

GUIDELINES FOR REGULATED RAIN CATCHMENT SYSTEMS IN HAWAII

GENERAL REQUIREMENTS AND APPLICABILITY:

The Department of Health Safe Drinking Water Branch (SDWB) is the primacy agency in the State of Hawaii for implementing and enforcing the Federal Safe Drinking Water Act and all of its associated Rules developed by the U.S. Environmental Protection Agency (EPA). These Rules apply to two established source water categories, i.e., surface water systems (40 CFR 141 Subpart H) or ground water systems. There are currently no Federal Rules that define or establish specific requirements for rain catchment systems.

Nevertheless, the four regulated public water systems in the State that derive their source of water for human consumption from rain catchment sources are required to meet all of the chemical and bacteriological compliance monitoring and reporting requirements, MCLs, MRDLs, action levels, treatment techniques and sanitary survey requirements of the EPA's Rules, as incorporated verbatim into the Hawaii Administrative Rules Title 11 Chapter 20 Rules *Relating to Public Water Systems*, and administered by the SDWB.

With the EPA's recent focus on microbial contamination of the nation's drinking water supply via the Long Term 2 Enhanced Surface Water Treatment Rule (LT2 ESWTR), the Ground Water Rule (GWR) and the recently finalized Revised Total Coliform Rule Revisions (RTCR), EPA Region 9 has asked the SDWB to develop microbial-specific guidelines as a part of the oversight of these four affected systems:

<u>SYSTEM NO.</u>	<u>SYSTEM NAME</u>	<u>OWNER</u>
144	Kilauea Military Camp	Pural Water Specialty Company
146	Hawaii Volcanoes National Park	National Park Service
153	Kulani Correctional Facility	State of Hawaii Department of Public Safety
222	Haleakala National Park	National Park Service

These guidelines are effective **January 1, 2015**. The SDWB will work with the four affected systems over the following year to encourage full compliance with these new guidelines by **January 1, 2016**.

A discussion on unregulated rain catchment systems is also included in these guidelines.

TREATMENT TECHNIQUE REQUIREMENTS:

1. All affected systems should provide a multi-barrier approach to the treatment of raw rain catchment source waters, consisting of mechanical filtration and disinfection.

Filtration and disinfection processes shall be approved by the SDWB. Pilot testing of new filtration technologies may be required. In addition, the SDWB may request performance testing of existing filtration technologies to validate treatment technique performance.

2. Filtration: All processes should meet a *treatment technique* of 1 NTU in 95% of the monthly filtered water measurements, with a maximum turbidity of 5 NTU at any time. Cartridge, bag or membrane filters should be NSF 53 certified for *Giardia* and cyst reduction and have a minimum nominal rating of 1 micron upstream of the first customer or treated water storage facility. Multi-stage filtration is encouraged to extend finished filter life, e.g. 20-50 um roughing filter and 1 um finish filter. Pre-sedimentation upstream of filtration is even more effective. Media filters using anthracite coal, silica sand or diatomaceous earth must be pilot tested.
3. Disinfection: 1-log *Giardia* inactivation and 4-log virus inactivation of viruses should be provided at the entry point to distribution (EPD) of the system. Inactivation calculations ("CT") should be submitted to the SDWB to determine the minimum residual which should be maintained at the EPD. Changes to disinfection processes may require the resubmittal and approval of calculations. The approval of UV systems shall be made on a case by case basis. However, a minimum disinfectant residual must still be maintained in the distribution system (see below).
4. Distribution System: A minimum disinfectant residual of 0.2 mg/L should be maintained at the most remote points in the distribution system at all times.

MONITORING REQUIREMENTS:

1. Filtration: Turbidity should be monitored continuously at the filtration plant effluent. "Continuous" is defined as instrumentation capable of logging values every 15 minutes. High turbidity alarms should be audible or visual at the treatment plant. The alarm should also have a function to page the operator in direct responsible charge that day.

For compliance with *treatment technique* requirements, turbidity should be recorded every four (4) hours that the plant is in operation. For plants that run less than four (4) hours per day, turbidity should be recorded at startup and at shutdown.

2. Disinfection: Compliance monitoring should be performed to verify 1-log *Giardia* and 4-log virus inactivation at the EPD. Measurement and recording of disinfectant residual

should be once per day during a period of peak system demand or at a set time approved by the SDWB.

3. Distribution System: A minimum disinfectant residual of 0.2 mg/L should be measured and recorded once per day at a monitoring point approved by the SDWB.

REPORTING AND RECORDKEEPING REQUIREMENTS:

1. All required turbidity and chlorine residual data should be recorded daily, and reported monthly on SDWB-provided forms.
2. All data should be available for inspection by the SDWB upon request, including verification of continuous monitoring of turbidity.

MONITORING AND REPORTING REQUIREMENTS SUMMARY

	Monitoring	Recording	Reporting
Filtration	Continuous turbidity (NTU) of filter effluent	Every 4 hours of operation (up to 6 data points/day)	<1 NTU in 95% of data points. 5 NTU max.
Disinfection	Daily grab at EPD	Daily grab at EPD	≥ min. residual?
Distribution System	Daily grab at approved DS point(s)	Daily grab at approved DS point(s)	≥ 0.2 mg/L?

SANITARY SURVEY REQUIREMENTS:

1. Rain catchment systems are defined by their source collection configuration, which typically consists of roof tops, other types of elevated collection infrastructure and/or ground level collection infrastructure, which are protected from surface runoff by a berm or other means. As they are neither a surface water system nor ground water system, the sanitary survey requirements of the Federal Surface Water Treatment Rule and Ground Water Rule do not apply.
2. However, all affected systems shall be surveyed every 3 years under the sanitary survey criteria set forth by the SDWB in HAR 11-20 and its policies and procedures relating to sanitary surveys. Outstanding performer status shall not apply.

3. Within 120 day of receiving a written notice of an SD from a sanitary survey, the affected system shall:
 - a. correct the SD and provide a written response, including photo documentation indicating the location and specific corrective action taken, or
 - b. Be in compliance with a SDWB-approved corrective action plan.

MISCELLANEOUS:

1. Affected systems proposing to modify their rain catchment collection area, raw water storage, treatment processes, or distribution system infrastructure must notify the SDWB to determine whether HAR 11-20-30 *New and modified public water systems* applies.
2. Water treatment chemicals shall meet NSF 60 and water system components shall meet NSF 61. Other forms of certification under UL, ASTM, etc will be considered on a case by case basis.
3. Unregulated rain catchment systems: The SDWB does not recognize unregulated rain catchment systems as capable of meeting State and Federal drinking water standards. Unregulated systems include individual residences, and commercial, institutional and agricultural operations that are not regulated as public water systems (PWSs) by the SDWB. Because there is no government agency oversight of these systems in Hawaii, and because their design, construction, operation and maintenance are the sole responsibility of each system's owners or users, the quality of the consumed water, and therefore the safety of the consumers of this water, cannot be assured.

For health and safety reasons, homeowners should not use unregulated rain catchment water for human consumption, which includes drinking, bathing, showering, cooking, dishwashing and maintaining oral hygiene. Additional precautions should be taken by rainwater catchment users during periods of increased volcanic activity. Information on these as well as normal suggestions for rainwater catchment system maintenance can be found in the document "Precautionary Measures for Residential Rainwater Catchment Users During Volcanic Activity" at this link:

http://health.hawaii.gov/sdwb/files/2013/12/Residential_RainCatch_Info.pdf

Additional information regarding the design, construction, maintenance and operation of an unregulated rainwater catchment system can be found in *Guidelines on Rainwater Catchment Systems for Hawaii*, Patricia S.H. Macomber, College of Tropical Agriculture

and Human Resources, University of Hawaii at Manoa
(<http://www.ctahr.hawaii.edu/oc/freepubs/pdf/RM-12.pdf>)