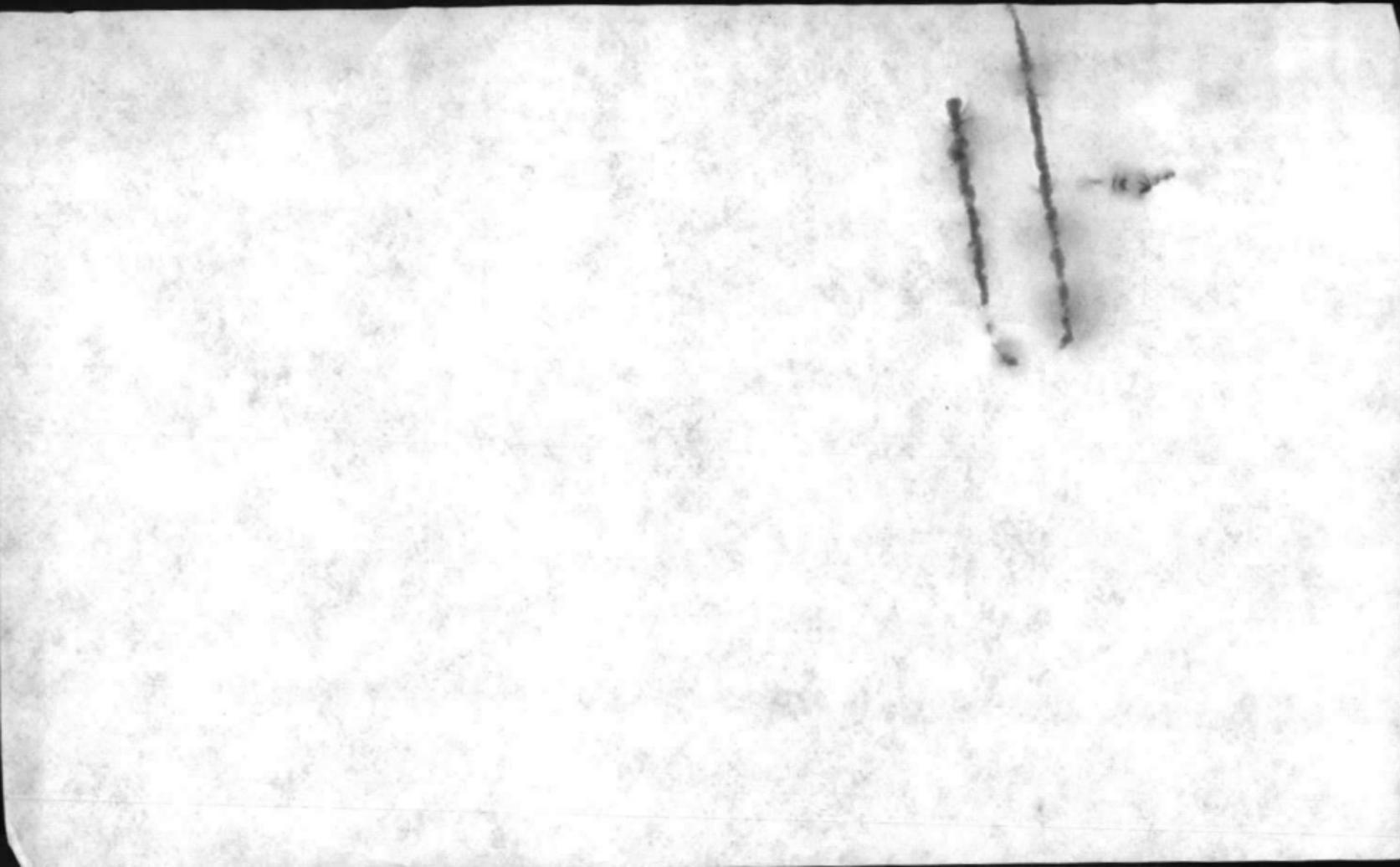


Betsy

Please Retain

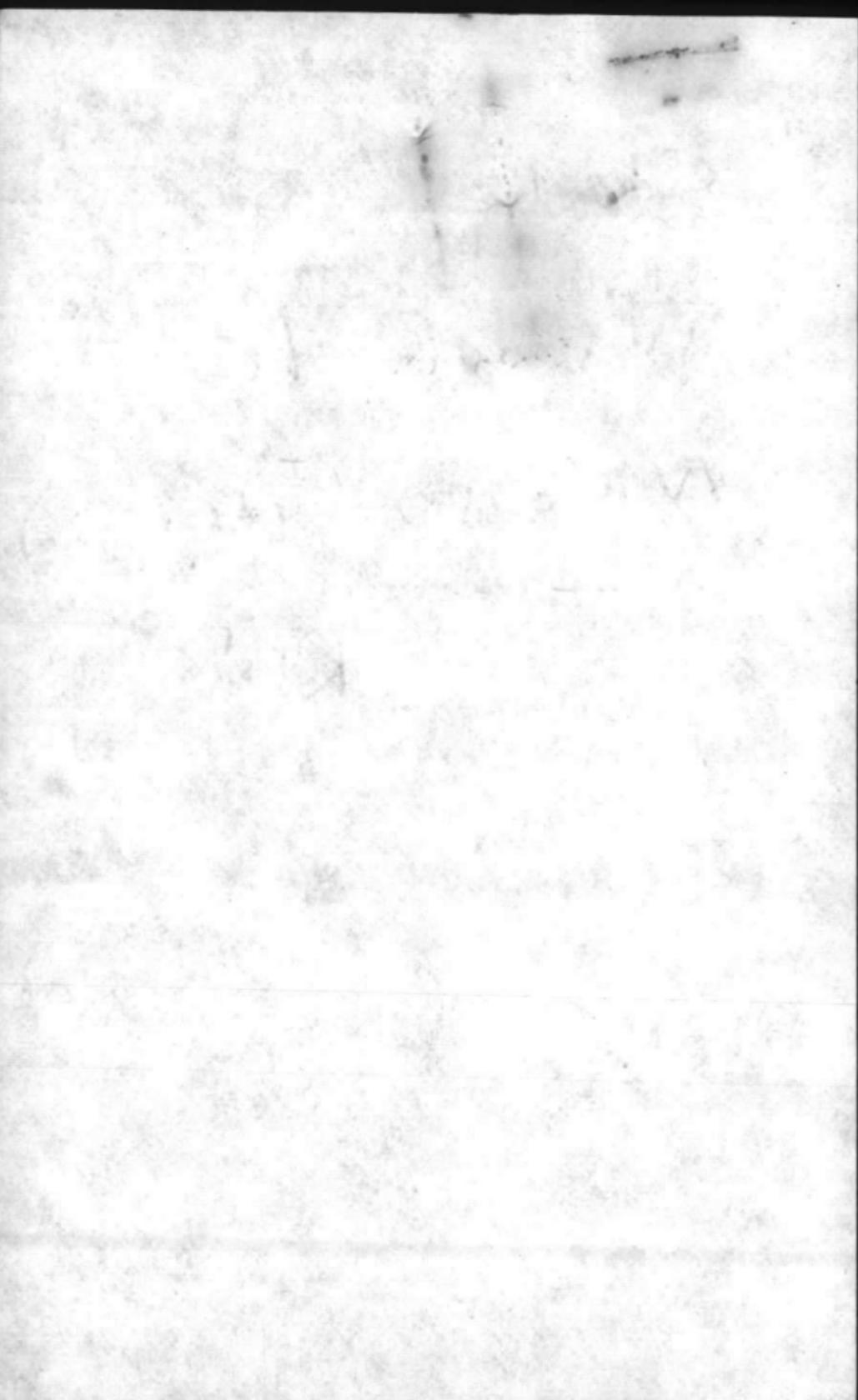


Carroll -

Forward to

NREAD (MERT)

RWD



Carol

ASSISTANT CHIEF OF STAFF, FACILITIES
HEADQUARTERS, MARINE CORPS BASE

BASE MAINTENANCE
MCB

DATE 1 May 81

MAY 5 9 42 ... 01

TO:

BASE MAINT O

PUBLIC WORKS O

COMM-ELECT O

MOTOR TRANSPORT O

DIR, FAMILY HOUSING

DIR, UNACCOMPANIED PERS HSG

BASE FIRE CHIEF

ATTN: _____

1. Attached is forwarded for info/action.
2. Please initial, or comment, and return all papers to this office.

3. Your file copy

VP of Curtis

"LET'S THINK OF A FEW REASONS
WHY IT CAN BE DONE"

THE HISTORY OF THE

... of the ...



DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

II-R-0
TELEPHONE NO.
690-4903
IN REPLY REFER TO:
114:WLC
6280

7 APR 1981

From: Commander, Atlantic Division, Naval Facilities Engineering Command
To: Commanding General, Marine Corps Base, Camp Lejeune

Subj: Bacteriological monitoring and reporting data

Ref: (a) FONECON MCB CAMP LEJEUNE (Ms. E. Betz/Mr. D. Sharp)/
LANTNAVFACENGCOM (Mr. W. Carter) of 2 Apr 1981

Encl: (1) Maximum Permissible Microbiological Contaminant Levels and
Reporting Requirements
(2) Monthly Average Coliform Computation Methods

1. Enclosures (1) and (2) are forwarded for your information as requested during reference (a).

2. Should there be further questions regarding this matter, please contact Mr. W. Carter, LANTNAVFACENGCOM, Code 114, telephone (804) 444-4903 or AUTOVON 690-4903.

J. R. Bailey
J. R. BAILEY
By direction

CERTIFICATE

WASHINGTON FIBER

8:00-9:00

11:00-12:00

7 APR 1981

From: Committee, Atlantic Division, Navy-Postal, Engineering Committee
To: Commanding General, Marine Corps Base, Camp Lejeune

Subject: Biological Control and Reporting

Re: (a) FOMMONT MCG CAMP LEJEUNE (Mr. W. G. Gandy, P. O. Box 1001)
LANTANA/CRONOUM (Mr. W. Gandy) of 2 Apr 1981

Re: (1) Maximum Permissible Biological Contaminant Levels and
Reporting Requirements
(2) Monthly Average Coliform Concentration Levels

In Enclosures (1) and (2) are found for your information as requested
during reference (a).

If you have any further questions regarding this matter, please contact
Mr. Gandy, LANTANA/CRONOUM, Room 101, Telephone (804) 444-4903 or
LANTANA/CRONOUM 280-4903.

J. R. BARRY
by direction

WASHINGTON FIBER

MAXIMUM PERMISSABLE MICROBIOLOGICAL CONTAMINANT LEVELS
AND REPORTING REQUIREMENTS

I. Bacteriological Quality

A. Standard Sample - The standard sample for the coliform test shall consist of:

1. Not less than 100 milliliters for the membrane filter technique, and
2. Five (5) standard portions for the fermentation tube method of either:
 - a. Ten milliliters, or
 - b. One hundred milliliters.

B. Coliform Limits

1. Primary Maximum Contaminant Level - The presence of organisms of the coliform group, as indicated by samples examined, shall not exceed the following limits:
 - a. When the membrane filter technique is used, the arithmetic mean coliform density of all standard samples examined per month shall not exceed any of the following:
 - (1) one (1) per 100 milliliters;
 - (2) four (4) per 100 milliliters in more than one (1) sample per month when less than 20 are examined per month; or
 - (3) four (4) per 100 milliliters in more than 5 percent of the standard samples when 20 or more are examined per month.
 - b. When the fermentation tube method and 10 milliliter standard portions are used, coliform bacteria shall not be present in any of the following:
 - (1) more than 10 percent of the portions in any month;
 - (2) three or more portions in more than one sample when less than 20 samples are examined per month; or
 - (3) three or more portions in more than 5 percent of the samples when 20 or more samples are examined per month.

MAXIMUM PERMISSIBLE MICROBIOLOGICAL CONTAMINANT LEVELS
AND REPORTING REQUIREMENTS

Bacteriological Quality

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b. One hundred milliliters.

B. Coliform Limits

1. Primary Maximum Contaminant Level - The presence of organisms of the coliform group, as indicated by samples examined, shall not exceed the following limits:

a. When the membrane filter technique is used, the arithmetic mean coliform density of all standard samples examined per month shall not exceed any of the following:

(1) one (1) per 100 milliliters;

(2) four (4) per 100 milliliters in more than one (1) sample per month when less than 20 are examined per month;

(3) four (4) per 100 milliliters in more than 7 percent of the standard samples when 20 or more are examined per month.

b. When the fermentation tube method and 10 milliliter standard portions are used, coliform bacteria shall not be present in any of the following:

(1) more than 10 percent of the portions in any month;

(2) three or more portions in more than one sample when less than 20 samples are examined per month; or

(3) three or more portions in more than 7 percent of the samples when 20 or more samples are examined per month.

c. When the fermentation tube method and 100 milliliter standard portions are used, coliform bacteria shall not be present in any of the following:

- (1) more than 60 percent of the portions in any month;
- (2) five portions in more than one sample when less than five samples are examined per month; or
- (3) five portions in more than 20 percent of the samples when five or more samples are examined per month.

II. Coliform Check Samples - A coliform density approaching the limit is indicative of a breakdown in the protective barriers and shall be cause for special follow-up action to locate and eliminate the cause of contamination.

A. Check samples shall be taken under the following conditions:

1. When coliform colonies in a single standard sample exceed four (4) per 100 milliliters, as measured by the membrane filter technique, daily samples shall be promptly collected and examined from the same sampling point until the results obtained from at least two (2) consecutive samples show less than one (1) coliform per 100 milliliters;
2. When organisms of the coliform group occur in three (3) or more of the 10 milliliter portions of a single standard sample (fermentation tube method), daily samples shall be promptly collected and examined from the same sampling point until the results obtained from at least two (2) consecutive samples show no positive tubes; or
3. When organisms of the coliform group occur in all five (5) of the 100 milliliter portions of a single standard sample (fermentation tube method), daily samples shall be promptly collected and examined from the sampling point until at least two (2) consecutive samples show no positive tubes.

B. These check samples shall not be included in the total number of samples examined per month. Neither shall such check samples be used as a basis for determining compliance with these regulations.

C. The sampling point required to be check sampled must not be eliminated from future collections based on a history of questionable water quality.

c. When the fermentation tube method and 100 milliliter standard portions are used, coliform bacteria shall not be present in any of the following:

- (1) more than 60 percent of the portions in any month;
- (2) five portions in more than one month when less than five samples are examined per month; or
- (3) five portions in more than 10 percent of the samples when five or more samples are examined per month.

Coliform Check Samples - A coliform density approaching the limit indicative of a breakdown in the protective bacteria and shall be cause for special follow-up action to locate and eliminate the cause of contamination.

A. Check samples shall be taken under the following conditions:

1. When coliform colonies in a single standard sample exceed four (4) per 100 milliliters, as measured by the membrane filter technique, daily samples shall be promptly collected and examined from the same sampling point until the results obtained from at least two (2) consecutive samples show less than one (1) coliform per 100 milliliters.

2. When organisms of the coliform group occur in five (5) or more of the 10 milliliter portions of a single standard sample (fermentation tube method), daily samples shall be promptly collected and examined from the same sampling point until the results obtained from at least two (2) consecutive samples show no positive tubes.

3. When organisms of the coliform group occur in all five (5) of the 100 milliliter portions of a single standard sample (fermentation tube method), daily samples shall be promptly collected and examined from the sampling point until at least two (2) consecutive samples show no positive tubes.

B. These check samples shall not be included in the total number of samples examined per month. Neither shall any check samples be used as a basis for determining compliance with these regulations.

C. The sampling point required to be checked sampled must not be situated from future collections based on a history of questionable water quality.

III. Reporting

- A. The results of any required monitoring activity shall be reported by the waterworks owner to the appropriate Regional Office no later than the 10th day of the month following the month during which the tests were taken.
- B. It shall be the owners duty and responsibility to report to the appropriate regional office in the most expeditious manner (usually by telephone) under the following circumstances. If notification is done by telephone, a confirming report shall be mailed as soon as practical.
 - *1. When a bacteriological examination shows a check sample is required (see Section II above), a report shall be made within 48 hours.
 - 2. When chlorine residual is permitted to be substituted in lieu of coliform examination, the owner shall report within 48 hours the lack of chlorine residual as required/approved by the appropriate regional office.
 - 3. The waterworks owner shall report to the appropriate regional office within 48 hours the failure to comply with the monitoring requirements.

* Although legally required, this reporting requirement is generally not enforced by most States.

ENCLOSURE (1)

A. The results of any required monitoring activity shall be reported by the waterworks owner to the appropriate Regional Office no later than the 15th day of the month following the month during which the tests were taken.

B. It shall be the owner's duty and responsibility to report to the appropriate Regional Office in the most expeditious manner (preferably by telephone) under the following circumstances. If notification is done by telephone, a confirming report shall be called as soon as practical.

1. When a bacteriological examination shows a check sample is deficient (see Section II above), a report shall be made within 48 hours.

2. When chlorine residual is permitted to be maintained in less than 0.5 mg/l, the owner shall report within 48 hours the lack of chlorine residual as required/required by the appropriate Regional Office.

3. The waterworks owner shall report to the appropriate Regional Office within 48 hours the failure to comply with the monitoring requirements.

* Although legally required, this reporting requirement is generally not enforced by most States.

MONTHLY AVERAGE COLIFORM COMPUTATION METHODS

COLIFORM (Membrane Filter)

To calculate the monthly coliform average, total the analysis results of all regular distribution samples and divide that value by the number of regular distribution samples taken. Note: The following samples should not be counted; raw water samples, plant tap samples, check samples, construction samples, or any other special samples. Results reported as "less than..." should be counted as zero. Example #1:

$$\frac{\text{Total of All Results}}{\text{Total No. of Samples}} = \text{Average Membrane Filter Result}$$

COLIFORM (Fermentation Tube)

To compute this average, first determine the total number of confirmed positive 10ml portions from all regular distribution samples. If standard portions are used (as is required), this number is simply the number of distribution samples multiplied by five. To compute the average, divide the number of 10ml portions analyzed in all regular distribution samples.

Note: Do not count any samples or portions other than standard 10ml portions. Do not consider the results of raw water samples, plant tap samples, check samples, construction samples, or any other special samples. See Example #2:

$$\frac{\text{No. of Confirmed Postivie 10ml Portion Results}}{\text{Total No. of 10ml Portions}} = \begin{array}{l} \text{Average} \\ \text{Multiple} \\ \text{Tube Result} \end{array}$$

MONTHLY AVERAGE COLIFORM COMPUTATION METHOD

COLIFORM (Membrane Filter)

To calculate the monthly coliform average, total the analysis results on all regular distribution samples and divide that value by the number of regular distribution samples taken. The following analysis should not be counted: raw water samples, glass samples, tap samples, or any other special samples. Results reported as "less than..." should be counted as zero.

$$\text{Total No. of Samples} = \text{Average Membrane Filter Result} \times \text{Total of All Results}$$

COLIFORM (Fermentation Tube)

To compute this average, first determine the total number of coliform positive 10ml portions from all regular distribution samples. If standard portions are used (as is required), this number is simply the number of distribution samples multiplied by five. To compute the average, divide the number of 10ml portions analyzed in all regular distribution samples. Do not count any samples or portions other than standard 10ml portions. Do not consider the results of raw water samples, glass tap samples, or any other special samples. See example 45:

$$\text{No. of Coliform Positive 10ml Portion Results} = \text{Average} \times \text{Total No. of 10ml Portions}$$

BACTERIOLOGICAL SUMMARY ANALYSIS - MEMBRANE FILTER
TECHNIQUE

EXAMPLE 1

The Town of Springfield, North Carolina, (population 22,000) records the following coliform results at their water treatment plant laboratory for the month of January 1981.

Jan. 1	2	*Jan. 20	3
Jan. 2	2	Jan. 21	2
Jan. 4	2	Jan. 22	2
Jan. 5	2	*Jan. 23	3
Jan. 8	2	Jan. 24	2
Jan. 10	2	Jan. 25	2
*Jan. 12	8	Jan. 27	2
c - Jan. 15	2	Jan. 27	2
c - Jan. 16	2	*Jan. 28	3
Jan. 13	2	Jan. 29	2
Jan. 16	2	Jan. 29	2
Jan. 17	2	*Jan. 30	2
		Jan. 18	2

Computation for the Above System

No. distribution samples analyzed - 23

Total results (those w/asterick counted--all others count as zero) - 19

Average $\frac{19}{23}$ = 0.8 (arithmetic mean coliform density)

Longest duration of violation - Jan 12 - Jan 16 - four days

Check samples on January 15 and 16, do not count in average.

BA TYPHOID SUMMARY ANALYSIS - MEMBRANE FILTER
TECHNIQUE

EXAMPLE 1

The Town of Springfield, North Carolina, (population 2,000) records the following coliform results at their water treatment plant laboratory for the month of January 1981.

Date	Coliforms	Date	Coliforms
Jan. 1	2	Jan. 21	2
Jan. 2	2	Jan. 22	2
Jan. 3	2	Jan. 23	2
Jan. 4	2	Jan. 24	2
Jan. 5	2	Jan. 25	2
Jan. 6	2	Jan. 26	2
Jan. 7	2	Jan. 27	2
Jan. 8	2	Jan. 28	2
Jan. 9	2	Jan. 29	2
Jan. 10	2	Jan. 30	2
Jan. 11	2	Jan. 31	2
Jan. 12	2		
Jan. 13	2		
Jan. 14	2		
Jan. 15	2		
Jan. 16	2		
Jan. 17	2		
Jan. 18	2		
Jan. 19	2		
Jan. 20	2		

Concentration for the Above System

No. distribution samples analyzed - 31

Total results (those water samples counted--all others count as zero) - 19

Average $\frac{19}{31} = 0.61$ (arithmetic mean coliform density)

Longest duration of violation - Jan 12 - Jan 18 - 7 days

Check samples on January 12 and 13, do not count in average.

BACTERIOLOGICAL SUMMARY ANALYSIS - FERMENTATION TUBE
TECHNIQUE

EXAMPLE 2

The Lake View (population 14,600) Water Treatment Plant performs coliform tests using the multiple tube fermentation tube method. The distribution sample results for the month of February 1981 are as follows.

DATE	RESULT	DATE	RESULT
Feb. 1	-----	Feb. 17	--++--
Feb. 3	-----	Feb. 18	-----
Feb. 6	-----	Feb. 20	-----
Feb. 10	-----	Feb. 23	----++
Feb. 12	----++	Feb. 26	-----
Feb. 13	-++++	Feb. 26	-++++
c - Feb. 15	--+++	Feb. 28	-----
c - Feb. 16	----+	Feb. 29	-----
c - Feb. 17	----+	Feb. 28	-----
c - Feb. 18	-----	Feb. 30	-----
c - Feb. 19	-----	Feb. 31	----+
Feb. 15	----+	Feb. 31	-----

Computation for the Above System

Total samples taken - 17

Total + 10ml portions - 14 Total 10ml portions - 85

Average $\frac{14}{85}$ = 0.165 (arithmetic mean coliform density)

Longest violation - Feb 13 - Feb 19 - six days

Check samples on February 15, 16, 17, 18, 19, 28 and 29, do not count in average.

TECHNIQUE
BACTERIOLOGICAL SUMMARY ANALYSIS - FERMENTATION TUBE

EXAMPLE 2

The Lake View (population 14,000) Water Treatment Plant performs coliform tests using the multiple tube fermentation tube method. The distribution sample results for the month of February 1951 are as follows.

DATE	RESULT	DATE	RESULT
Feb. 1	----	Feb. 17	++++
Feb. 3	----	Feb. 18	----
Feb. 5	----	Feb. 20	----
Feb. 10	----	Feb. 23	----
Feb. 12	++++	Feb. 26	----
Feb. 13	++++	Feb. 26	++++
Feb. 15	++++	Feb. 28	----
Feb. 16	o -	Feb. 29	----
Feb. 17	o -	Feb. 28	----
Feb. 18	o -	Feb. 30	----
Feb. 19	o -	Feb. 31	----
Feb. 25	----	Feb. 31	----

Computation for the Above System

Total samples taken - 17

Total + 10ml portions - 14 Total 100l portions - 35

Average $\frac{14}{35} = 0.40$ (arithmetic mean coliform density)

Longest violation - Feb 12 - Feb 13 - all days

Check samples on February 12, 16, 17, 18, 19, 28 and 29, do not count in average.

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