
 - Does the casing extend at least 12" above the floor or 18" above the ground?
 - Is the top of the well protected so that foreign matter or surface water cannot enter the well?
 - Is the site protected against flooding?
 - Do the well site and well pump house have proper drainage?
 - Is the well vent properly constructed including a screened end that terminates in a down-turned position at least 18" above the ground level or above the maximum flood level?
 - Are the check valves, water meters, and other well system appurtenances maintained and operating properly?
 - If standby power is available, is it in operable condition and well maintained?
 - Well house security condition?
- For each surface water (e.g. reservoir, river, spring, catchment, cistern) have you evaluated :
 - Short term and long-term land use?
 - Intake location, condition, and protection?
- During the previous year, what were the average daily demands and the peak hourly flow?
- Was the quantity of water supplied sufficient to meet the facility's demands?
- Were there any interruptions in the raw water supply?

- Was raw water quality monitoring performed during the previous year?
- Were there any water quality concerns associated with the raw water supply or with the emergency supply?
- Is there an interconnect to a nearby water system?
- Is the source water within or outside the security fence?
- Is there raw water storage?

3 POTABLE WATER TREATMENT SYSTEM

- Does the excessive age or poor physical condition of the facility adversely affect water quality delivered to consumers?
- Is hourly production within the design flow capacity of the treatment facility?
- Do one or more raw water quality characteristics exceed what the facility was designed for, or exceed what is thought to be tolerable, or degrade process performance?
- Are the treatment chemicals NSF certified, Host Nation approved or equivalently certified? Are they being properly stored, maintained and used?
- If the water supply was determined to be a GWUDISW, is the appropriate disinfection (as defined by Concentration Time (CT)) being maintained? How is this being demonstrated?
- Do operational and maintenance records identify any irregularities in performance or maintenance on the units that would indicate loss in system reliability?
- Are there any leaks and malfunctioning instrumentation or valves associated with treatment components or online monitoring units?

- Are the operating procedures sufficient to ensure that the equipment is being properly monitored and that records are being completed properly?
- Are the chemical dosages, feed locations, and monitoring sufficient to ensure that consistent and proper residual levels are being maintained?
- Are electrical connections and equipment in good and safe operating condition?
- Verify that water meters, all monitoring devices, and instrumentation have been calibrated, maintenance work for the equipment is being conducted, at frequency recommended by the manufacturers to ensure that accurate readings are being recorded.
- Have all storage tanks been inspected and has maintenance been performed?
- Have the repairs and/or modifications contained in the previous sanitary survey been completed?
- Is the disinfection equipment appropriate for the application (e.g., correct equipment for chloramines, or gas chlorine, ozone, chlorine dioxide)?
- Are backup units available in case of failure, and are they operational?
- Is auxiliary power available with automatic start-up in case of power outage? Is it tested and operated on a regular basis, both with and without load?
- Is there an adequate quantity of disinfectant on hand and is the feed rate proportional to the water flow? Is the disinfectant properly stored?
- Are critical repair tools and spare parts on hand to repair disinfection equipment?
- Are disinfection residuals and production records maintained to determine CT values (OEBGD C.3.2.3 or applicable FGS requirements)?

- Are year-round CT values acceptable based on the level of treatment provided?
- Is the proper disinfectant residual maintained at the entry point and in the distribution system, and are records kept of daily or continuous measurements? (OEBGD Table C3.T1 or applicable FGS requirements).
- Is the system in compliance with all disinfectant and disinfectant by-products monitoring requirements? (OEBGD C.3.32.6.3 or applicable FGS requirements).
- Does the operator frequently measure and record the appropriate water quality parameters throughout the source, treatment and distribution processes to determine and/or verify proper chemical treatment?
- Does the absence or wrong type of process control cause improper operational control decisions to be made?
- Does the operator correctly interpret and apply the monitoring results?
- Is the analytical equipment adequate and are the instruments properly and regularly calibrated? Is the shelf life of reagents expired?
- Is the system in compliance with all treatment techniques and monitoring requirements for the source, treatment and distribution process?
- Are records of water test results and water quality compliance results maintained? (OEBGD C.3.3.1.12 or applicable FGS requirements)

4 DISTRIBUTION SYSTEM

- Are all overflow lines, vents, drain lines, or cleanout pipes turned downward and screened?
- Are reservoirs, raw water storage and finished water storage inspected regularly? (OEBGD C.3.3.1.7.4 or applicable FGS requirements)

- Is the storage capacity adequate for the system, including fire fighting demands?
- Are surface coatings within the reservoirs in good repair and acceptable for potable water contact?
- Is the hatch cover for the tanks watertight? Are ladder for tank access and hatch covers secured with locks?
- Can each reservoir or storage tank be isolated from the system?
- Is adequate safety equipment (e.g., caged ladder, OSHA approved safety belts, etc.) in place for climbing tanks?
- Are storage reservoirs disinfected after undergoing repairs?
- Are adequate chlorine residuals maintained throughout the water system? (OEBGD C3.3.1.7.1 or applicable FGS requirements)
- Have there been any positive coliforms detected in the distribution system? If yes, were the appropriate follow-up actions taken? (OEBGD C3.3.2.1 or applicable FGS requirements)
- Are maps of the distribution system available and current? (OEBGD C.3.3.1.1 or applicable FGS requirements)
- Was the pressure in the distribution system greater than 20 psi (140 kPa) throughout the previous year? Were there any incidents where the pressure fell below 20 psi (140 kPa)? Was the appropriate response implemented? (OEBGD C.3.3.1.6)
- Has the required maintenance of the pumps, pump controls and tanks been performed and recorded?
- Has the cross-connection and backflow prevention plan been updated and finalized? Has it been implemented? Have the required inspection and maintenance actions

been performed? (OEBGD C.3.3.1.7.8 or applicable FGS requirements)

- Does the distribution system have an adequate maintenance program:
 - Is leakage evident in the system?
 - Is there a pressure testing program?
 - Is there a regular line flushing program? (OEBGD C.3.3.1.7.3 or applicable FGS requirements)
 - Are valves and hydrants regularly exercised and maintained? (OEBGD C.3.3.1.7.5 or applicable FGS requirements)
 - Are UFC 3-230-02 and AWWA standards for disinfection followed after all repairs?
- How many water line breaks occurred during the previous year? How quickly were repairs made? Were appropriate repair and disinfection procedures followed?
- Have corrosion indices (e.g., Langelier Saturation Index, Aggressive Index, etc.) been calculated to predict corrosion?
- Has an accurate, representative sampling plan been developed for a thorough corrosion monitoring program? Has the program isolated problem sections in the distribution system due to differences in pipe materials, pipe/tank linings or water quality characteristics?
- Is the best corrosion control treatment or combination of treatments in use (e.g., alkalinity and pH adjustment, calcium and hardness adjustment, or phosphate/silicate based corrosion inhibitor)?
- Has the water system developed a means to evaluate an optimum corrosion control treatment plan (e.g., desk top evaluation, pipe rig/loop tests, metal coupon tests, partial system tests, etc.)?

5 WATER QUALITY MONITORING

- Is there a written coliform sampling plan? Does it comply with the requirements of the OEBGD or applicable FGS? Is the plan being followed? (OEBGD C3.3.2.1 or applicable FGS requirements).
- Has an accurate, representative sampling plan been developed for lead and copper monitoring? Does it comply with the requirements of the OEBGD or applicable FGS requirements? Is the plan being followed?
- Has the water system exceeded any action levels for lead and copper? (OEBGD C3.3.2.4 or applicable FGS requirements). If so, have the correct target public audiences received minimum education materials that are consistent with mandatory language? (OEBGD C3.3.2.4.3 or applicable FGS requirements)
- Has the water system identified areas of lead pipe and lead service lines, and areas of lead solder used? (OEBGD C3.3.1.11 or applicable FGS requirements).
- Is the system in compliance with all Lead and Copper Rule monitoring requirements? (OEBGD C3.3.2.4 or applicable FGS requirements).
- Is there a written water Lead and Copper sampling plan? Is the plan being followed?
- Did this Sanitary Survey find any non-compliance related to water quality monitoring frequency, Action Level or MCL?
- Have there been any NOV's related to water quality? What were they? Was the appropriate corrective action taken? (OEBGD C3.3.3 or applicable FGS requirements).
- Was the appropriate medical authority notified? (OEBGD C.3.3.2.2.3.1 or applicable FGS requirements).
- Was the installation personnel notified within required time period? (OEBGD C.3.3.2.2.3.2 or applicable FGS requirements).

- Was off-installation population at risk? Was the host nation authority notified through the DoD medical authority? (OEBGD C3.3.3 or applicable FGS requirements).
- **Notification Time Line:** Check Appropriate Box

Contaminant	OEBGD Notification Time Line		Insert Applicable FGS Time Line	
	DoD Medical Authority and The U.S. Base Command and Host Nation	Base Population	DoD Medical Authority and The U.S. Base Command and Host Nation	Base Population
Total Coliforms	• By the end of the same day	• Within 3 days	•	•
Inorganic Chemicals	• As soon as possible	•	•	•
Nitrate, Nitrite or Total Nitrate and Nitrite	• By the end of the same day	• Within 3 days	•	•
Fluoride	• Within 14 days	•	•	•
Lead and Copper	• Within 14 days	•	•	•
Synthetic Organics	• Within 14 days	•	•	•
D/DBP	• Within 14 days	•	•	•
Radionuclide	• Within 14 days	•	•	•
Turbidity	• Within 14 days	•	•	•

6 POTABLE WATER SYSTEM MANAGEMENT

- Is there a water system master plan/management action plan? If yes, has it been updated in the past 5 years? (OEBGD C.3.3.1.2 or applicable FGS requirements).
- Does the facility have an emergency contingency plan to respond to water service interruption resulting from natural disasters, accidental treatment malfunctions or operational and maintenance failures? (OEBGD C.3.3.1.10 or applicable FGS requirements).
- Has a vulnerability assessment (OEBGD C.3.2.25 or applicable FGS requirements) been conducted and an emergency response plan been developed to provide countermeasures to an act of sabotage of the water system?
- Has the facility made arrangements for installation commander approved alternative water supplies (e.g. POE/POU, bottled water)? (OEBGD C.3.3.2.10 or applicable FGS requirements).
- Has the installation provided and/or ensured proper training for the operation of the drinking water system? (OEBGD C3.3.4 or applicable FGS requirements).
- Are supplies and maintenance parts inventories adequate?
- Are sufficient operation and maintenance records being kept?
- Are all facilities and activities free from safety defects?
- Are the required records being kept:
 - Bacteria results - 5 years (OEBGD C3.3.1.12 or applicable FGS requirements).
 - Chemical results - 10 years (OEBGD C3.3.1.12 or applicable FGS requirements).
 - Lead and copper results - Check applicable FGS

- Actions to correct applicable FGS MCL/Action level exceedance for at least 3 years
- Sanitary surveys - Check applicable FGS
- Variance or exemption reports - Check applicable FGS
- Water treatment and distribution system operating records - 3 years (OEBGD C3.3.1.12 or applicable FGS requirements).
- Cross connection inspection and repair reports - 10 years (OEBGD C3.3.1.13 or applicable FGS requirements).

7 SUMMARY OF DEFICIENCIES

Significant

Moderate

Minor

8 CERTIFICATION

Name:

Title:

Date:

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APPENDIX D

ADDITIONAL EXAMPLES OF SANITARY SURVEY DEFICIENCIES

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APPENDIX D

ADDITIONAL EXAMPLES OF SANITARY SURVEY DEFICIENCIES

This appendix provides examples of significant, moderate, and minor deficiencies. All examples of significant deficiencies and a few moderate deficiencies listed are found in the USEPA documents titled *Sanitary Survey Guidance Manual for Ground Water Systems (10-2008)* and *Guidance Manual - Conducting Sanitary Surveys of Public Water Systems - Surface Water and GWUDI (4-1999)*. Other moderate deficiencies and minor deficiencies are compiled based on recent SS reports for overseas water systems owned, managed, and/or operated by the U.S. Navy. All deficiencies are organized based on typical SS elements, including source; treatment; distribution and transmission; finished water storage; pump, pump facilities, and controls; monitoring, reporting, and data verification; system management and operation; and operator compliance.

The list provided in this appendix is not intended to be exclusive. Moderate and minor deficiencies may lead to significant deficiencies if they are not identified and corrected in a timely manner.

SOURCE AND TRANSMISSION

Significant Deficiencies

- There are activities or pollution sources in the immediate wellhead area that will cause sanitary risks
- The well is vulnerable to surface water runoff or in a flood plain
- The well casing is cracked, not sealed, or is improperly sealed

- The vent for the well casing is not screened and turned downward
- The top of the well casing is not elevated to prevent contamination from flooding or ponding
- The well is not secure and is susceptible to vandalism and tampering
- Cross connections exist between storm drains, sanitary sewers, non-potable water supplies, or a pump bearing cooling water
- An unapproved source is being used.
- Non-microbial indicators of well susceptibility to fecal contamination are present (e.g. methylene blue active substances [MBAS] or high chloride or nitrate levels from baseline or historic trends)
- Springs of improper construction

Moderate Deficiencies

- No blow-offs on the wells
- Well houses are not equipped with emergency power supplies
- The well's zone of absolute conservation and zone of respect are not followed
- Inadequate connection to the main raw water supply line
- Improperly installed Y-strainer (i.e. horizontal, with Y parallel to the ground rather than aiming downward) renders the strainer ineffective, resulting from the pit's shallow depth and inadequate dimension
- Pipe lines and fittings inside the metering pit lack the proper pipe supports and thrust blocks

TREATMENT AND CHLORINATION BOOSTING PROCESS

Significant Deficiencies

- System is not in compliance with applicable treatment technique requirements

- Inadequate disinfection contact time, disinfectant concentration, disinfectant dose; or disinfection is not continuous
- Inadequate application of treatment chemicals; not paced to flow
- Unapproved treatment chemicals used
- Lack of treatment process monitoring, failure alarms, or automatic process shutdown
- Cross connections at chemical tanks, filter backwash, membrane cleaning processes.
- Loss of membrane integrity or lack of monitoring of membrane integrity
- Auxiliary power is not available, enabling power outage to cause a complete shutdown of treatment
- Lack of redundant components
- Failure to act in an emergency situation

Moderate Deficiencies

- Leaking antiscalant feed pump
- Stairs or steps to access platforms not in compliance with OSHA guidelines
- Chlorine day tank dirty
- Chemicals hanging over secondary containment
- Sodium hypochlorite feed system not located in its own, separate room
- Online chlorine analyzer needs replacing
- Corroded fitting on the acid feed system
- Drinking water supply is corrosive and requires implementation of appropriate treatment
- Granular Activated Carbon (GAC) media was found in a building faucet aerator strainer, possibly indicating GAC may be leaking through the GAC vessel(s) into the distribution system

- Spent GAC from media replacement was observed on the WTP grounds, in the catch basin, and trench drains
- No backup generator to operate the pumping and treatment system during a power outage
- Manual injection of sodium hypochlorite solution (by operating the chlorine feed pump) versus automatic in-line chlorine feed
- No secondary containment for chlorine container in use for the stored chlorine container
- No safety eyewash station installed at the pump house
- Samples are being collected from inappropriate sampling locations
- Inadequate ventilation was observed inside the chlorinator room and chlorine bulk storage room
- Chlorine gas alarms are not functional or nonexistent in the chlorinator room
- The light switch for the chlorinator room is located on the inside wall versus the outside wall
- No hazardous materials signs installed outside the chlorinator room and/or chlorine bulk storage room
- A valve or the pipe tap located at the chlorine injection point is leaking bleach into the pump room. The hypochlorite chlorine solution feed tubing bends are not encased in a conduit in the pump room and the chlorinator room

Minor Deficiencies

- Rusted valves at or within the water treatment plant
- Raw water pump rusting
- Sand filter elbow rusting
- Chemical precipitation in chemical storage room
- Rust, grease, and dust accumulating on top of reverse osmosis (RO) feed pumps
- Rusted vent with no screen on chemical storage room
- Wall scaling observed inside room or building

- Old treatment equipment is offline but still drawing power
- Rusted piping in water treatment plant
- If present, chlorine residual reading from the online chlorine analysis unit that controls the automatic dosing of the chlorine is not connected through the Supervisory Control and Data Acquisition (SCADA) system
- Water treatment plant wall and pipe sleeves for ground and storm water drains need patching and sealing
- Better housekeeping needed in the water treatment plant chemical storage room
- Treatment equipment is not properly labeled
- No additional/backup colorimeter for the existing, primary colorimeter
- The chlorine containers or metering pumps used in the chlorine system were installed insecurely.
- The pump station has no personal protection equipment (PPE), including safety goggles; safety gloves; or a laboratory coat for safe handling of chlorine solutions (e.g. chlorine container replacement)
- No chlorine spill kit for the sodium hypochlorite solution used on-site
- No Material Safety Data Sheet (MSDS) for the sodium hypochlorite solution or other chemicals used on-site
- A proper "PM Checklist," including daily, monthly, and yearly PM lists for the pump station and chlorination system has not been provided
- Failure to perform periodic leak inspection survey
- Out-of-service emergency wells must be abandoned properly if not being developed for placement back into operation
- Blocking the access to the sprinkling valve(s)
- Rusted gate valves on the inlet or outlet pipes
- Broken ball valve handle

- Remove all clutter not appertaining to the pump house and employ good housekeeping practices

DISTRIBUTION AND TRANSMISSION

Significant Deficiencies

- Customers are receiving raw water from the raw water transmission main (where treatment is required)
- The raw water transmission main is equipped with a bypass around the treatment plant
- Repeated or frequent Total Coliform Rule (TCR) violations or detections of fecal indicators
- The TCR sampling plan is not representative of the distribution system
- The system receives numerous complaints of colored and/or odorous water
- Required disinfection residual levels are not met
- Compliance monitoring is not conducted at the required frequency and locations
- Pressures in parts of the distribution system fall below 20 psi during periods of high demand
- The system is subject to contamination from hazardous cross connections
- Failure to have a cross connection control program when one is required
- High leakage rates that pose risks of backsiphonage
- Inadequate separation between distribution system mains and sewer lines

Moderate Deficiencies

- Bacteria sampling plan not representative of distribution system

- Routine water distribution system inspection is not being performed
- An effective annual water main flushing program has not been implemented
- No stand-by emergency power generators for the WTP and distribution system
- Fire hydrants located on the piers or other remote locations not protected from unauthorized use
- Due to the elevated water storage tank being out of service for repairs, the unidirectional flushing program is not being performed
- Converting a building water supply from a potable to a non-potable water source

FINISHED WATER STORAGE

Significant Deficiencies

- Inadequate storage to maintain adequate distribution system pressure
- The tank's vents or overflows are not screened or protected
- Tank's overflows or drains are subject to flooding
- Holes or other failures of tank roof or structure, faulty roof or faulty floating cover drainage
- In ground tanks subject to flooding
- The entry hatch tank is not of the overlapping shoe-box type and is subject to runoff from the tank roof
- Ladder protection is missing or loose
- The tank's entry hatch or access ladders are not secured
- The storage tank has not been surveyed for sanitary defects for an extended period of time

Moderate Deficiencies

- Inadequate internal cleaning and maintenance of storage tank
- Lack of proper screening of overflow pipe and drain. Inadequate roofing (e.g., holes in the storage tank, improper hatch construction)

Minor Deficiencies

- Improper venting of tank
- A leaking gate valve was observed
- Exterior surface of the hatch cover is rusted, including the gooseneck vent
- The flapper valves in the overflow manholes are not being periodically tested and maintained to confirm their proper operation
- Padlocks installed on gates, water tank hatch covers and other locations for security are unlocked
- The ultrasonic water level sensor system is not operational and cannot accurately record flow
- Raise the manholes covers above the local rain runoff or flood level

PUMPS, PUMP FACILITIES, AND CONTROLS

Significant Deficiencies

- Unapproved oil is used for pump lubrication
- The air/water relief valves provide a cross connection to the floor drains
- Auxiliary power needed to keep the system under positive pressure during commonly experienced power outages is not available
- There is a lack of redundant pumps

- Cross connections to non-potable supplies, pump or generator cooling water lines

Moderate Deficiencies

- Inadequate pump capacity
- Leaky fire fighting pump needs repairing

Minor Deficiencies

- Need to provide a proper "PM Checklist" including daily, monthly and yearly PM lists for the pump station
- Failure to perform periodic leak inspection survey
- Out of service emergency wells not being developed for placement back into operation must be abandoned properly
- Blocking the access to the sprinkling valve(s)
- Rusted gate valves on the inlet or outlet pipes
- Broken ball valve handle
- Remove all clutter not appertaining to the pump house and employ good housekeeping practices

MONITORING, REPORTING, AND DATA VERIFICATION

Significant Deficiencies

- The system has been found to be in significant non-compliance for one or more contaminants
- Operators are using improper procedures and/or methods when conducting onsite laboratory analyses

- The system does not have a compliance or microbial monitoring plan
- The system is not using a certified laboratory
- Failure to complete operational evaluation reports

Moderate Deficiencies

- Consumer Confidence Reporting Requirements are not met
- The protocols for upstream and downstream sampling sites as identified in the current Management Action Plan (MAP) after a routine or compliance positive total coliform occurrence was not followed
- No one time analysis for maximum total THM formation potential (TTHMFP)
- Pressure zone delineation (possibly from the water storage tanks being taken out of service) has created an unnecessary dead end in the distribution system

SYSTEM MANAGEMENT AND OPERATION

Significant Deficiencies

- System security is inadequate
- Failure to complete required Public Notice
- Failure to notify MCL violations or ground water source fecal contamination
- Variance or exemption conditions or schedules not met
- Failure to comply with enforcement actions and compliance agreements
- Lack of appropriately trained or qualified staff to operate the water systems
- System does not have adequate managerial or financial capacity to ensure continued operation

Moderate Deficiencies

- Lack of approved water system management plan
- Lack of approved operation and maintenance manual
- Lack of approved Standard Operating Procedures (SOPs)
- Failure to keep adequate operational and monitoring records
- Failure to make timely reports as required
- Failure to update the Water Information Central Data Repository and Sharing Database
- Raw water supply, water treatment plant and distribution system drawings need updating
- Failure to maintain the personal protective equipment and eyewash station, covering and securing the raw water pipe and air vent valve at bridge crossing and installing isolation valves before air vent valves
- The existing backflow prevention cross-connection control program is not comprehensive and needs updating
- No program in place to exercise the fire hydrants, test water pressure and maintain records

Minor Deficiencies

- Pipes and sampling gauges in the water treatment plant need better labeling

OPERATOR COMPLIANCE WITH TRAINING AND CERTIFICATION REQUIREMENTS

Significant Deficiencies

- The Operator in Responsible Charge and Assistant Operator in Responsible Charge are not certified at the appropriate certification level
- Inadequate number of operators

Moderate Deficiencies

- Water treatment plant and distribution system operators do not have the required level of training
- Water treatment plant and distribution system operators do not have the required continuing education credits