
Audit of the Department of Health's Oversight of Public Water Systems

A Report to the
Governor and
the Legislature
of the State of
Hawaii

Report No. 00-15
November 2000

THE AUDITOR
STATE OF HAWAII

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Submitted by

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Foreword

This audit of the Department of Health's oversight of public water systems was conducted pursuant to Section 23-4, Hawaii Revised Statutes, which requires the Auditor to conduct postaudits of the transactions, accounts, programs, and performance of all departments, offices, and agencies of the State and its political subdivisions.

We initiated the audit in response to an invitation by the National State Auditors Association to participate in its 2000 joint audit project on "water quality."

We wish to acknowledge the cooperation and assistance of the Department of Health, the Board of Certification of Operating Personnel in Water Treatment Plants, the federal Environmental Protection Agency, and other agencies that assisted us during the audit.

Marion M. Higa
State Auditor

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Chapter 1

Introduction

This audit was initiated in response to an invitation by the National State Auditors Association to participate in its 2000 joint audit project. The association selected “water quality” as the joint audit topic for its relevance to many member states and its complementary nature to recent audit work by some states. The specific aspect of water quality chosen by Hawaii’s State Auditor was safe drinking water and the Department of Health’s oversight of public water systems. The audit was conducted pursuant to Section 23-4, Hawaii Revised Statutes (HRS), which requires the State Auditor to conduct postaudits of the transactions, accounts, programs, and performance of all departments, offices, and agencies of the State and its political subdivisions.

Background on the Safe Drinking Water Program

Preventing, reducing, and eliminating contaminants in drinking water ensure that public health is being protected. Regulating potentially harmful contaminants and establishing clear governmental authority to obtain all information relating to chemical contamination of water resources are essential for health protection. The Department of Health is designated as the state agency with overall responsibility for ensuring that the public is provided safe drinking water. The department has implemented and enforced a state program of regulations that meet or exceed national drinking water standards. The standards were established under the federal Safe Drinking Water Act of 1974.

History and background of the Safe Drinking Water Act of 1974

In the late 1960s, it became apparent that industrial and agricultural advances and manmade chemicals were harming the environment and public health. Many new chemicals found their way into water supplies and were suspected of causing health problems. By the early 1970s, this increased awareness of chemical contamination of water supplies led Congress to pass several federal environmental and health laws dealing with polluted water, hazardous waste, and pesticides.

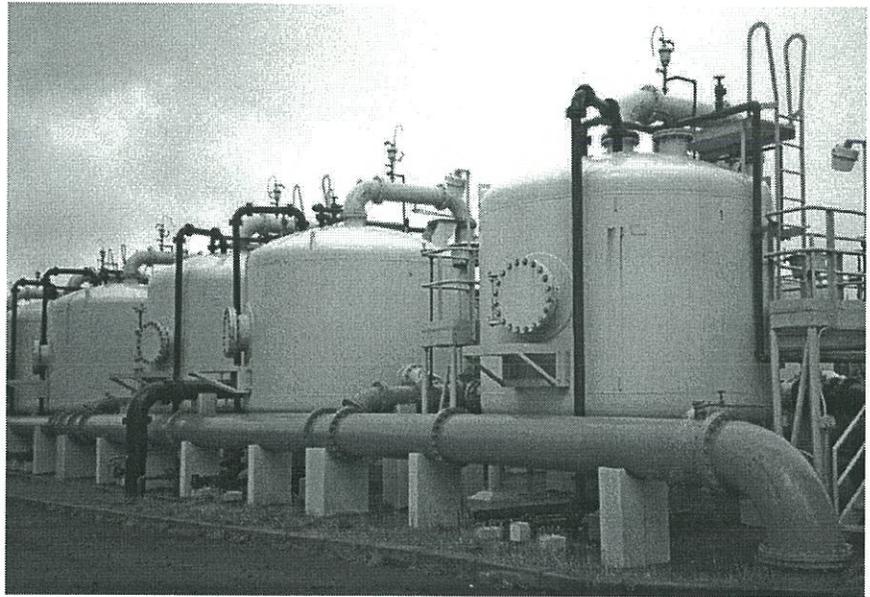
One of these laws, the Safe Drinking Water Act of 1974, required all public water systems to meet national standards that would protect consumers from harmful contaminants in drinking water. A public water system provides drinking water to at least 25 people or serves 15 or more service connections for at least 60 days per year. Under federal law, a public water system may be publicly or privately owned. As of February 2000, there were 134 public water systems in Hawaii.

As originally passed in 1974, the Safe Drinking Water Act primarily focused on water treatment as the means of providing safe drinking water at consumers' taps. The law was amended in 1986 and 1996 and now requires many other actions that protect drinking water and its sources. The 1996 amendments addressed source water pollution, operator training, funding for water system improvements, and public information as important components for safe drinking water. This approach sought to ensure the quality of drinking water by protecting it from the source to the tap.

Drinking water regulations

The Safe Drinking Water Act of 1974 requires the federal Environmental Protection Agency (EPA) to set national drinking water standards to protect against health risks and ensure consistent quality of the nation's water supply. The National Primary Drinking Water Regulations set standards for chemical, microbiological, radiological, and physical contaminants that are known or anticipated to occur in public water systems and can adversely affect public health. Adverse health effects of ingesting such contaminants in water may include kidney damage, reproductive difficulties, diarrhea, circulatory problems, and increased risk of cancer.

Specific standards set by the National Primary Drinking Water Regulations apply to all public water systems and include enforceable maximum contaminant levels and treatment techniques. A maximum contaminant level is the highest permissible level of a contaminant in drinking water. For example, the maximum contaminant level for arsenic in drinking water is 0.05 milligrams per liter. Treatment techniques are specified by the EPA for certain contaminants whose concentrations in drinking water cannot be measured by economically or technologically feasible analytical methods. The specified treatment techniques, rather than measuring contaminant levels, reduce the level of contaminants. For example, public water systems that draw their water from surface sources (rivers, lakes, and reservoirs) are required to treat (filter and disinfect) their water to ensure a 99.99 percent removal and inactivation of viruses. The adequacy of the filtration process is determined by measuring the turbidity, or cloudiness, of the treated water. The national standards include testing requirements for treated water to ensure standards are achieved.



Granular activated carbon filtration system for the Honolulu Board of Water Supply's Mililani public water system.

Roles and responsibilities

The responsibility for ensuring safe public drinking water is divided among the EPA, states, and public water systems. The Safe Drinking Water Act gives the EPA authority to delegate primary responsibility (primacy) for enforcing drinking water regulations to states that meet specific requirements. All states except Wyoming have assumed primacy.

With EPA's oversight, states with primacy adopt and implement drinking water regulations that are no less stringent than the National Primary Drinking Water Regulations set by the EPA. Primacy states must also adopt, implement, and maintain a formal enforcement program to ensure that violations of state regulations are promptly addressed and that public health is protected. In addition, states are required to establish and maintain records and reports regarding their regulatory and enforcement activities.

Public water systems are responsible for ensuring that contaminants in tap water do not exceed federal or state standards. Water systems treat source water if necessary, monitor for the wide variety of regulated contaminants, and report the results to the state. Based on the results, the state determines whether the water is in compliance or in violation of regulations.

The State bears primary enforcement authority

Act 84, Session Laws of Hawaii 1976, established the legal basis for Hawaii's primacy. Act 84 was eventually codified as Chapter 340E, HRS, Safe Drinking Water. In crafting the law, the Legislature determined that the Department of Health should have clear authority and jurisdiction to protect the public from unacceptable exposure to chemical contaminants.

Chapter 340E, HRS, requires the director of health to promulgate state primary drinking water regulations and to adopt and implement procedures for enforcing these regulations. Enforcement includes monitoring, inspection, and recordkeeping procedures that comply with federal regulations. The director is authorized to pursue penalties and other enforcement measures administratively or in civil court against violators of the law or rules.

Safe Drinking Water Branch oversees the program

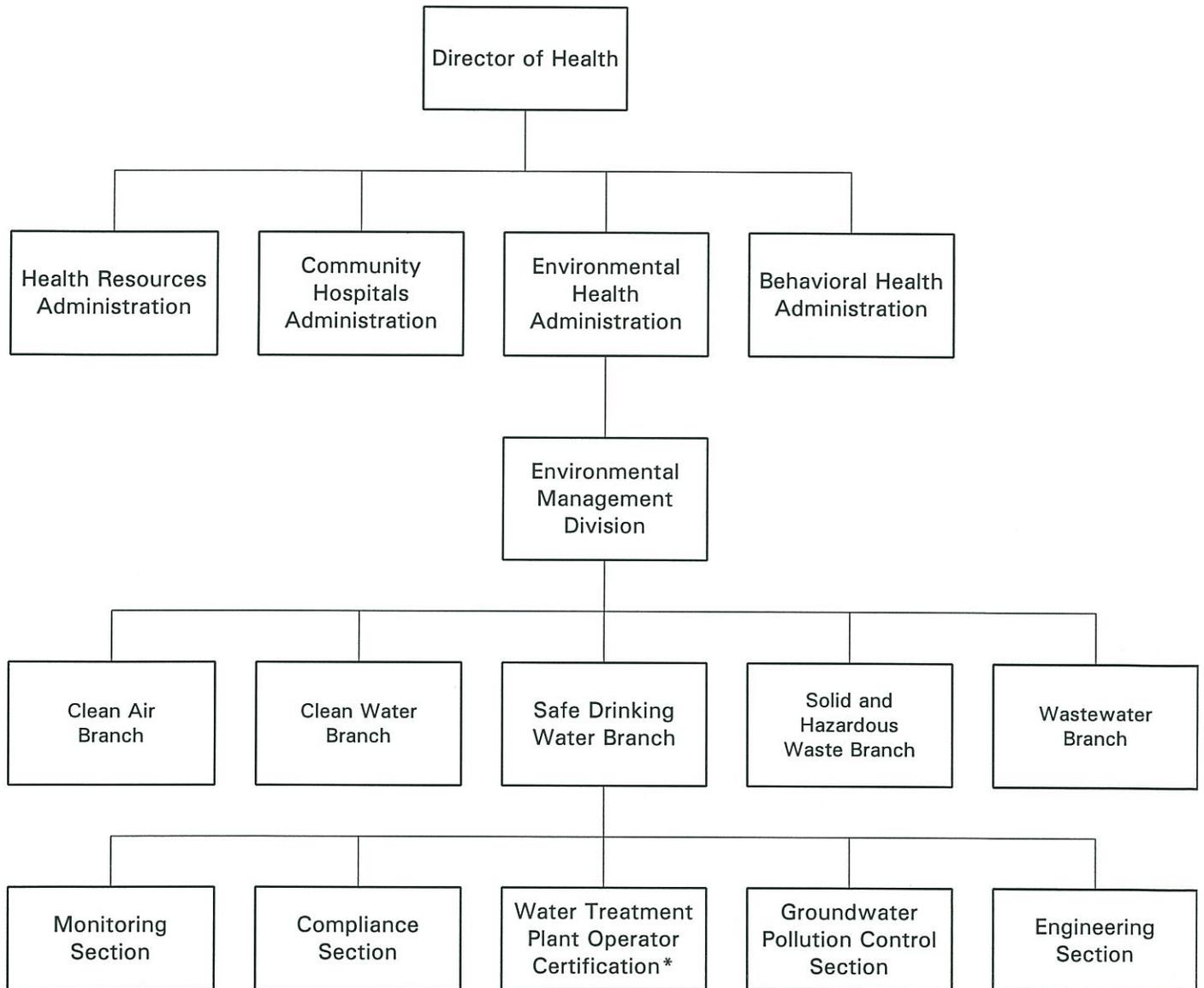
Hawaii's safe drinking water program as delegated by the EPA is located in the Safe Drinking Water Branch of the Department of Health. The branch's mission is to protect public health by regulating owners and operators of public water systems so that safe drinking water is provided to the community. Specifically, the branch implements and maintains a program of statewide public water system supervision that includes surveillance, monitoring, technical assistance, engineering review, and enforcement.

The branch was created in 1989 and placed under the Environmental Management Division of the department's Environmental Health Administration. An engineering program manager administers the branch and must ensure that the branch has adequate statutory, fiscal, and personnel resources to accomplish its mission. As Exhibit 1.1 reflects, the branch comprises four sections and one program: (1) Monitoring Section, (2) Compliance Section, (3) water treatment plant operator certification program, (4) Groundwater Pollution Control Section, and (5) Engineering Section.

Monitoring and certification responsibilities are shared

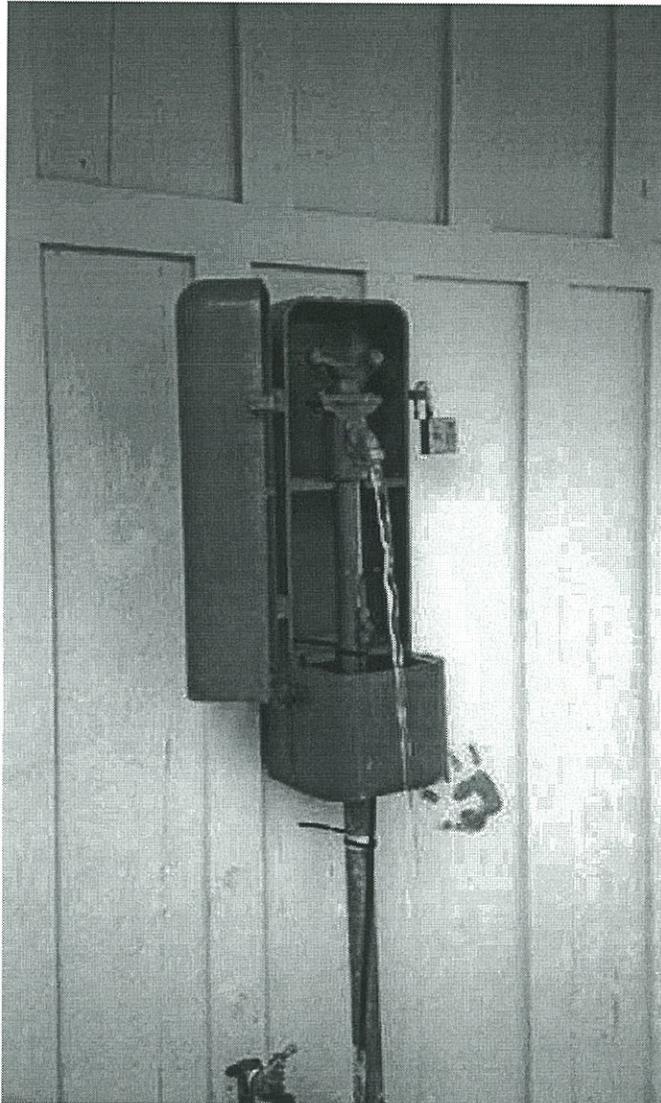
Monitoring functions involve statewide water sampling and certification of water treatment personnel. The Monitoring Section, with staff on Oahu, Hawaii, Maui, and Kauai, monitors public water systems and groundwater for contaminants. Specifically, this section coordinates statewide sampling between staff of water systems on neighbor islands and Oahu and the State Laboratories Division, to ensure that analyses are conducted efficiently. It also receives, evaluates, records, stores, and transmits data for all analyses to ensure proper response to analytical results.

Exhibit 1.1
Department of Health
Safe Drinking Water Branch
Organization Chart



* Supports the Board of Certification of Operating Personnel in Water Treatment Plants, which is administratively attached to the department.

Source: Department of Health



Sampling tap for the U.S. Army's Kilauea Military Camp public water system.

The five-member Board of Certification of Operating Personnel in Water Treatment Plants, placed in the Department of Health for administrative purposes, is responsible for ensuring that qualified individuals operate the plants. The Safe Drinking Water Branch assists the board in ensuring qualified operators. Specifically, the water treatment plant operator certification program administers the program; receives, screens, and prepares certification applications for review; and conducts operator certification training and testing.

State ensures compliance with regulations

The Compliance Section of the Safe Drinking Water Branch ensures that all public water systems are in compliance with state and federal rules, regulations, and requirements. There are three main types of violations that public water systems may incur:

1. *Maximum contaminant level violation* – occurs when tests indicate that the level of a contaminant in treated water is above the legal limit.
2. *Treatment technique violation* – occurs when a water system fails to treat water in the way prescribed by law.
3. *Monitoring and reporting violation* – occurs when a system fails to test its water for certain contaminants or fails to report test results in a timely fashion.

After a noncompliant public water system has been identified, the Compliance Section ensures that violation response measures and enforcement actions are taken as necessary. The section seeks compliance through formal enforcement, technical assistance, or other means. Formal enforcement may include administrative penalties in the form of notices of violation or judicial penalties including civil penalties involving significant fines.

Resources are obtained from a variety of sources

The Safe Drinking Water Branch receives funding from three sources: state general funds, federal grants, and revolving funds. The branch reports that it received a \$550,000 general fund appropriation for FY1998-99. The branch also receives federal funds to carry out its public water system supervision program (about \$400,000 during FY1998-99). To support the public water system supervision program, about 10 percent of federal funds and appropriations are allocated to the Environmental Management Division, Environmental Resources Office, Environmental Planning Office, and the State Laboratories Division.

The branch receives revolving funds from the Environmental Response Revolving Fund and the Drinking Water Treatment Revolving Loan Fund. The Environmental Response Revolving Fund receives the petroleum tax, fines and penalties levied for environmental violation, grants, and legislative appropriations, and may be used to address concerns related to drinking water. The Safe Drinking Water Branch was budgeted about \$600,000 from this fund during FY1998-99. The major sources of funding for the Drinking Water Treatment Revolving

Loan Fund have included federal capitalization grants, matching state appropriations, and interest earnings on investments. This fund had about \$19.0 million in available resources at the end of FY1998-99. Approximately \$135,000 from the revolving loan fund was used to administer the loan program for eligible infrastructure costs and to support the public water system supervision program during FY1998-99.

During FY1998-99, the Safe Drinking Water Branch was appropriated 38 positions, with the majority (20) funded through the two revolving funds.

Objectives of the Audit

1. Assess whether the Department of Health has effectively monitored public water systems to ensure that they distribute safe drinking water.
2. Assess whether the department ensures safe drinking water and the protection of public health by appropriately and effectively utilizing available enforcement procedures.
3. Assess the department's use of the Drinking Water Treatment Revolving Loan Fund.
4. Make recommendations as appropriate.

Scope and Methodology

This audit was limited to assessing the Department of Health's activities related to drinking water that is distributed by public water systems (either publicly or privately owned) for human consumption. We did not assess the department's efforts with regard to ground water protection. Our audit focused primarily on the activities of the Monitoring Section, Compliance Section, and water treatment plant operator certification program of the Safe Drinking Water Branch.

Our assessment of the department's safe drinking water monitoring program focused on calendar year 1999 and previous years as was necessary. Our assessment of the department's enforcement procedures encompassed calendar years 1997 through 1999 and previous years as needed. Our review of monitoring and enforcement activities included public water systems on all islands. We also reviewed the department's use of its Drinking Water Treatment Revolving Loan Fund since the fund's inception in 1997.

We reviewed relevant federal laws and regulations, state statutes and administrative rules, and department policies and procedures. We also reviewed national reports and studies on safe drinking water and agreements between the EPA and Department of Health. We conducted interviews with Safe Drinking Water Branch, Wastewater Branch, State Laboratories, board of certification, and EPA officials and personnel. We examined public water system files and various database information at the Safe Drinking Water Branch on Oahu and neighbor island offices. We also reviewed water treatment plant operator certification files maintained at the Safe Drinking Water Branch. We conducted field observations of water sampling techniques and chain of custody procedures on Oahu, Maui, Hawaii, and Kauai. We also examined budgeting, expenditure, and loan application information of the Drinking Water Treatment Revolving Loan Fund.

At the time of our audit, we were aware that some residents of the Village Park subdivision in Waipahu had been concerned that certain pesticides may have caused health problems in their community through contamination of drinking water. However, our audit did not focus on Village Park. As Chapter 2 explains, we took a random sample of public water systems to assess the effectiveness of the monitoring that the Department of Health conducts in its efforts to ensure that contaminants do not exceed maximum standard levels. The water system serving Village Park did not show up in our random sample.

However, for the information of our readers, we did obtain recent Department of Health chemical contaminant reports on the water that serves Village Park through the Kunia II wells. The samples were taken after the water had been treated by the water system's granular activated carbon filtration system. For samples taken on July 13, 2000 and July 28, 2000, the reports indicate nondetectable levels of ethylene dibromide (EDB) and dibromochloropropane (DBCP), two chemicals suspected of possibly contaminating Village Park's water sources. The reports also indicate that levels of trichloropropane (TCP)—another "suspect" chemical—were below the maximum contaminant level of 0.8 parts per billion set by state regulations.

Our work was performed from January 2000 through September 2000 in accordance with generally accepted government auditing standards.

Chapter 2

State Oversight Of Public Water Systems Is Adequate But Could Be Improved

The oversight of public water systems impacts the lives of all citizens in Hawaii. Protecting drinking water quality is one of the most vital environmental protection activities of the State. Adequate oversight by the Department of Health helps ensure that water for consumption does not pose a public health risk.

Our review of the Department of Health’s oversight of public water systems found that, overall, the department has ensured that safe drinking water is distributed to the public. Effective monitoring and appropriate enforcement of violations have contributed to the high quality water Hawaii currently enjoys. However, we also found room for improvement. The department’s monitoring practices require clarification and timely enforcement action against serious violators is essential but lacking. The current data management system should be integrated to reduce the occurrence of inaccurate data and wasted staff time. Finally, resources available to provide financial assistance to public water systems could be maximized with appropriate departmental staffing and long-term planning.

Summary of Findings

1. Overall, the Department of Health has effectively monitored public water systems to ensure that safe drinking water is distributed to the public. However, further improvements would enhance the State’s safe drinking water program.
2. Although enforcement procedures were appropriately utilized to ensure safe drinking water and public health protection, timely enforcement action against public water systems in significant noncompliance has been lacking.
3. The department has been unable to maximize the use of the Drinking Water Treatment Revolving Loan Fund.

Improvements Would Enhance the Department's Drinking Water Monitoring Efforts

It is the responsibility of the State's drinking water program to ensure that public water supplies are tested regularly for specified contaminants and ensure that contaminant levels meet the required standards. Components of the drinking water monitoring system include water sample collection; laboratory analysis; and data analysis, interpretation, and management. Monitoring also includes certification of water treatment plant operators and inspections of public water systems. Overall, the Department of Health has adequately managed these activities, but procedures in several areas need to be clarified and enhanced.

Monitoring requirements are generally met

Public water systems are required to collect water samples at designated intervals and locations and to test the samples in state-approved laboratories. Unlike other states where individual public water systems are delegated responsibility for sample collection, Hawaii's Safe Drinking Water Branch has assumed primary responsibility for sampling the majority of public water systems for microbiological and chemical contamination. Test results for the samples collected by the water systems are reported to the Safe Drinking Water Branch, which determines whether the system is in compliance with or violation of drinking water regulations. Exhibit 2.1 shows the major group of contaminants and the minimum frequency that public water systems must test for them. Monitoring requirements differ based on the size or type of public water system.

Our review of the department's monitoring efforts included calendar year 1999 chemical and microbiological monitoring requirements for 29 randomly selected public water systems on Oahu, Hawaii, Maui, Kauai, and Molokai. Our sample included small, medium, and large public water systems both publicly and privately owned. A list of the 29 public water systems randomly selected for our sample is included as Appendix A.

We found that all 1999 *chemical* monitoring requirements were satisfied for the 29 systems in our sample. However, one system failed to collect the required number of monthly coliform (*microbiological*) samples in 1999. Hawaii Administrative Rules and national drinking water regulations require that systems serving between 33,001 and 41,000 persons collect 40 coliform samples per month. We found that the Mililani water system, with a population of 34,681, collected 31 or fewer samples each month during 1999—at least nine (or 108 for 12 months) less than required. The Safe Drinking Water Branch acknowledged that it did not catch the error. The discrepancy was corrected when we brought it to the branch's attention and any compliance actions will be determined by the branch's Compliance Section.

**Exhibit 2.1
Sample Monitoring Schedule**

Contaminant		Minimum Monitoring Frequency
Acute Contaminants	Bacteria	Monthly or quarterly, depending on system size and type
	Protozoa and viruses	Continuous monitoring for turbidity and monthly for total coliform as indicators
	Nitrate	Annually
Chronic Contaminants	Volatile organics (e.g., benzene)	Annually for two consecutive years for ground water systems; annually for surface water systems
	Synthetic organics (e.g., pesticides)	Twice in three years for larger systems; once in three years for smaller systems
	Inorganics/Metals	Once every three years for ground water systems; annually for surface water systems
	Lead and Copper	Annually
	Radionuclides	Once every four years

Source: U.S. Environmental Protection Agency

The Mililani water system will be required to notify its consumers of the monitoring violation and the potential adverse health effects in a daily newspaper.

Although failing to monitor at the required level may not necessarily result in public health problems, conducting the required monitoring is critical to ensure the detection of problems. Coliform samples at levels above drinking water standards indicate that pathogenic contaminants are present in the water. These pathogens may cause health problems including diarrhea, cramps, nausea, and vomiting. These problems are not usually dangerous for healthy adults but may lead to more serious health problems or even death for people with underdeveloped or weakened immune systems.

Water treatment plant operators are appropriately certified

Chapter 340F, Hawaii Revised Statutes (HRS), requires all classified water treatment plants to be under the direct supervision of an appropriately certified operator. The chapter also prohibits an individual from performing the duties of a water treatment plant operator without first being certified.

Certification requirements serve the following purposes:

1. To assure that safe drinking water is served to consumers in the state from water treatment plants using surface water sources or ground water sources under the direct influence of surface water. (Ground water under the direct influence of surface water includes water beneath the surface of the ground with significant occurrence of large-diameter pathogens or significant and relatively rapid shifts in water characteristics that closely correlate to climatological or surface water conditions.)
2. To ensure that finished water does not contain viruses or other pathogenic organisms.
3. To assure that personnel knowledgeable in the operation, maintenance, and management of approved water treatment plants operate them.

The director of health issues the certificates upon the approval of the state Board of Certification of Operating Personnel in Water Treatment Plants. The board, which is placed in the department for administrative purposes, comprises four individuals qualified in the fields of sanitary engineering or drinking water treatment plant operation and one individual from the Safe Drinking Water Branch. The board also receives assistance from the branch's water treatment plant operator certification program in implementing the certification rules.

We randomly selected 21 operators certified as of January 5, 2000 and reviewed their certification files to determine whether they met minimum education, work experience, continuing education, and reciprocity (as applicable) requirements; and to assess whether their initial and renewal applications were submitted and processed in a timely manner.

Our review found that the department, through the board of certification, has adequately managed its certification program. The Safe Drinking Water Branch has maintained neat and organized files for all certified operators and for board meeting minutes and correspondence. Although in some cases we could not verify or confirm certain information, overall we found that the board strictly enforced the certification requirements as outlined in statutes and administrative rules. The branch's environmental engineer assigned to the water treatment plant operator certification program proactively ensures that all uncertified water treatment plant operators submit their applications and that certified operators meet their continuing education unit requirements.

Chain of custody and sampling procedures require clarification

Chain of custody procedures are applicable to all drinking water samples. Chain of custody is defined as follows:

A written procedure to be followed whenever samples are collected, transferred, stored, analyzed, or destroyed; it is used to trace the possession of the sample from the moment of its collection through its analysis and interpretation.¹

Chain of custody forms, which are developed by the Safe Drinking Water Branch and used to record all samples, are legal documents and records that should not contain any discrepancies. A sample chain of custody form is shown in Exhibit 2.2. In addition, water samples must be collected according to set procedures to protect against misrepresentation of the material being sampled. We found, however, that chain of custody and sampling procedures require clarification to ensure the full integrity of all water samples collected by the Safe Drinking Water Branch and public water systems.

Water samples are not consistently documented

Proper documentation is vital to support the integrity of all water samples. Compliance enforcement action may depend on evidence of primary labels and chain of custody forms; therefore, all samples need to be fully documented for later reference. Our review of over 500 chain of custody forms revealed that the integrity of water samples may be jeopardized by Safe Drinking Water Branch and State Laboratories personnel who do not consistently follow accepted documentation procedures or fail to completely document chain of custody.

Information that is necessary to accurately trace the chain of custody of water samples is often omitted from the chain of custody forms. In many instances we could not trace water samples from the time they were collected to the time the lab received the samples for analysis. This was especially prevalent for samples that were collected on the neighbor islands and sent to the Oahu State Laboratory for analysis. In addition, critical information, such as the time a water sample was collected or the method of shipping a sample from the neighbor islands to Oahu (for example, commercial airlines or private courier), was also missing from a number of the chain of custody forms we reviewed.

In addition to missing information, we found that chain of custody was not consistently documented. For example, each chain of custody form for chemical contaminants includes space for information pertaining to custody seals that are used to prevent tampering and to maintain the integrity of the shipping container. However, the use (or non-use) and documentation of custody seals are not clearly defined in the Safe Drinking Water Branch's quality assurance plan or standard operating

**Exhibit 2.2
Safe Drinking Water Branch
Chain of Custody Form**

Department of Health Laboratories

**SAFE DRINKING WATER BRANCH
CHAIN OF CUSTODY & EDB/DBCP CONTAMINANT REPORT**

Q199

seq: X

Water System Name: MILILANI

Number: 367

Source Name: MILILANI WELLS I P-2

Sample Location: EAST OF P-1, PUMPHEAD

Well Log # 2800-02

Sample Point # 367-008

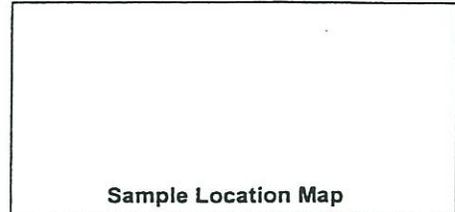
Type of Sample: Routine: Special:

Collection Remarks: _____

Treatment: B Cl₂ Reading (if Chlorinated): _____ mg/l

Sampler(s) _____

Date: _____ Time: _____



Sample Location Map

Administration Only	
<input type="checkbox"/> Copies Done	<input type="checkbox"/> Pos. Result
<input type="checkbox"/> Sent System	<input type="checkbox"/> Chem Pos.
<input type="checkbox"/> Sent NI Office	<input type="checkbox"/> Inor. Mon.
<input type="checkbox"/> Data Entered	<input type="checkbox"/> Violation
<input type="checkbox"/> SDWB Data	<input type="checkbox"/> Neg. Result
<input type="checkbox"/> GIS Data	<input type="checkbox"/> Reduce Mon.

Relinquished by: _____	Date / Time _____	Received by: _____	Date / Time _____
Relinquished by: _____	Date / Time _____	Received by: _____	Date / Time _____
Delivered to Airport by: _____	Date / Time _____	Received by: _____	Date / Time _____
Relinquished by: _____	Date / Time _____	Received by: _____	Date / Time _____
Delivered to Lab by: _____	Date / Time _____	Received for Laboratory by: _____	Date / Time _____

Method of Shipment: Hand Carried Hawaiian Air Island Air Other (Specify) _____
Custody Seal Intact? Yes No Not Used

Sample Lab # _____	Locked in Refrig. by: _____	Date / Time _____	Removed from Refrig by: _____	Date / Time _____
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Regulated Contaminant	ND	NQ	MCL	RESULT	Date	Analyst
	ug / l	ug / l	ug / l	ug / l		
Ethylene Dibromide (EDB)	<0.01	<0.04	0.04			
1,2-Dibromo-3-Chloropropane (DBCP)	<0.02	<0.04	0.04			

ND = Non-detectable NQ = Non-quantifiable MCL = Maximum Contaminant Level

Method: EPA 504

Sample Preservation / Dechlorination: Approx. 4 mg Na₂S₂O₃

Reported by: _____ Date: _____ QA Check: _____ Date: _____

Forwarded by: _____ Date: _____

(EDB99.DOC) (Rev. 2/99)

procedures manual. Therefore, the forms that we reviewed did not routinely indicate whether a custody seal was used or not.

We also found that the State Laboratories procedures and documentation for locking samples in a refrigerator at the lab are inconsistent. The Safe Drinking Water Branch's quality assurance plan states that laboratory analysts are required to sign and date the chain of custody form when removing a sample from the refrigerator/storage area for analysis. Some water samples may be removed from a refrigerator or storage area several times over the course of days or weeks to be analyzed. However, a laboratory official informed us that staff no longer follow the branch's chain of custody procedures. Once a sample arrives at the State Laboratory and is received by a laboratory analyst, it is considered to be in the custody of that analyst and secured (that is, "locked in a refrigerator"). No further signing and dating on the chain of custody forms are done.

Security measures for samples are lax

According to standard operating procedures, the person collecting the water sample is responsible for assuring that each container containing the sample is in his or her physical possession or in his or her view at all times, or is secured in such a place and manner that no one can tamper with it. However, water samples are no longer secured during shipment from neighbor island sampling sites to the State Laboratory on Oahu. Safe Drinking Water Branch personnel acknowledge that there is a potential for tampering with neighbor island samples.

Although the use of custody seals is mentioned in the standard operating procedures, specific requirements regarding the use of custody seals are not clearly defined. As a result, appropriate usage of the seals is uncertain. A key Safe Drinking Water Branch official claims that custody seals are normally used for samples that are shipped from the neighbor islands to Oahu to ensure that no one tampers with the samples. An Oahu based sampler concurs with the advisability of this practice. However, neighbor island branch staff report that they do not use custody seals. Instead, they report using duct tape to secure the coolers containing water samples that are sent to Oahu for analysis. They acknowledge that this method of securing coolers does not ensure the integrity of the samples and does not prevent unauthorized personnel from opening the coolers without the branch's knowledge.

Although collection procedures are generally followed, holding times are sometimes exceeded

The quality assurance plan of the Safe Drinking Water Branch requires water samples to be collected according to set procedures and to be

analyzed within a certain amount of time. Although branch personnel are collecting water samples in accordance with the prescribed sampling procedures, the maximum allowable holding time for some microbiological samples has sometimes been exceeded.

In general, samples should be analyzed as soon as possible after they are collected. The Safe Drinking Water Branch has developed maximum times that specific samples may be held before being analyzed and still be considered valid. Pursuant to the branch's quality assurance plan, the holding/travel time between sampling and analysis for microbiological samples is not to exceed six hours for those samples delivered directly to the laboratory by the sampler. For microbiological samples that are shipped by mail or public transportation, the holding/travel time is not to exceed 30 hours. In addition, all samples received by the laboratory are to be analyzed within two hours of receipt.

We found that microbiological samples collected on Oahu and the Big Island of Hawaii during 1999 sometimes exceeded the six-hour maximum holding time requirement and two-hour analysis requirement. For example, a sample collected on Oahu at 7:05 a.m. was delivered to the State Laboratory at 12 noon. However, the sample was not analyzed until 3:00 p.m.—about eight hours after it was collected and three hours after the lab received the sample. Similarly, a sample collected from a Hawaii public water system at 8:00 a.m. was not analyzed until 3:12 p.m.—seven hours after it was collected. Another Hawaii sample was delivered to the lab at 10:50 a.m. but was not analyzed until 2:09 p.m.—more than three hours later. One system on Oahu collected 78 routine microbiological samples during 1999 that exceeded the six-hour maximum holding time requirement.

We asked an Oahu State Laboratory official to clarify the maximum holding time requirement for microbiological samples. The official stated that the federally set holding time for all microbiological samples is 30 hours but that the State has *recommended* six hours as the maximum holding time. We found that it is unclear whether the six-hour state-recommended maximum holding time or the 30-hour federally set maximum holding time is the adopted standard. While the quality assurance plan states the maximum holding time for microbiological samples delivered directly to the lab is not to exceed six hours, the branch's standard operating procedures note 30 hours as the maximum holding time for these samples. Without clarification, the reliability of drinking water samples that are analyzed for coliform but held more than six hours may be questionable.

Revived sanitary survey program is deficient

Sanitary surveys are onsite reviews of water systems to evaluate the adequacy of their sources, facilities, equipment, operation, and maintenance for producing and distributing safe drinking water. These

surveys are among the most important tools states can use to help ensure water system compliance with drinking water requirements and are an essential element of a state's drinking water program. The effectiveness of Hawaii's sanitary survey program has been weakened by an extended period of inactivity in the early 1990s and by a lack of consistent follow-up on survey recommendations.

As a condition of primary enforcement responsibility, federal regulations require states to adopt and implement a systematic program for conducting sanitary surveys of public water systems. States should give priority to sanitary surveys of public water systems that are not in compliance with state primary drinking water regulations.

Sanitary surveys have not been timely

Sanitary surveys performed by the branch have been untimely by standards recommended by the Environmental Protection Agency (EPA) and required by federal and state regulations. The EPA recommends annual surveys for surface water systems and triennial surveys for ground water systems. Federal and state regulations require systems that serve fewer than 4,100 people to undergo a sanitary survey every five years. In a sample of surface water systems that serve fewer than 4,100 people, we found that the period between surveys ranged from over six years to almost twenty years.

From approximately 1992 to 1997, the sanitary survey program was inactive. Funding and neighbor island travel restrictions contributed to the inactivity. These issues have reportedly been resolved, but Safe Drinking Water Branch staff predict that maintaining staff and meeting expanding sanitary survey requirements may impair the branch's ability to keep current with survey requirements. The branch revived its sanitary survey program in 1997 and appears to be making a good faith effort to complete sanitary surveys of *all* systems—both recommended and required—within a three-year cycle.

Follow-up on survey recommendations is uneven

The department's sanitary survey program could be improved by developing a standard system for following up on survey findings and recommendations. A 1995 EPA/state joint guidance document on sanitary surveys recommended that states develop a follow-up program for recommendations made in sanitary surveys. Timely corrective action, especially to correct deficiencies that can significantly impact public health, is a necessary next step for an effective sanitary survey program. Survey reports should identify the deficiencies noted during inspections and should request the water systems to provide recommendations for their corrective action, with a timetable.

Currently, the branch transmits copies of the sanitary survey reports to the water systems with a request for a response to survey recommendations within 30 days. We found that beyond the initial transmittal letter, follow-up on survey findings was uneven. In one case, an incomplete initial response from a water system prompted the branch to send a follow-up letter that successfully elicited a point-by-point response from the system. However, the branch did not follow up on two other water systems—one submitting an incomplete response and the other never submitting a formal response. The inconsistency of follow-ups is due to the lack of a protocol coupled with divided survey responsibilities among numerous engineers.

Establishing a protocol for follow-up on survey findings will help the branch prepare for future requirements. Federal regulations require states to adopt appropriate rules or other authority to assure that public water systems address any significant deficiencies identified in a survey report.

Inadequate data management system causes inefficiencies

Federal regulations require states with primary enforcement authority to maintain records on each public water system for their compliance with applicable provisions of state regulations. Hawaii's records-maintenance system comprises both physical documents and electronic databases. In 1997 and 2000 EPA assessments of Hawaii's public water system supervision program, the EPA expressed concern about the lack of a comprehensive data management system in Hawaii. The assessments advised that new provisions of the Safe Drinking Water Act will continue to require information management needs. We found that while the branch's document management system was adequate, fragmentation of electronic data management caused inefficiencies.

Branch files are well organized

With few exceptions, the branch's document management system is well organized. Overall, the files that we reviewed were neat, orderly, and complete. Of the more than 500 chemical reports we reviewed, less than 3 percent were missing from the branch's files. During our audit period, the branch either located the misplaced reports or obtained copies of the missing reports from backup copies maintained by the State Laboratories Division. In contrast, bacteriological reports for privately owned, nonmilitary public water systems on Oahu were not readily accessible. These reports were filed, loose leaf, in approximate order with the date that the sample was collected. The reports were not filed by water systems' names. Therefore, to determine whether a particular privately owned water system on Oahu collected the required number of monthly bacteriological samples during 1999, all 1999 forms had to be searched.

According to federal regulations for record maintenance standards, records must be maintained in a form admissible as evidence in state enforcement proceedings. Drinking water documents also serve as a source of public information. The branch should continue to maintain a well-organized document management system to ensure the integrity of its legal documentation and the quality of public information. However, its record keeping for coliform samples of privately owned systems should be improved.

Overall system is fragmented

While the branch's document files are well organized, we found the branch's computerized data management system to be fragmented and inefficient. The EPA asserts that a comprehensive data management program is essential for implementing a successful public water system supervision program. Hawaii's safe drinking water program currently lacks an integrated data management system.

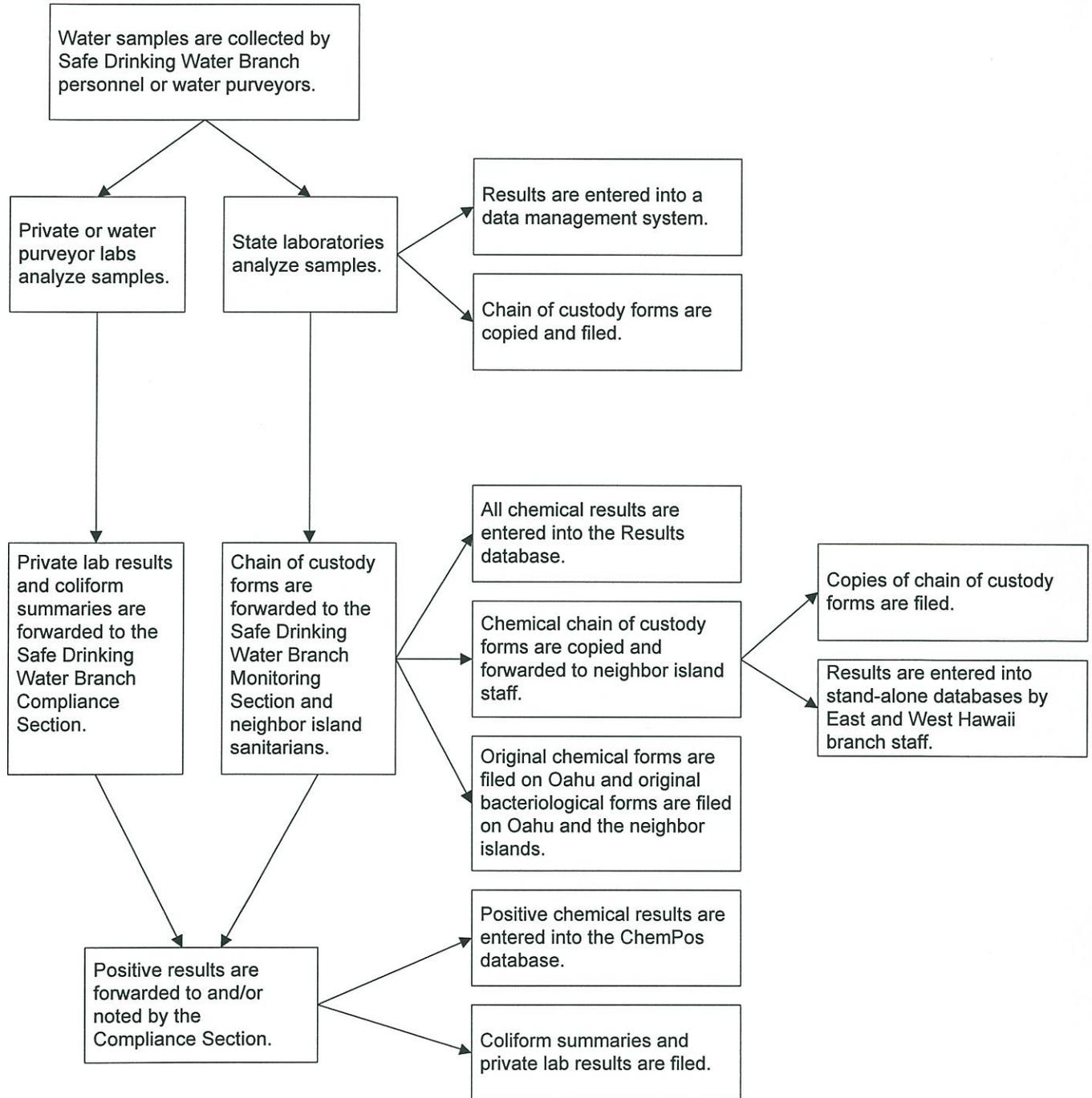
Drinking water data is maintained in a variety of independent and stand-alone databases that contain the same data. One group of data files, collectively referred to as the Results database, records all monitoring results by chemical contaminant groups. A separate database, ChemPos, contains only positive monitoring results. Also, some neighbor island staff maintain their own stand-alone databases. In contrast, some data, such as microbiological data, are currently not entered into a central database but are kept in manual files. Exhibit 2.3 reflects the current data management system of the safe drinking water program.

Maintaining data in multiple databases duplicates efforts. For example, positive water testing results are entered into both the Results and ChemPos databases. Additionally, two neighbor island staff input their own databases with data that are also entered into the Results database and, as applicable, into the ChemPos database on Oahu. Consequently, positive results for two neighbor island districts might be manually inputted into as many as three separate databases (Results, ChemPos, and individual neighbor island database).

The absence of electronic data for some contaminants also leads to inefficiencies. The branch does not maintain a complete database for chemical contaminants that are analyzed by private laboratories, and its microbiological database is not current. As a result, the history of sampling performed for these contaminants can be reconstructed only through a labor intensive manual review of the physical documents.

The branch has taken steps towards resolving the data fragmentation problem, but progress has been slow. One step has been the development of a data management plan to assess how the branch can

Exhibit 2.3 Safe Drinking Water Program Data Management System



better manage data. Now in draft form, the plan recognizes the importance of data management to the safe drinking water program and proposes numerous activities that will improve efficiency. However, developing the plan took over three years and a final draft is still pending.

As an alternative to developing its own data management system, the branch is also assessing whether an EPA-proposed system could be used in Hawaii. The EPA sponsored a demonstration workshop of its system earlier this year (2000), but the branch has not determined whether to adopt the program. The staff member who oversees data management at the branch also has numerous other program responsibilities. Consequently, data management may be of lower priority than other activities such as regulatory revisions that have federal deadlines.

Computerized databases are accurate but contain extraneous data

In spite of the fragmentation of the branch's overall data management system, the data in the branch's existing central databases are relatively accurate. Branch data are used by various stakeholders, including the EPA, other state agencies, public water systems, and the general public. Data are used to determine future regulatory standards, assess the susceptibility of drinking water sources to contamination, determine regulatory compliance, and prepare consumer confidence reports and other responses to public information requests.

The branch's 1999 data files for chemical monitoring results (the Results database) were over 95 percent accurate for the data points we tested. The inaccuracies were caused by missing chain of custody reports, analysis results assigned to the wrong sample points, and data entry errors. Quality assurance efforts, such as those implemented by the branch in 2000, could have reduced the error rate. However, branch staff report the 1999 data have not been verified.

In our review of the chain of custody reports to the Results database, we found a high degree of accuracy for data entered. However, we discovered that the database contained extraneous data. A branch official attributed the extraneous data to database programming that automatically enters data under certain circumstances. The official explained that default settings in the database cause duplicate entries and entries for contaminants that were not actually tested for.

We reviewed the branch's database that maintains only positive chemical results, ChemPos, and found our sample to be over 97 percent accurate for the analyses. ChemPos is slated to be phased out when a main database system becomes operational. The branch should continue

to ensure a high level of accuracy in whatever data management system it ultimately adopts.

Violations of the drinking water regulations must be reported to the EPA through the Federal Reporting Data System. We found that the branch accurately reported four of five violations through the system. One violation was not reported because it was not identified until we brought it to the branch's attention.

Enforcement Has Been Adequate Overall But Timely Actions Against Significant Noncompliers Have Been Lacking

As a condition of primacy, states are required to have formal enforcement authority. States' enforcement programs ensure that violations are promptly addressed and that public health is protected. In taking enforcement action, states generally follow an enforcement management system or policy. The first response to a violation is generally an informal action, such as a reminder letter. When a public water system does not return to compliance or incurs additional violations, formal action should be initiated. In addition, the federal Safe Drinking Water Act recognizes that since everyone drinks water, everyone has the right to know what is in it. Therefore, all public water systems must quickly notify consumers when there is a serious problem with water quality. We found that the Department of Health has ensured that consumers are informed of violations and public water systems address microbiological violations, but the department has not addressed repeat violators in a timely fashion.

Microbiological violations are effectively addressed

Public water systems that collect less than five routine microbiological (coliform) samples per month (that is, serve 4,100 persons or fewer) and have one or more positive samples per month are required to collect at least five routine samples during the next month. From 1997 to 1999, ten public water systems on Maui, Molokai, Lanai, Oahu, and Kauai violated coliform sampling requirements. Eight of these systems provided water to 4,100 or fewer persons. As a result, the Safe Drinking Water Branch sent notification letters to these eight systems reminding them of the requirement to collect at least five routine samples the month after the violation. We found that the eight systems conducted the required resampling.

The Department of Health and public water systems have a good history of addressing coliform violations. In 1997, the EPA reported that "aggressive follow up by DOH [Department of Health] on positive samples and responsiveness on the part of the purveyor for collection and attention to water quality problems have proven effective."² More recently, an EPA official reported that Hawaii has a good reputation for addressing enforcement actions.

Public notification is appropriate and timely

The Department of Health has ensured that Hawaii consumers are informed of safe drinking water violations. The importance of prompt public notification is demonstrated by the recent May 2000 incident of contaminated water in Canada. According to news accounts, the contamination was never reported by the water utility to health authorities or the public and resulted in six fatalities.

Hawaii Administrative Rules require the following:

- A public water system that fails to comply with applicable maximum contaminant levels or treatment techniques must notify persons served by the system. The water supplier shall give notice: (a) by publication in a daily newspaper of general circulation no later than 14 calendar days after the violation and (b) by mail delivery or by hand delivery not later than 45 calendar days after the violation or failure.
- Public water systems that violate maximum contaminant levels of contaminants that may pose an acute risk to human health (for example, total/fecal coliform) must furnish a copy of the notice to the radio and television stations serving the area no later than 72 hours after the violation.
- Public water systems that fail to perform required monitoring, or fail to comply with testing procedures, must give notice within three months of the violation in a daily newspaper of general circulation in the area served by the system.

Since 1997, the department has issued letters to 24 public water systems informing them of public notice requirements for violations of treatment technique, monitoring/reporting, or maximum contaminant level requirements. With few exceptions, we found that the systems met the public notice requirements in a timely manner. Two systems did not issue public notices for violating monitoring/reporting requirements by the department's deadlines.

The Safe Drinking Water Branch attributed the delays to the systems' managers who did not understand the public notice requirements. The branch successfully worked with one system to publish the required notices. During the time of our fieldwork, the branch was still working with the other system to achieve compliance.

Enforcement actions against significant noncompliers are appropriate but untimely

Hawaii's public water system supervision program adopts EPA's definition of timely and appropriate actions against significant noncompliers. Significant noncompliers are violators who pose the greatest risk to health. They comprise the top tier of violators and are generally the highest priority for enforcement actions. To meet the

EPA's timeliness criteria, an enforcement action should be issued within six months of the violation. Appropriate actions to significant noncompliance include bilateral compliance agreements and administrative and judicial actions, depending on a state's authority. For states with administrative order authority, including Hawaii, or an effective judicial process, a bilateral compliance agreement is considered an inappropriate enforcement action.

Appropriate enforcement actions were taken in nine of the 12 instances of significant noncompliance that we reviewed. However, two of the nine enforcement actions were administrative orders that had not been issued at the time of our review. Hawaii received the EPA's agreement to use a bilateral compliance agreement in a tenth case. The branch pursued voluntary compliance with the remaining two significant noncompliers. Both systems serve small populations. One of the two has returned to compliance, while the other is taking steps to return to compliance.

The branch's enforcement activities did not meet the EPA's timeliness criteria for eight of the 12 instances of significant noncompliance we reviewed. An EPA official indicated that the inadequate access to attorney general representation slowed the branch's enforcement process in the past. The Safe Drinking Water Branch and the Clean Water Branch began funding a position in the attorney general's office in January 2000. In addition to the lack of ready access to legal assistance, the branch reported that new regulations to be drafted and adopted placed heavy demands on staff time. The Compliance Section's resources were further strained by a budgetary restriction on a general funded position.

Timely and appropriate actions do not guarantee that systems will return to compliance by a mandated deadline. We noted numerous instances where water systems failed to meet interim and final compliance deadlines established in administrative orders. Many delays were beyond the systems' control and the branch approved extensions to their compliance schedules. However, reasons for other delays were not clearly documented in the branch's enforcement files. The EPA recommends that states monitor systems' progress towards compliance and investigate why any milestones or requirements were missed. Reasons and results of the investigations should be documented and filed.

Contaminants that may be present in drinking water can cause acute and long-term health problems. Timely enforcement action is necessary to promptly detect and prevent public exposure to these contaminants.

Available Resources Have Not Been Maximized

The Drinking Water Treatment Revolving Loan Fund, which was created by 1996 amendments to the federal Safe Drinking Water Act, provides federal grants from the EPA to states. The purpose of the loan fund is to assist public water systems to finance the costs of water system infrastructure needed to achieve or maintain compliance with the Safe Drinking Water Act requirements and to protect the public health objectives of the act. Chapter 340E, HRS, established the loan fund in 1997 to be administered by the director of health. The law requires the fund to be administered, operated, and maintained to remain available in perpetuity to provide loans and other financial assistance to eligible public water systems for eligible projects or activities. Although the fund is readily available to provide resources for the purpose of protecting safe drinking water, the department has not used the fund to its full potential.

New loan program has had a slow start

In a report to the 2000 regular session of the Legislature, the Department of Health reported that the loan fund had \$19,046,890 in available funding for FY1998-99. However, the department expended only \$992,387, or 5.2 percent of available funds. The department reported that it did not execute any loan agreements to provide any financial assistance to drinking water facilities and acknowledged that there was no major financial activity during the fiscal year. For FY1999-00, the department reported an estimated \$26.5 million in available loan resources. However, as of June 2000, only one loan had been made from the fund. This loan was for the Department of Water Supply of the County of Maui to finance its Kamole Weir treatment plant project. The loan amount consists of \$4,854,579 of federal funds and \$3,115,000 of state funds for a total not to exceed \$7,969,579.

One measure of the fund's performance is the number and value of loans issued or funds committed under the program to public water system improvement projects. As of June 2000, Hawaii's estimated loan issuance rate was 30 percent. Compared to Arizona, a state that receives a similar amount of federal loan moneys, Hawaii's pace of issuing loans is lagging. By June 1998, Arizona had an issuance rate of 40 percent. The EPA considered this rate to be adequate in June 1998 and Hawaii's rate has not yet reached this level. Despite this slow start, the department was reviewing applications for five projects at the time of our fieldwork. The Department of Water Supply of Hawaii County applied for estimated loan amounts totaling \$9,137,775. Two of the projects were ready for interim loan agreements while the remaining three loan applications were still pending.

Set-aside monies are underutilized

In addition to providing loans to eligible public water systems, the federal Safe Drinking Water Act allows each state to use a portion of the loan funds for “set aside” purposes. Up to 4 percent of the funds allotted to states may be used to cover reasonable costs of administering the loan fund. Each state may also use up to 10 percent of the funds allotted to support the public water system supervision programs, to administer or provide technical assistance through source water protection programs, to develop and implement a capacity development strategy, and for an operator certification program. However, the department has not taken full advantage of this potentially significant source of funding.

For FY1998-99, the Safe Drinking Water Branch planned to expend \$1,340,601 to administer the loan fund and to provide funding support to the public water system supervision program. However, the branch expended or encumbered only 13 percent (\$174,633) of this amount. The EPA reported that Hawaii has been unable to use all its set aside funds because it lacks a long-term plan and strategy for integrating all available resources. The agency recommended, and we concur, that the department needs to review long-term program staffing and budget needs and develop a written plan for the appropriate use of all available resources, including the set aside funds.

Inadequate staffing has hampered progress

The EPA has continued to express concern about the insufficient staffing levels of Hawaii’s loan fund program and, at one point, affirmed that it might withhold future capitalization grants unless additional staff were hired. As a condition for receiving federal capitalization grant funds, the State must prove that it has the technical capability (that is, personnel and resources) to establish and manage the fund. In a June 2000 assessment of the State’s safe drinking water program, the EPA reported that the loan fund program needs to be fully staffed to ensure its success.

In 1997, the Legislature established four temporary revolving fund positions to support the loan fund’s administrative activities. Although the department requested approval to fill some of these temporary positions, it reported a backlog of work and apologized to loan fund applicants, informing them that it hoped to provide them with timely service in the near future. In late 1998, the EPA expressed its concern about the lack of staffing. The EPA recommended that by June 30, 1999, the department hire an accountant and a clerk-typist and fill two business loan officer positions funded by the program. Reportedly all but one approved administrative staff positions were filled at the end of June 2000.

Conclusion

The State of Hawaii, through the Department of Health, is charged with implementing a complex system of regulations to ensure that public water systems distribute water that is safe to drink. Overall, the department is effectively managing the safe drinking water program. With few exceptions, we found that the department has satisfied monitoring requirements for 1999, enforced microbiological violations in a timely and appropriate manner, followed water collection procedures, revived its sanitary survey program, met public notification requirements, and appropriately certified water treatment plant operators through an administratively attached board.

However, deficiencies in several areas point to the need for additional improvements. Safeguards to protect the integrity of water samples are unclear and require clarification. In addition, timely sanitary surveys and enforcement action against serious drinking water violators have been lacking but are necessary to minimize the risk to public health. We found a fragmented data management system that results in inefficient use of staff time and inaccurate computer-generated drinking water information. Finally, inadequate staffing and the absence of long-term planning have resulted in the department's inability to maximize the use of available resources.

Recommendations

1. The Department of Health should continue to ensure that safe drinking water is distributed to the public through a comprehensive monitoring program. The director of health can improve oversight of public water systems by ensuring that the Safe Drinking Water Branch:
 - a. Monitors for all contaminants as required by the Safe Drinking Water Act and carefully reviews all monitoring results;
 - b. Evaluates its current chain of custody policies and procedures to determine whether they reflect current practices and revises them as necessary;
 - c. Reviews all chain of custody reports to verify that drinking water samples are appropriately documented and, as necessary, provides training in proper chain of custody procedures and documentation;
 - d. Completes, at a minimum, sanitary surveys required by the Total Coliform Rule and makes an effort to conduct sanitary surveys of other high-risk systems;

- e. Develops a systematic program for follow-up on sanitary survey recommendations;
 - f. Expedites its decision of either adopting an EPA-developed information system or implementing an alternative integrated information system; and
 - g. Conducts timely quality assurance of all paper and electronic data, and reprograms existing databases to prevent default entry of extraneous data.
2. The director of health in cooperation with the Board of Certification of Operating Personnel in Water Treatment Plants should continue to ensure that all water treatment plant operators are appropriately certified.
 3. The department should continue to address violations in a timely manner and ensure that the public remains informed of all safe drinking water violations.
 4. The department should exercise greater vigilance in bringing significant noncompliers back into compliance by ensuring that the Safe Drinking Water Branch:
 - a. Initiates enforcement action in a more timely manner with the assistance of the attorney general's office;
 - b. Routinely reminds systems on compliance schedules to submit status reports; and
 - c. Exercises its penalty powers on systems that exhibit a lack of commitment to resolving noncompliance.
 5. The department should maximize the use of available resources to protect drinking water supplies by:
 - a. Working with public water systems with high priority projects to ensure that they will be ready to apply for assistance;
 - b. Continuously evaluating whether the Drinking Water Treatment Revolving Loan Fund program is adequately staffed; and
 - c. Developing a long-term integrated expenditure plan for all funds available to the safe drinking water program.

Appendix A
Public Water Systems Included in Our Review of the Department of Health's
Monitoring Efforts for Microbiological and Chemical Contamination

Location	System Name	Population	Owner	Source
Oahu	Waimano Training School & Hospital	200	Department of Health	Ground
	Waiahole	300	Housing Finance & Dev. Corp.	Ground
	Waialua Sugar Pump 2	400	Waialua Sugar Co., Inc.	Ground
	NAVMAG Lualualei	411	Navy Public Works Cntr PH	Ground
	Laie	5,577	Hawaii Reserves, Inc.	Ground
	Aliamanu	9,387	U.S. Army Dir of Public Works	Ground
	Kaneohe Marine Corps Air	16,638	U.S. Dept of the Navy	Ground
	Mililani	34,679	Honolulu Board of Water Supply	Ground
Hawaii	Huehue Ranch	135	W.B. Kukio Resorts, LLC	Ground
	Ninole	149	Hawaii Department of Water Supply	Ground
	Hakalau-Wailea	269	Hawaii Department of Water Supply	Ground
	Kilauea Military Camp	400	U.S. Army	Catchment
	Paauiilo	468	Hawaii Department of Water Supply	Ground
	Papaikou	1,636	Hawaii Department of Water Supply	Ground
	Hawaiian Beaches	3,155	Miller & Lieb Water Co.	Ground
	Waikoloa	7,327	West Hawaii Water Company	Ground
	North Kona	19,422	Hawaii Department of Water Supply	Ground
Maui	Hawaii Nature Center	75	Hawaii Nature Center	Ground
	Hana	1,084	Maui Department of Water Supply	Ground
	Makawao	33,000	Maui Department of Water Supply	Surface
Kauai	Kekaha	3,550	Kauai Department of Water	Ground
	Wahiawa	300	Kauai Coffee Company	Ground
	Anahola	1,181	Kauai Department of Water	Ground
	Lawai-Omao	2,929	Kauai Department of Water	Ground
	Kekaha	200	Amfac Sugar Kauai	Ground
	Wailua-Kapaa	14,039	Kauai Department of Water	Ground
Molokai	Maunaloa	300	Molokai Ranch, Inc.	Surface
	Ualapue	979	Maui Department of Water Supply	Ground
	Kaunakakai	3,338	Maui Department of Water Supply	Ground

Source: Department of Health, Safe Drinking Water Branch, February 2000

Notes

Chapter 2

1. Hawaii, Department of Health, *Safe Drinking Water Monitoring Program Quality Assurance Project Plan*, Honolulu, August 1998, p. B-2.
2. United States Environmental Protection Agency, Region IX, *Hawaii Public Water System Supervision Program FY-96/97 Program Evaluation*, San Francisco, August 1997, p. 4.

Responses of the Affected Agencies

Comments on Agency Responses

We transmitted drafts of this report to the Department of Health and the Board of Certification of Operating Personnel in Water Treatment Plants on October 25, 2000. A copy of the transmittal letter to the department is included as Attachment 1. A similar letter was sent to the board; however, we invited the board to respond only to recommendation No. 2. The department's response is included as Attachment 2. The board did not submit a response.

In its response, the department commented that it generally concurred with our conclusions and recommendations. The department reported that the Safe Drinking Water Branch is in agreement with and committed to implementing our recommendations pertaining to: (1) improving sample security, (2) executing timely enforcement, (3) implementing a usable data management system, (4) increasing the number of sanitary surveys conducted, and (5) making effective use of available resources. The department illustrated its commitment by describing several activities under way.

The department also offered additional comments in the interest of accuracy and clarity. Concerning our discussion of custody seals, the department observes: "Although an important part of custody, the possibility of tampering with a drinking water sample is extremely remote." While this may be true, we reiterate the need for the department to review its chain of custody policies and procedures to determine whether they reflect current practices and revise them if necessary. The department says that the Safe Drinking Water Branch has never used custody seals; however, we found that its standard operating procedures and chain of custody forms make reference to them. It is especially important to clarify the usage (or non-usage) of custody seals on chain of custody forms because these forms are legal documents that should not contain such discrepancies.

The department stated that "there is no question about the validity of properly stored total coliform samples analyzed within 30 hours." However, our audit found that state-established procedures for total coliform samples were not followed. The Safe Drinking Water Branch should revise its standard operating procedures and quality assurance plan to clarify which maximum holding time—six hours or 30 hours—it in fact adheres to for all total coliform samples.

The department asserted that sanitary surveys for all systems were conducted in accordance with frequency requirements, but that, in a

number of cases, a sanitary survey report was not completed, resulting in our concluding that the survey was not performed. In response, we can only point out that if sanitary surveys were conducted but reports not completed, the Safe Drinking Water Branch did not adhere to its own rules. According to these rules, a final report of the survey should be completed as soon as possible and contain certain information, since the report may be used for future compliance actions and inspections. Furthermore, to clarify, under the Total Coliform and Surface Water Treatment Rules (promulgated in 1989), the first sanitary survey for each system in our sample should have been conducted by June 29, 1994. After the initial sanitary survey, surveys are required every five years. However, as confirmed in writing by a branch official, some water systems have not been surveyed since 1990.

The department observed that significant noncompliance “is defined differently for different types of violations and can result from combinations of violations.” The department suggested that our report infers that significant noncompliance is predicated on a single violation. We disagree. The department also claimed that it met the Environmental Protection Agency’s criteria for timeliness in eight of the 12 instances of significant noncompliance that occurred between 1997 and 1999. However, we stand by our finding; in our audit, we could not find any evidence to indicate that the Safe Drinking Water Branch’s enforcement of eight systems in significant noncompliance was timely.

Finally, we made some minor changes to our draft report for purposes of accuracy and clarity. These included changes to address the department’s comments concerning penalty provisions, the allocation of 10 percent of federal funds and appropriations, and the status of loan fund positions.

STATE OF HAWAII
OFFICE OF THE AUDITOR
465 S. King Street, Room 500
Honolulu, Hawaii 96813-2917



MARION M. HIGA
State Auditor
(808) 587-0800
FAX: (808) 587-0830

October 25, 2000

COPY

The Honorable Bruce S. Anderson
Director of Health
Department of Health
Kinau Hale
1250 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Anderson:

Enclosed for your information are three copies, numbered 6 to 8 of our draft report, *Audit of the Department of Health's Oversight of Public Water Systems*. We ask that you telephone us by Friday, October 27, 2000, on whether or not you intend to comment on our recommendations. If you wish your comments to be included in the report, please submit them no later than Friday, November 3, 2000.

The Board of Certification of Operating Personnel in Water Treatment Plants, Governor, and presiding officers of the two houses of the Legislature have also been provided copies of this draft report.

Since this report is not in final form and changes may be made to it, access to the report should be restricted to those assisting you in preparing your response. Public release of the report will be made solely by our office and only after the report is published in its final form.

Sincerely,

Marion M. Higa
State Auditor

Enclosures

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

RECEIVED
Nov 3 3 39 PM '00
OFC. OF THE AUDITOR
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EMD/SDWB

November 3, 2000

11001AMH.00

Ms. Marion M. Higa
State Auditor
State of Hawaii
Office of the Auditor
465 S. King Street, Room 500
Honolulu, Hawaii 96813-2917

Dear Ms. Higa:

Thank you for the opportunity to review and comment on the draft document, "Audit of the Department of Health's Oversight of Public Water Systems." The Department of Health greatly appreciates the efforts of your office to review and improve the operations of our program. We have been impressed by the diligence and professionalism of your staff in conducting this audit.

My staff has reviewed the draft document and concurs with the conclusions and recommendations offered. The subject areas covered in these conclusions and recommendations demonstrate a remarkable understanding of a program with greatly varying and complex requirements. The Safe Drinking Water Branch is in agreement with and committed to implementing your recommendations pertaining to: improving sample security, executing timely enforcement, implementing a usable data management system, increasing the number of sanitary surveys conducted, and making effective use of available resources. Our commitment is illustrated by the following activities already underway:

1. We are requesting to establish a data processing systems analyst (DPSA IV) position in the Safe Drinking Water Branch as part of the Department's 2002-2003 Budget Request. This position will help improve our data management.
2. The SDWB proposes to convert an existing position to a quality assurance officer (EHS V) to implement our quality assurance program plan (QAPP). This position will address chain of custody issues such as sample security and custody documentation.

3. A workshop on sanitary survey requirements to be conducted by the U.S. Environmental Protection Agency has been scheduled for December of this year. This workshop will make more staff available to conduct sanitary surveys.
4. The SDWB will be revising its regulations to include requirements for water system owners and operators to respond to significant deficiencies identified during the sanitary surveys of their water systems. This will tighten sanitary follow-up actions.
5. The SDWB in FY2001, will procure a contractor familiar with the use of State Revolving Funds to develop a 10-year needs assessment and plan for effective use of the available funding. This work will address the loan fund preservation issues and address resource needs.
6. As cited in your audit, the SDWB has funded additional Attorney General support which has already improved our ability to take timely enforcement actions and expedited the processing of loan agreements.
7. To assure the timeliness of our loans to drinking water systems, the staffing requirements for administering the Drinking Water State Revolving Fund are now almost complete. There remains the hiring of one environmental engineer and the rehiring of an accountant.

We offer the following comments for your consideration in the interest of accuracy and clarity of the report. In an attempt to present our comments clearly, we cite the page, paragraph and sentence as well as quote the sentence which is being discussed when appropriate.

Page 7, paragraph 2, last sentence. "Formal enforcement may include administrative penalties in the form of notices of violation or judicial penalties including civil penalties of \$25,000 per day of violation." We suggest that two changes be considered in this sentence. First, the civil penalty amount has a maximum of \$25,000, which means that fines could be anywhere from \$1 to \$25,000. Second, Act 84 of the 2000 Legislature increased our ability to assess civil penalties from "per day of violation" to "per day for each violation". Therefore, a system which has multiple violations could now be subject to fines totaling more than \$25,000.

Ms. Marion M. Higa
November 3, 2000
Page 3

Page 7, paragraph 3, last sentence. "To support the public water system supervision program, about 10 percent of federal funds and appropriations are allocated **from** the Environmental Management Division, Environmental Resources Office, Environmental Planning Office, and the State Laboratories Division **to the Safe Drinking Water Branch.**" This statement requires a correction. These agencies **receive** about 10% of the federal funding allotted to the Safe Drinking Water Branch through the Public Water System Supervision Grant.

Page 12, paragraph 4. We provide follow-up information on the Mililani water system microbiological monitoring violation. The system is now in full compliance with monitoring requirements having immediately increased its monthly testing of the system to the appropriate level. The Honolulu Board of Water Supply has satisfactorily fulfilled the public notification requirement by publishing a notice in Midweek Magazine August 9, 2000, and by mail delivery to residents of Mililani Town and Mililani Mauka on August 2, 2000.

Page 15, paragraph 2, last sentence. The issue of chain of custody is one of high priority to the Safe Drinking Water Branch. For this reason, we are attempting to establish a Quality Assurance Officer position within the branch to address many issues related to sampling, preservation, analyses, and reporting, including custody. We believe that the major need in the area of complete chain of custody forms is the proper training of the individuals performing the sampling and transporting the samples. The new QA officer will be able to conduct training sessions to answer this need. This position will be responsible for identifying shortcomings in the sampling/handling/custody/analysis process and resolving them.

Page 17, paragraph 3, third sentence. "A key Safe Drinking Water Branch official claims that custody seals are normally used for samples that are shipped from neighbor islands to Oahu to ensure that no one tampers with the samples." While we do not dispute that this information was obtained, please know that the Safe Drinking Water Branch has not used custody seals since the inception of the program. Custody seals were considered at one time, but the option to lock metal shipping containers was selected over the use of custody seals. The use of locks was subsequently discontinued when metal coolers could no longer be obtained in sufficient numbers.

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Although an important part of custody, the possibility of tampering with a drinking water sample is extremely remote. First, the incentive to tamper with drinking water samples is low. There is no "benefit" of tampering with drinking water samples. The Safe Drinking Water Branch quality assurance procedures such as confirmation sampling and review of historical performance of the sample point, also serve as backup protection against false positives or negatives. Further, a considerable amount of prior knowledge would be required to successfully tamper with a sample or samples. Finally, the Safe Drinking Water Branch has never experienced any tampering with our water samples.

Page 18, paragraph 3. Please allow us to clarify the confusion expressed in this paragraph. In order to do this, we refer to the reference, "Standard Methods for the Analysis of Water and Wastewater, 20th Edition." (Attachment 1). This reference identifies a maximum holding time of 30 hours for total coliform samples that are properly preserved. The reference also identifies a maximum holding time of 8 hours for samples to be tested for heterotrophic plate count (hpc). Some systems on Oahu are tested for heterotrophic plate count as well as total coliform. According to Standard Methods, there is no question about the validity of properly stored total coliform samples analyzed within 30 hours. All total coliform samples used for regulatory purposes have met the thirty-hour requirement.

Page 19, paragraph 2, last sentence. "In a sample of surface water systems that serve fewer than 4,100 people, we found that the period between surveys ranged from over six years to almost twenty years." Until 1989, the sanitary survey frequency requirement for all public water systems was once every ten years. The Total Coliform and the Surface Water Treatment Rules, both promulgated in 1989, increased the frequency requirements for sanitary surveys. Surveys for all systems were in fact conducted in accordance with the prescribed schedule. While the surveys were all physically performed, in a number of cases, the sanitary survey **report** was not completed. Thus, your auditors concluded, from reviewing paper files, that the survey was not performed.

Page 19, paragraph 3, sentence 3. "These issues have reportedly been resolved, but Safe Drinking Water staff predict that maintaining staff and meeting expanding sanitary survey requirements may impair the Branch's ability to keep current with

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survey requirements." An EPA-conducted training on their new sanitary survey requirements has been scheduled for December 5-8, 2000. New sanitary survey requirements for surface water systems issued under new rules will be presented. This training will help standardize methods and enable an increase in the number of branch personnel assigned to conduct sanitary surveys.

Page 20, paragraph 1, last sentence. "The inconsistency of follow-ups is due to the lack of a protocol coupled with divided survey responsibilities among numerous engineers." The Safe Drinking Water Branch will establish a formal protocol for sanitary survey follow-ups.

Page 21, paragraph 2, last sentence. "Hawaii's safe drinking water program currently lacks an integrated data management system." The Department of Health has submitted a request to establish a data processing systems analyst for the Safe Drinking Water Branch as part of our 2002-2003 budget request. This position will address the need for an integrated data management system. It is our intent that this position will assess and consolidate the currently fragmented databases into a system which meets our surveillance, compliance tracking, public request, groundwater protection, contaminant occurrence and other data needs.

Page 23, paragraph 1. The EPA data management system mentioned in this paragraph should not be considered a fully acceptable alternative. The Safe Drinking Water Information System (SDWIS) is: 1) not complete, 2) not user friendly and 3) uses expensive software to both operate and maintain (Oracle). The Branch staff will continue to track developments of this system.

Page 26, line 2. Significant non-compliance is defined differently for different types of violations and can result from combinations of violations. We have attached copies of pages 51 and 52 (Attachment 2) of the Environmental Protection Agency's report, "The National Public Water System Supervision Program FY 1995 National Compliance Report" which identifies the multiple definitions of a significant noncompliance. The SNC is not predicated on a single violation as seems to be inferred on page 26.

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Page 26, paragraph 2, first sentence. "The branch's enforcement activities did not meet EPA's timeliness criteria for 8 of the 12 instances of significant noncompliance we reviewed." Our review of the 12 instances of significant noncompliance which occurred between 1997 and 1999 shows that timeliness criteria were met in 8 of the 12. Further, of the four systems that did not meet the timeliness criteria for enforcement actions, two have already returned to compliance (both in the absence of a formal enforcement orders) and two are well on their way to compliance, while enforcement orders are still being developed.

As cited in your report, the Branch, in cooperation with the Clean Water Branch, is funding an additional deputy attorney general. This additional support has already improved the Branch's enforcement capability by enabling the assessment of fines and negotiation of compliance schedule in a major long-standing enforcement case.

Page 27, paragraphs 1, 2 and 3. The responsibility of operating a loan program in perpetuity has caused the Department to take a conservative approach in the issuance of loans. The administration of a new loan program involves the development of programs and policies, recruitment and training of staff, creation of standard documents, establishment of loan fee rates, interest rate determinations, investment decisions, introducing the program to prospective applicants and more. In addition, EPA's effort to provide funds from the State Revolving Fund to address program funding shortfalls infuses additional complexity in this loan program. A battery of conditions on the allowable uses of these funds has made the application of these funds extremely difficult. Cash flow issues and other potential pitfalls exist. In addition, the obvious problem of loan failures need to be prevented. For these reasons, we have yet to establish an approach to issue loans to private water system owners.

Page 28, paragraph 4, last sentence. "A loan fund official reports that all approved administrative staff positions were filled at the end of June 2000." There are a total of six positions allocated for the administration of the SRF loan fund. Two of these positions are environmental engineers located in the Safe Drinking Water Branch. Three of these positions are located in the Wastewater Branch (two business loan officers and one clerk-typist). The last position (an accountant which is 50% Drinking Water SRF and 50% Clean Water SRF) is located for

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administrative purposes in the Environmental Resources Office. At the end of June 2000, this statement was true for loan fund positions in the Wastewater Branch and the accountant position in the Environmental Resources Office; however, the Safe Drinking Water Branch has yet to fill one environmental engineer position. The accountant position must be refilled having lost the incumbent in July 2000.

Again, we thank you for the opportunity to comment. Should you have questions pertaining to these comments or wish to discuss them further, please contact Mr. William Wong of the Safe Drinking Water Branch at 586-4258.

Sincerely,

A handwritten signature in black ink, appearing to read "Bruce S. Anderson". The signature is fluid and cursive, with a large initial "B" and "S".

BRUCE S. ANDERSON, Ph.D., M.P.H.
Director of Health

Enclosures

5. Identifying Data

Accompany samples by complete and accurate identifying and descriptive data. Do not accept for examination inadequately identified samples.

6. References

1. ZOBELL, C.E. 1941. Apparatus for collecting water samples from different depths for bacteriological analysis. *J. Mar. Res.* 4:173.
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- SHIPE, E.L. & A. FIELDS. 1956. Chelation as a method for maintaining the coliform index in water samples. *Pub. Health Rep.* 71:974.
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9060 B. Preservation and Storage

1. Holding Time and Temperature

a. General: Start microbiological analysis of water samples as soon as possible after collection to avoid unpredictable changes in the microbial population. For most accurate results, ice samples during transport to the laboratory, if they cannot be processed within 1 h after collection. If the results may be used in legal action, employ special means (rapid transport, express mail, courier service, etc.) to deliver the samples to the laboratory within the specified time limits and maintain chain of custody. Follow the guidelines and requirements given below for specific water types.

b. Drinking water for compliance purposes: Preferably hold samples at <10°C during transit to the laboratory. Analyze samples on day of receipt whenever possible and refrigerate overnight if arrival is too late for processing on same day. Do not exceed 30 h holding time from collection to analysis for coliform bacteria. Do not exceed 8 h holding time for heterotrophic plate counts.

c. Nonpotable water for compliance purposes: Hold source water, stream pollution, recreational water, and wastewater samples below 10°C during a maximum transport time of 6 h. Refrigerate these samples upon receipt in the laboratory and process within 2 h. When transport conditions necessitate delays in delivery of samples longer than 6 h, consider using either field laboratory facilities located at the site of collection or delayed incubation procedures.

d. Other water types for noncompliance purposes: Hold samples below 10°C during transport and until time of analysis. Do not exceed 24 h holding time.

2. Bibliography

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Significant Noncompliance (SNC) Definitions

Total Coliform Rule (TCR) MCL

- MONTHLY MONITORING: ≥ 4 acute/monthly MCL violations in any 12 consecutive months.
- QUARTERLY MONITORING: ≥ 3 acute/monthly MCL violations in any 4 consecutive quarters.
- ANNUAL MONITORING: ≥ 2 acute/monthly MCL violations in any 2 consecutive periods.

Total Coliform Rule (TCR) M/R

- MONTHLY MONITORING: In any 12 consecutive months, meeting one of the following criteria:
 - ≥ 4 major repeat M/R violations
 - ≥ 4 combined major repeat M/R and MCL violations
 - ≥ 6 combined major repeat M/R, major routine M/R, and/or MCL violations
 - ≥ 10 combined major/minor routine/repeat M/R and/or MCL violations
- QUARTERLY MONITORING: In any 4 consecutive quarters, meeting one of the following criteria:
 - ≥ 3 major repeat M/R violations
 - ≥ 3 major repeat M/R, major routine M/R and/or MCL violations
- ANNUAL MONITORING: In any 2 consecutive one-year periods, meeting one of the following criteria:
 - ≥ 2 major repeat M/R violations
 - ≥ 2 combined major repeat M/R, major routine M/R, and/or MCL violations

Turbidity MCL

- MONTHLY MONITORING: ≥ 4 MCL violations in any 12 consecutive months.
- QUARTERLY MONITORING: ≥ 2 MCL violations in any 4 consecutive quarters.

Turbidity M/R and Combined M/R and MCL

- Monthly MONITORING: In any 12 consecutive months, having either of the following:
 - ≥ 6 major M/R and/or MCL violations, or
 - ≥ 10 major/minor M/R and/or MCL violations
- QUARTERLY MONITORING: ≥ 3 major M/R and/or MCL violations in any 4 consecutive quarters.
- ANNUAL MONITORING: ≥ 2 major M/R and/or MCL violations in any 2 consecutive one-year periods.

Chemical/Radiological MCL (excluding Nitrate)

- Exceeds the short term acceptable risk to health level.

Nitrate MCL

- > 10 mg/l.

Chemical/Radiological M/R

- Fails to monitor for, or report the results of any regulated contaminant for ≥ 2 consecutive compliance periods.

Public Notification

- Failure to provide public notification of the violation which caused the system to become an SNC.

Significant Noncompliance (SNC) Definitions -

Surface Water Treatment Rule (SWTR)

- UNFILTERED SYSTEMS
 - A system informed of the requirement to filter before January, 1992 that does not install filtration by June 29, 1993.
 - A system informed of the requirement to filter after December, 1991 that does not install filtration within 18 months of being informed that filtration is required.
 - A system that has 3 or more major M/R violations in any 12 consecutive months.
- FILTERED SYSTEMS
 - A system that has 4 or more treatment technique violations in any 12 consecutive months.
 - A system that has a combination of 6 violations including treatment technique violations and major M/R violations in any 12 consecutive months.

Lead and Copper Rule (LCR)

- INITIAL TAP M/R
A system which does not M/R as required and does not correct a violation within:
 - 3 months for large systems
 - 6 months for medium systems
 - 12 months for small systems
- OPTIMAL CORROSION CONTROL INSTALLATION
A system which fails to install optimal corrosion control on lime and has a 90th percentile lead level of ≥ 30 ppb in its most recent monitoring period.
- SOURCE WATER TREATMENT INSTALLATION
A system which fails to install source water treatment on lime and has a 90th percentile lead level of ≥ 30 ppb in its most recent monitoring period.

PUBLIC EDUCATION

A system which fails to complete public education as required and has a 90th percentile lead level of ≥ 30 ppb in its most recent monitoring period.

Notes

- (1) A "major" M/R violation (except for SWTR) occurs when no samples are taken or no results are reported during a compliance period. For SWTR, a major M/R violation occurs when at least 90% of the required samples are not taken or results reported during a reporting period.
- (2) A "minor" M/R violation (except for SWTR) occurs when an insufficient number of samples are taken or incomplete results are reported during a compliance period. For SWTR, a minor violation occurs when less than 100% but more than 90% of the required samples are not taken or results reported during a reporting period.
- (3) SNC definition is modified, if needed, to cover new regulations as they are promulgated.
- (4) For details on the SNC definition, please see the following memorandum:
 - (a) "Revised Definition of Significant Noncompliance (SNC) and the Model for Escalating Responses to Violations in the PWSS Program." May 22, 1990. [Water Supply Guidance #70]
 - (b) "Final SNC Definition for the TCR and proposed SNC Definition for the SWTR." December 19, 1990. [Water Supply Guidance #80]
 - (c) "Final SNC Definition for the SWTR." February 20, 1991. [Water Supply Guidance #82]
 - (d) "Final Guidance for the Lead and Copper - Definitions and Federal Reporting for Milestones, Violations, and SNCs." May, 1992.