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

Lab
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IN REPLY REFER TO.
114:WLC
6280
05 FEB 1982

From: Commander, Atlantic Division, Naval Facilities Engineering Command
To: Commander, Naval Facilities Engineering Command

Subj: LANTNAVFACENGCOM monitoring data for total Trihalomethanes (TTHM) in drinking water and request for guidance

Ref: (a) 40 CFR Part 141, Federal Register, Vol. 44 of 29 Nov 1979
(b) Mtg U.S. AEHA, Aberdeen Proving Ground (CAPT P. Thiess)/ LANTNAVFACENGCOM (Mr. A. Talts) of 14 Jul 1980
(c) LANTNAVFACENGCOM ltr 114:WLC 6280 of 29 Jul 1980

Encl: (1) LANTNAVFACENGCOM TTHM Data Base Summary (Potable Water Systems Serving Between 10-75,0000 People - CONUS)
(2) LANTNAVFACENGCOM TTHM Data Base Summary - (Potable Water Systems Serving Less Than 10,000 People - CONUS)
(3) LANTNAVFACENGCOM TTHM Data Base Summary (Potable Water Systems Serving Less Than 10,000 People - Overseas)
(4) Overview of Treatment Techniques Available for Removal of Trihalomethanes

1. In compliance with requirements of the Safe Drinking Water Act, the Environmental Protection Agency (EPA) published final regulations in reference (a) for the control of total Trihalomethanes (TTHM) as an amendment to the National Primary Drinking Water Standards. The regulations establish a maximum contaminant level (MCL) of 0.10 mg/l for TTHM's, including chloroform, that are introduced into drinking water by the reaction of naturally occurring substances with chlorine in the course of water treatment.

2. For community water systems serving a population of 75,000 or more people, monitoring must have started by 29 November 1980 and compliance achieved by 29 November 1981. For systems serving between 10,000 and 75,000 people, monitoring must start by 29 November 1982 and compliance must be achieved by 29 November 1983. Smaller systems serving fewer than 10,000 people do not have to monitor and comply unless the state requires it.

3. Reference (b) discussed plans to initiate subject program at various naval activities for development of subject data base. It was agreed that the U.S. Army Environmental Health Agency (RD-S) Laboratory, Fort McPherson, Georgia would perform the TTHM analysis. Pursuant to reference (c), the monitoring program was initiated during October 1980 and terminated December 1981. Enclosures (1) through (3) summarize data collected by this Command during the sampling period. This information is therefore being forwarded for your information and use.

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4. Enclosures (1) through (3) reveal that many of the systems monitored did exceed the established MCL for TTHM. Thus, it is felt that the following issues need to be addressed at this time:

a. Establish NAVFACENGCOM policy regarding compliance for naval community water systems serving less than 10,000 population that are not currently and may never be required by the state to monitor for TTHM, but could be exceeding the 0.10 mg/l MCL.

b. Address monitoring and compliance programs for overseas activites which are not legally impacted by CONUS requirements (i.e., who would accept responsibility for initiating such a program: NAVFACENGCOM or BUMED?, where will funds for state-side laboratory monitoring services and equipment installation come from to bring out of compliance systems within the recommended limit, etc.?).

c. As exhibited by the enclosures, Navy activities located in the Tidewater area which have secondary community water systems (i.e., water is purchased from a larger municipal supplier (> 75,000 people and transported on-station for immediate use and storage) are exceeding the recommended 0.10 mg/l MCL for TTHM. More than likely, these systems will not be able to achieve compliance through easy fixes, because they are so far away from the primary system and most of the easy fixes have already been implemented. Hence, enclosure (4) provides an overview of treatment techniques available for the removal of Trihalomethanes.

It should be understood, nevertheless, that naval community water systems under LANTNAVFACENGCOM area of cognizance are not in violation of the Federal TTHM regulation at this time. Public water supplies, serving less than 75,000 people but greater than 10,000, do not have to be in compliance until 29 November 1983.

d. Since time is a factor, early identification of problem areas is pertinent toward attainment of congressional funding for major expenditure. As a result, guidance regarding compliance policies, program implementation and project initiation is now being requested.

5. Questions and comments may be addressed to Mr. W. Carter, LANTNAVFACENGCOM, Code 114, telephone number (804) 444-9558 or AUTOVON 690-9558.

J. R. BAILEY
By direction

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CMC
PWC NORFOLK
NSC NORFOLK (Craney Island)
NSC NORFOLK (Facilities Engineering)
NSC CHEATHAM ANNEX
NAVWPNSTA YORKTOWN
NAVSECGRUACT NORTHWEST
NAVPHIBASE LITTLE CREEK
NORFOLKNAVSHIPYD
NAS OCEANA
FLECOMBATRACENLANT VIRGINIA BEACH
NAVRADSTA SUGAR GROVE
CNTT DET BAINBRIDGE
MCB CAMP LEJEUNE
MCAS CHERRY POINT
NAVSTA ROOSEVELT ROADS
NAS BERMUDA
NAVFAC ARGENTIA
NAVSUPPO LA MADDALENA
NAVSTA KEFLAVIK
NAVSTA ROTA

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LANTNAVFACENGCON TTHM D. .A BASE SUMMARY

(Potable Water Systems Serving Between 10-75,000 People - Conus)

Activity/ Location	Number of Sampling Period Submissions	TTHM Range (mg/l)*	Source of Supply	Treatment Facility	Effec Monit Compl Date
PWC NORFOLK, VA**	(10)	0.12-0.13	Surface (Secondary System)	Municipal Connection	29 Nov 29 Nov
NNSY PORTSMOUTH, VA**	(9)	0.11	Surface (Secondary System)	Municipal Connection	29 Nov 29 Nov
MCAS CHERRY PT, NC**	(8)	0.11-0.12	Groundwater	WTP	29 Nov 29 Nov
MCB CAMP LEJEUNE, NC**					
- HADNOT POINT	(9)	0.05-0.07	Groundwater	WTP	29 Nov 29 Nov
- MCAS NEW RIVER	(9)	0.11-0.12	Groundwater	WTP	29 Nov 29 Nov

*Figures represent the running annual average concentration based on mon monitoring. The high and low ranges take into account erroneous data which could influence results (i.e., non-designated points of entry, samples not analyzed within days of sampling and lack of information due to septum inversion, spilla contamination, molecular interference and etc.). Instances where there were no cha between the high and low TTHM readings are reflected by one range.

** Monthly sampling frequency with six (6) samples collected per sampling period.

ENCLOSURE (1)

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LANTNAVFACENGCOM TTHM DATA BASE SUMMARY

(Potable Water Systems Serving Less Than 10,000 People - Conus)

Activity/ Location	Number of Sampling Period Submissions	TTHM Range (mg/l)*	Source of Supply	Treatment Facility	Effect. Monito Complia Date
NSGA NORTHWEST, CHESAPEAKE, VA **	(3)	0.004-0.01	Groundwater	Chlorination	State Discret
NSC NORFOLK (Craney Island), PORTSMOUTH VA**	(1)	0.07	Surface & Groundwater	WTP (To be Secondary System)	State Discret
NAVRADSTA (R) SUGAR GROVE, WV **	(2)	0.05	Surface	WTP	State Discret
NAVWPNSTA YORKTOWN, VA **	(3)	0.13-0.30	Surface (Secondary System)	Municipal Connection	State Discreti
NAVPHIBASE LITTLE CREEK, NORFOLK, VA **	(3)	0.27-0.31	Surface (Secondary System)	Municipal Connection	State Discreti
NAS OCEANA, VA BEACH, VA **	(3)	0.29-0.31	Surface (Secondary System)	Municipal Connection	State Discreti
FCTC DAM NECK VA BEACH, VA **	(3)	0.26-0.78	Surface (Secondary System)	Municipal Connection	State Discreti
CNTT DETACHMENT, BAINBRIDGE, MD **	(1)	0.10	Surface	WTP	State Discretio
MCB CAMP LEJEUNE, NC - Rifle Range ***	(4)****	0.06	Groundwater	WTP	State Discretio

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ENCLOSURE (7)

LANTNAVFACENGCOM TTHM DATA BASE SUMMARY

(Potable Water Systems Serving Less Than 10,000 People - Conus)

(Continued)

Activity/ Location	Number of Sampling Period Submissions	TTHM Range (mg/l)*	Source of Supply	Treatment Facility	Effective Monitorir Complianc Date
NAVSTA ROOSEVELT ROADS, PR ***	(7)*****	0.16-0.20	Surface	WTP	State Discretio
NSC CHEATHAM ANNEX, WILLIAMSBURG, VA ***	(10)	0.013-0.15	Surface	WTP	State Discretio

* Figures represent the running annual average concentration based on both quarterly a monthly monitoring. The high and low ranges take into account erroneous data whi could have influence results (i.e., non-designated points of entry, samples not analyz within 14 days of sampling and lack of information due to Septum inversion, spillag contamination, molecular interference and etc). Instances where there were no chan between the high and low TTHM readings are reflected by one range.

** Quarterly sampling frequency with six (6) samples collected per sampling period.

*** Monthly sampling frequency with six (6) samples collected per sampling period.

**** Commence TTHM monitoring program during July 1982, per special request (excludi other parts of Base (<10K)). This is still an on-going program.

***** Actual submissions were nine (9), two (2) had to be discarded because of a bubbles.

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LANTNAVFACENGCOM TTHM DATA BASE SUMMARY

(Potable Water Systems Serving Less Than 10,000 People - Overseas)

Activity/ Location	Number of Sampling Period Submissions	TTHM Range (mg/l)*	Source of Supply	Treatment Facility	Effecti Monitor Complia Date
NAS BERMUDA **	(2)	0.04-0.05	Surface	WTP	BUMED Discret
NAVFAC ARGENTIA, NEWFOUNDLAND CANADA **	(2)	0.21-0.22	Surface	WTP	BUMED Discreti
NAVSUPPO LA MADDALENA, SARDINIA, ITALY **	(2)	0.09-0.10	Surface	WTP	BUMED Discreti
NAVSTA KEFLAVIK, ICELAND **	(3)	0.01	Groundwater	Chlorination	BUMED Discreti
NAVSTA ROTA, SPAIN**	(3)	0.07	Surface (Secondary System)	Municipal Connection	BUMED Discreti

* Figures represent the running annual average concentration based on quarte monitoring. The high and low ranges take into account erroneous data which could h influence results (i.e., non-designated points of entry, samples not analyzed within days of sampling and lack of information due to Septum inversion, spilla contamination, molecular interference and etc). Instances where there were no cha between the high and low TTHM readings are reflected by one range.

** Quarterly sampling frequency with six (6) samples collected per sampling period.

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ENCLOSURE 3 1

6. Conclu ns

a. Prevent Formation of Trihalomethanes Rather than Remove Them

I. Review Chlorination Practices

II. Apply Chlorine to Best Quality Water Possible - Improve Pretreatment

III. Use Alternate Disinfectant

b. No relaxation of Microbiological Quality of Drinking Water will be Permitted Because of Trihalomethane Control

* James M. Symons, Physical and Chemical Contaminant Removal Branch, Drinking Water Research Division, Municipal Water Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio.

NOTE: Typical approach: Change point(s) of chlorine addition (if possible); Monitor; If appropriate investigate individual raw water sources (e.g. if possible, shutdown wells with high precursors); Monitor; Investigate aeration; Monitor; Investigate carbon treatment.

ENCLOSURE (4)

OVERVIEW OF TREATMENT TECHNIQUES AVAILABLE FOR REMOVAL OF TRIHALOMETHANES*

A. Trihalomethane Control

1. General Equation of Formation

   a. Chlorine + Precursor(s) → Trihalomethanes + Other By-Products

2. Three Approaches to Control

   a. Precursor Removal

   b. Alternate Disinfectants (oxidants)

   c. Trihalomethane Removal

   d. Combinations

3. Precursor Removal

   a. Precipitation; Iron or Alum Coagulation, Softening

   b. Oxidation; Ozone, Chlorine Dioxide, or Potassium Permanganate

   c. Adsorption; Powdered or Granular Activated Carbon

4. Alternate Disinfectants or Change in Chlorination Practices

   a. Chlorine Dioxide

   b. Ozone

   c. Chloramines

   d. Bromine chloride

5. Trihalomethane Removal

   a. Aeration

   b. Oxidation; Ozone or Chlorine Dioxide

   c. Adsorption

      I. Synthetic Resins

      II. Activated Carbon, Powdered or Granular