

## UNIFORM GUIDELINES FOR SEWAGE DISINFECTION

The Sanitary Engineering Section, State Department of Health Services, recognizing the importance of treatment and disinfection of sewage effluent towards the protection of the health of the public, has prepared guidelines to provide disinfection criteria for various public exposures to sewage effluent.

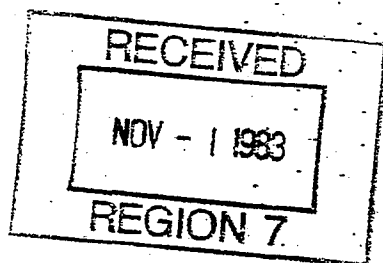
These guidelines have been developed with two considerations in mind:

- (1) What is necessary to protect the health of the public; and
- (2) What is attainable with current technology and practices.

Discharge situations in California range from remote ocean discharges by means of submarine outfalls to discharges to dry stream beds which pass through residential and popular park and recreation areas. The concept employed in the guidelines appropriately incorporates consideration of the type and degree of disease exposure in the establishment of disinfection requirements. Both available dilution and type of receiving water use are incorporated in the basis for the specific bacteriological requirements.

The bacterial levels set forth are an attempt to describe conditions of cleanliness and assured safety, not a threshold of disease transmission. It should be recognized that these are not absolute values and that it is not feasible to prescribe policies uniformly applicable to all situations.

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## GENERAL PROVISIONS

### No Discharge Situations

A "no discharge" recommendation should be made for the following situations. Proposed discharges to:

1. Lakes, reservoirs, and freshwater streams used for domestic water supply.

### No Disinfection Situations

Disinfection of sewage discharges should not be required where:

1. Discharges to ocean waters where recreational waters and shellfish waters meet the appropriate water standards due to dilution and distance;
2. There is no health concern over the use made of the receiving waters and no proposed beneficial use of health concern is identified by the RWQCB. (Example -- discharges to Imperial Valley agricultural drains.)

### Determination of Median Total Coliform Numbers

The median total coliform bacteria number should be based on the last seven samples for which analyses have been completed. All coliform values represent total coliform.

### Sampling Frequency

Where a median coliform MPN of 23/100 ml, or 230/100 ml is required, bacteriological samples should be collected at least twice per week. Where a median of 2.2 is required, samples should be collected daily.

### Maximum Bacterial Limits

The basic disinfection criteria, in terms of median coliform bacteria numbers, designate the operating levels which should be achieved for the particular discharge situation. The designation of a median coliform bacteria requirement does not address the serious situation where little or no disinfection is provided for a limited period. A maximum coliform bacteria limit may be designated to provide for this; however, the maximum limit should be significantly higher than the median so that it will not be exceeded due to statistical variations in the coliform test or other factors. Consequently, it is recommended that the maximum coliform bacteria number, if one is established, should be the concentration which is 100 times the median coliform bacteria number.

## SPECIFIC GUIDELINES

### Case I. Proposed Discharge is to:

Lakes and reservoirs.

There should be no direct discharge of sewage effluent to a lake or reservoir used for domestic water supply.

For lakes and reservoirs used for recreation where year-round confinement to land without direct discharge of effluent is not possible:

- a. Confinement to land except for wet weather periods during the non-recreational season. The waste discharge should be disinfected to a median MPN of 23/100 ml.
- b. Effluent directly discharged during periods of significant receiving water use must be an adequately disinfected, oxidized, coagulated, filtered, wastewater. The wastewater shall be considered adequately disinfected if at some point in the treatment process the median MPN of coliform organisms does not exceed 2.2/100 ml.

### Case II. Proposed Discharge is to:

Accessible drainage ways or ephemeral streams with little or no natural flow during all or part of the year.

Accessible drainage ways and ephemeral streams which received waste discharges are often attractive areas for planned or unplanned recreational activities involving water contact. Further, there is generally little dilution available during the summer recreational season. The recommended disinfection criteria are logically related to the degree of public exposure.

- a. A Case II discharge occurs where there is no nearby habitation and limited use of the discharge area. Access should be limited and posting of the area may be appropriate if there is potential for recreational use on an informal basis. These areas are generally not identified as having recreation as a beneficial use and contact with the waste discharge is not encouraged.

Recommendation: The effluent must have a median total coliform MPN not exceeding 23/100 ml. No specific treatment requirement is stated, but generally secondary treatment is desired.

- b. A Case II discharge occurs where there is residential development in the vicinity of the receiving area and the RWQCB has not designated water contact recreation as a beneficial use. There may be ready access to the discharge area; however, water contact recreation is not encouraged, and posting of the area may be appropriate if there is a substantial resident population or an easy access for body contact recreation.

Recommendation: The effluent must be an adequately disinfected, oxidized wastewater (clarification and filtration not required). The wastewater shall be considered adequately disinfected if at some point in the treatment system the median MPN of total coliform organisms does not exceed 2.2/100 ml.

- c. A case II discharge occurs where the RWQCB has identified water contact recreation as a beneficial use and most, if not all, of the following conditions are met:

1. The discharge occurs in a residential area.
2. The discharge occurs in an area where there is ready access to the stream and exclusion of the public is not a realistic alternative.
3. Historical attempts to post the stream to warn and exclude the public have been unsuccessful.
4. The recreation potential in the stream is high and justified because of weather, proximity to other recreation areas, etc.
5. Public interest has been identified and the resident population wants or expects body contact recreation in the stream.

Recommendation: The effluent must be adequately disinfected, oxidized, coagulated and filtered wastewater. The wastewater shall be considered to be adequately disinfected if at some point in the treatment process the median MPN of the total coliform organisms does not exceed 2.2/100 ml.

The Case II designations may not apply for discharges to major agricultural drainage ways and sloughs which are remote from the public. Such discharges may have less restrictive requirements depending on dilution and use.

**Case III. Proposed Discharge is to:**

Freshwater streams.

There should be no direct discharge of sewage effluent to streams used for domestic water supply.

It is the expressed goal of the Department of Health Services to maintain California's high quality mountain and coastal streams

free of sewage discharges irrespective of the water use. This goal is compatible with the "non-degradation policy" of the State. Consequently, the Department should recommend that no discharge of wastewater be permitted to such waters where land disposal is physically and economically possible.

Where it is not possible to prevent a discharge to unsullied streams and for other stream discharge situations, the following disinfection recommendations apply.

<u>Beneficial Use*</u>	<u>Ratio of Diluting Water to Effluent at Low Stream Flow**</u>		
	< 20:1	20:1 to 100:1	> 100:1
Domestic Water Supply	No direct discharge	Median 2.2/100 ml <i>governs in stringency</i>	Median 23/100 ml
Swimming or Other Water Contact	Use Category II c (Med 2.2 + Disinf/oxid/coag/filtered)	Median 23/100 ml	Median 230/100 ml
Agricultural Use	Use Reclamation criteria	Median 23/100 ml	Median 230/100 ml

\*Beneficial use identified by RWQCB

\*\*The low flow is meant to be an average over a period of time and not the instantaneous minimum low flow of the year.

For these discharge situations it is particularly important to fully consider the individual circumstances so that adequate health protection is provided through the application of reasonable disinfection requirements. For example, it may be appropriate to reflect seasonal changes in recreational use, dilution at the use area, etc.

Case IV. Proposed Discharge is to:

Saltwater Recreation areas\*.

Disinfection criteria for the protection of water-contact sports areas from discharges to ocean or bay waters are based on the degree of dilution which is available.

- a. Ocean discharge to deep waters, remote from recreational waters. No disinfection is required, provided that recreational waters meet Ocean Water Contact Sports Area Standards.
- b. Discharge is near recreational areas and could influence recreational water quality. Dilution is > 100:1. Median MPN 230/100 ml.

\*Saltwater Recreation areas such as lagoons and beaches situated at the effluence of ephemeral streams are subject to Case II, b and c, depending on the beneficial use.

c. Discharge is near recreational waters. Dilution is from 20:1 to 100:1. Median MPN 23/100 ml.

d. Discharge is to or near recreational waters and there is little or no dilution (< 20:1). The effluent must be an adequately disinfected, oxidized, coagulated, filtered wastewater. Median coliform MPN 2.2/100 ml.

Case V. Proposed Discharge is to:

Shellfish Growing Areas.

Shellfish growing areas in the vicinity of discharges constitute a particularly sensitive situation because of the ability of shellfish to concentrate contaminants and the documented outbreaks of hepatitis and other diseases transmitted by contaminated shellfish. In open coastal areas and some bays, a high degree of dilution is available; however, in other bay systems, dilution is limited and more restrictive disinfection requirements should be recommended.

- a. Ocean discharge to deep waters, remote from shellfish waters. No disinfection is required provided that shellfish waters meet 70/100 ml.
- b. Ocean or bay discharge where a high degree of dilution is provided; however, the discharge can affect the quality of waters overlying shellfish beds. Median MPN 23/100 ml.
- c. Ocean discharge in vicinity of a shellfish growing area. Required "closed area" to assure a high degree of dilution (> 100/1). Median MPN 23/100 ml.
- d. Bay discharge where a high degree of dilution cannot be assured by a "closed area". Median MPN 2.2/100 ml and provision for maximum possible dilution and separation.