

**RATIONALE
FOR
PROPOSED REVISIONS**

TO

**HAWAII ADMINISTRATIVE RULES
TITLE 11
DEPARTMENT OF HEALTH
CHAPTER 54
WATER QUALITY STANDARDS**

**DEPARTMENT OF HEALTH
ENVIRONMENTAL MANAGEMENT DIVISION
CLEAN WATER BRANCH
HONOLULU, HAWAII**

February 27, 2009

PART I. INTRODUCTION

Proposed revisions to Department of Health (DOH), Hawaii Administrative Rules (HAR), Title 11, Chapter 54, Water Quality Standards (hereafter referred to as Chapter 11-54) are to:

1. Correct a typographical error in a chlordane standard, and
2. Conform to the federal bacteria indicator organism criteria.

This rationale serves to provide an explanation for the changes which are proposed for Chapter 11-54. Additional information may be obtained by calling (808) 586-4309 or by writing to the Clean Water Branch (CWB) at the following address:

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PART II. TABLE OF CONTENTS REVISION

There are no changes to the Chapter 11-54 Table of Contents. Content and technical changes are discussed thoroughly in Part III of this rationale.

PART III. CONTENT OF TECHNICAL CHANGES

Section 11-54-4(b)(3)

1. **Proposed:**

Chlordane* 2.4 0.0043 0.09 0.004 [0.000016] 0.00016

Rationale:

Background: In 1990, §11-54-4 was revised to incorporate standards for approximately 100 toxic pollutants. Chlordane was included in this list of pollutants, however, the limit for the fish consumption category was stated incorrectly. The value was stated as 0.000016 ug/l rather than 0.00016 ug/l.

This error has been documented by Laurence K. Lau, Deputy Director of Health in a U.S. District Court Declaration dated October 15, 2007. The Department of Health has committed to rectifying this error and intends to do so through this revision to Chapter 11-54.

Recommendation: It is recommended that the limit for Chlordane for Fish Consumption be corrected from 0.000016 ug/l to 0.00016 ug/l.

Section 11-54-8(b)

2. **Proposed:**

(b) In marine recreational waters:

(1) Within 300 meters (one thousand feet) of the shoreline, including natural public bathing or wading areas, enterococcus content shall not exceed a geometric mean of [seven] 35 CFU per [one hundred] 100 milliliters in not less than five samples which shall be spaced to cover a period between twenty-five and thirty days. No single sample shall exceed the single sample maximum of [100] 104 CFU per 100 milliliters or the site-specific one-sided 75 per cent confidence limit. Marine recreational waters along sections of coastline where enterococcus content does not exceed the standard, as shown by the geometric mean test described above, shall not be lowered in quality.

(2) At locations where sampling is less frequent than five samples per twenty-five to thirty days, no single sample shall exceed the single sample maximum nor shall the geometric mean of these samples taken during the thirty-day period exceed [7] 35 CFU per 100 milliliters.

Rationale:

1. ***Enterococcus* Geometric Mean**

Background: The *Enterococcus* standard for marine recreational waters was adopted in 1988, replacing *Fecal Coliform* as the health risk indicator organism. Section 11-54-8 read, "In marine recreational waters ... enterococci content shall not exceed a geometric mean of 35 per 100 milliliters in not less than five samples equally spaced over a 30-day period." This limit was based upon studies that were summarized in an EPA document entitled "Ambient Water Quality Criteria for Bacteria – 1986." In this document, EPA recommended that States adopt a geomean limit of 35 colony forming units (CFU) per 100 milliliters (ml) of water. This level of *Enterococcus* bacteria corresponded to a risk of 19 illnesses per 1000 swimmers in sewage impacted waters.

(Enterococcus, as an indicator organism, is not the cause of illnesses. Rather, it serves as a marker for sewage. Sewage contains many other different types of pathogenic organisms, some of which (e.g. viruses) are actually responsible for causing the illnesses.)

After further review of the data, the Deputy Director in 1988 felt that 19 illnesses per 1000 swimmers was too high a risk level. He preferred that risk be reduced to half that amount, or 10 illnesses per 1000 swimmers. This lower risk corresponded to an *Enterococcus* geomean level of 7 CFU/100 ml. As a result, Hawaii opted to lower the State standard from the recommended Federal limit of 35 CFU/100 ml to a more stringent 7 CFU/100 ml.

At that time, the standard was used solely to assess potential health risks from swimming related activities. If an exceedance occurred, the situation was evaluated to determine if the cause was sewage related. Subsequent actions were taken only when a sewage source was suspected.

However, it must be understood that there are other environmental sources of Enterococcus bacteria besides sewage. Furthermore, these bacteria have been shown to survive and replicate in the natural environment. This is important because, for example, during rain events, the non-sewage related Enterococcus bacteria are washed into the waterways and are eventually transported out to marine waters. It is common for bacteria levels to increase after rain events. Unlike with sewage, however, this does not mean that the other pathogenic organisms contained in sewage are also present in elevated quantities. It is for this reason that the sources of the elevated Enterococcus levels were assessed before corrective actions were taken.

Discussion: EPA based their studies on individuals who swam in sewage impacted waters. It was assumed that each swimmer swallowed a mouthful of water. Their risk of illness was predicated on the assumed presence of pathogenic organisms contained in sewage.

Since then, EPA has broadened the application of this standard to include any instances of elevated Enterococcus levels, regardless of the source of the bacteria.

These changes have expanded the usage of the bacteria standard beyond the scope and intent as applied by Hawaii, while concurrently limiting how States may respond to exceedances. EPA no longer allows States the discretion to respond to elevated bacteria levels as in the past.

At the same time, differing views among the experts result in our having a low degree of confidence in the validity of EPA's indicator bacteria criteria, especially where most pollution sources are non-point in origin. In the last few years, EPA and the states have extensively examined the adequacy of bacterial indicators for identifying sewage contamination, and there is consensus on the need for better and quicker indicator tests. While studies are underway to identify new testing methods for regulatory purposes, they have not concluded. In practice, the department has moved toward a "tool box approach" to water quality analysis, looking at more than one indicator. This is current best practice.

The State Enterococcus standard of 7 CFU/100 ml was established based mainly on a health risk assessment, not as a regulatory limit. "EPA is in agreement with DOH that Hawaii should raise its coastal Enterococcus criterion to the federal level because adoption of the higher federal standard has not been shown to result, in practice, in an increased risk of minor illness after recreational use of states' surface waters. Switching to the federal criterion will allow us to compare recreational water quality in Hawaii to that of other states using the same criterion, until such time as more human-specific sewage indicators are identified and made widely available at a low cost for routine monitoring purposes" (as stated in the State of Hawaii, Department of Health/ Environmental Health Administration Comments on a Proposed Rule for 40 CFR Part 131-Water Quality Standards for Coastal and Great Lakes Recreation Waters, Published at 69 Federal Register 41720-41743, July 9, 2004 for EPA EDOCKET ID No. OW-2004-0010).

Conversation with the former Deputy Director who in 1988 adopted the geometric mean of seven indicators that in light of subsequent developments and understanding, he does not object to the resumption of using a standard of 35 CFU/100 ml.

Recommendation: While *Enterococcus* is less than an ideal indicator organism, it remains our official standard and one of only two allowed by EPA for official water quality standards. The DOH recommends that the State standard be revised to a geometric mean of 35 CFU/100 ml, as recommended in EPA's Federal Guidelines. This revision will allow for the application of the standard in a manner that is consistent with other States and the EPA, until new indicators can be promulgated by EPA.

2. *Enterococcus* Single Sample Maximum (SSM)

Background: In "Ambient Water Quality Criteria for Bacteria – 1986," EPA recommended that States adopt a Single Sample Maximum limit of 104 CFU/100 ml of water. In 2004, the DOH adopted changes to §11-54-8 to include a Single Sample Maximum (SSM) for marine waters of 100 CFU/100 ml.

Discussion: Given the low degree of confidence in the validity of EPA's indicator bacteria criteria, and State of Hawaii participation in nationwide efforts to improve these criteria, it is in the best interests of the State, EPA, and the scientific community for Hawaii to maintain consistency with the current national criterion and usage of the criterion in accordance with 40 CFR Part 131 in 69 FR 67218, dated November 16, 2004).

Recommendation: The DOH recommends that the State standard be revised to a Single Sample Maximum of 104 CFU/100 ml, as recommended in EPA's Federal Guidelines. This revision will allow for the application of the standard in a manner that is consistent with other States and the EPA, until new indicators can be promulgated by EPA.

