



DEPARTMENT OF THE NAVY  
NAVAL HOSPITAL  
CAMP LEJEUNE, N.C. 28542

IN REPLY REFER TO  
6260.1  
371  
24 Jan 85

From: Commanding Officer  
To: Commanding General, Marine Corps Base, Camp Lejeune, NC 28542 (Attn: AC/S Facilities)

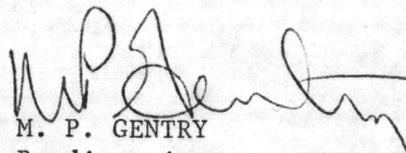
Subj: BASELINE INDUSTRIAL HYGIENE SURVEYS OF WATER TREATMENT PLANTS

Ref: (a) OPNAVINST 5100.23B  
(b) ANZ1 Standard, 2358.1-1981, Emergency Eyewash Equipment  
(c) DOD 6050.5-M, Hazardous Materials  
(d) OPNAVINST 5103.1

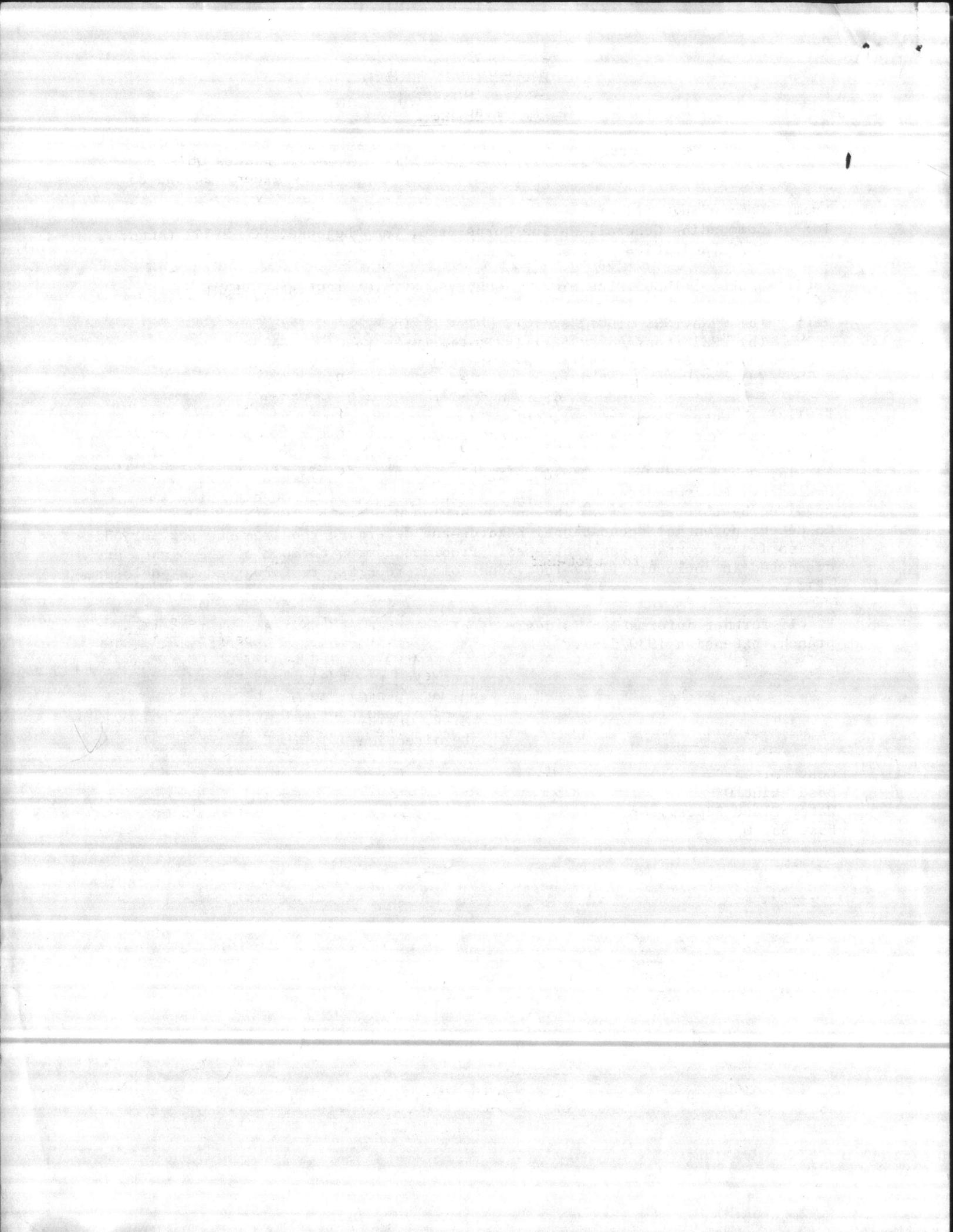
Encl: (1) Water Treatment Plants - General  
(2) Water Treatment Plants - Individual

1. The subject surveys were conducted on the dates indicated by Mr. J. McCloskey, Environmental Health Technician, as part of an ongoing program required by reference (a). The survey included potable water treatment plants to detect potential occupational hazards and determine requirements for periodic monitoring of contaminants/stresses. Problems common to most of the plants are discussed in enclosure (1). Individual plant reports are forwarded in enclosure (2).

2. If further information is desired, please contact the Industrial Hygiene Branch, extension 1930/2767.

  
M. P. GENTRY  
By direction

Copy to:  
Base Maint 0  
Water Plant Supervisor  
Base Saf 0



Occupational Hazards  
General Discussion  
Water Treatment Plants

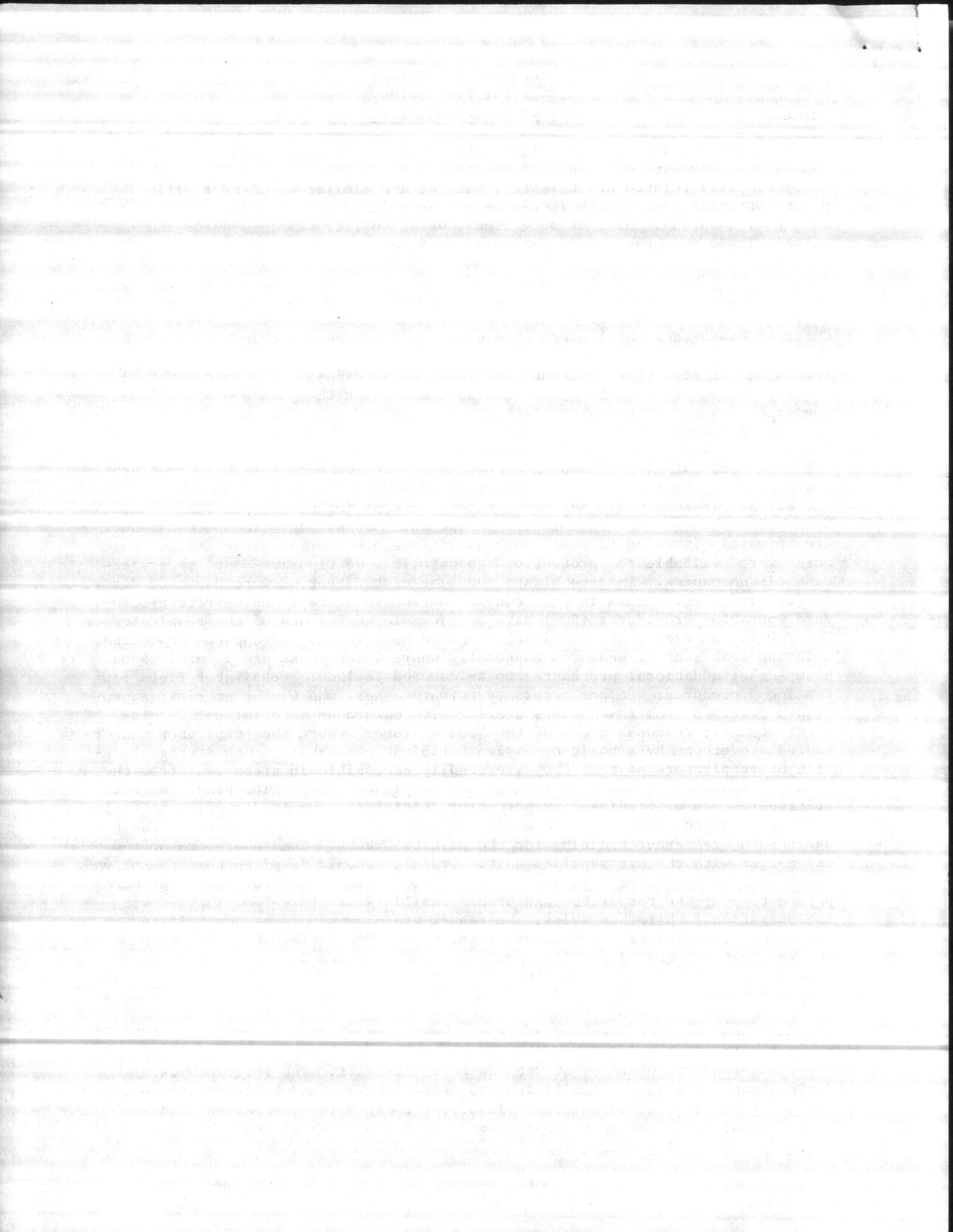
I. Camp Lejeune is served by eight potable water treatment plants which are manned by, approximately, 46 civilian personnel. With few exceptions, the occupationally related health/safety hazards are similar at every facility. Major potential contaminants/stresses are associated with chlorine gas (storage uses, handling, and leak detection), water quality testing, dusts and noise. These and other topics are discussed below:

A. Chlorine - Chlorine gas is used to disinfect drinking water supplies prior to distribution to the consumer. Chlorination equipment in all plants is located in a special enclosure. However, in a number of facilities the Chlorine Room (enclosure) doors open directly into other sections of the plant. This circumstance increases the potential hazard for personnel. Chlorine rooms should be isolated to the extent that leaking gas cannot infiltrate other plant areas via door cracks, etc. Exhaust fans located in Chlorine Rooms should be provided with on/off switches which can be operated from the outside. The bottles of ammonia which are in general use for the detection of chlorine leaks are kept in the vicinity of the chlorination equipment. To insure access to the leak test solution it should be kept away from potential leak sources/areas.

B. Respirators - All but one plant had a supplied air respirator on hand. Most plants had gas mask cannisters in operating condition. These respirators are primarily intended for emergency use in the event of chlorine leaks. Dust masks were available for protection against lime and fluoride dusts under routine circumstances. In some plants the dust masks observed were damaged, dirty, and/or misshapen. Masks in this condition should be replaced. Written Standard Operating Procedures (SOP) have been developed for use of the respirators. The SOP for emergency use respirators should be reviewed and updated to include chlorine leak control measures especially where 1 ton tanks are in use. Some examples of additional procedures to be covered include: respirator field fit testing procedures; actions necessary to warn others who may be at risk; appropriate excerpts from Base Orders dealing with hazardous material spills/disaster control; reasonable use of the "Buddy System" where the respirator wearer could be overcome by a toxic or oxygen deficient atmosphere; the storage location of respirators so that they are readily accessible in areas away from the paths of leaking gas and monthly/afteruse respirator inspection practices with written records of findings. Reportedly, initial air supplied respirator training has been provided plant operators but not the helpers. Apparently, there has been no refresher training for the past two years. Some operators seemed unfamiliar with the air supplied unit. Training should be given to each (potential) respirator wearer. This training should include an opportunity for each person to wear the respirator and become familiarized or re-familiarized with the operational characteristics. Refresher training should be accomplished annually. The National Institute for Safety and Health (NIOSH) recommends wearing respirator protection while opening, connecting, or disconnecting chlorine containers or systems. A cannister gas mask or cartridge respirator should suffice for these uses.

C. Water Quality Testing/Hazardous Chemical Handling - Chemical tests for the presence of chlorine, ph determination and water hardness are conducted at every plant by the operator at 2 to 24 hour intervals. The reagents used include weak solutions of sulfuric acid, EDTA Titrant, and TISAB (acetic acid/sodium hydroxide), silver nitrate ( $AgNO_3$ ), Phenolphthalein, borax sulfide and dyes. Handling of the above substances involves pouring from stock containers,

LTE sent  
for Fine Dusts  
to give instr.



dispensing of controlled amounts through glass tubing and stop cocks and pipettes drawn with a hand compressed bulb. The  $AgNO_3$  solution used may discolor skin and may cause minor irritation along with some of the other reagents. Protective gloves should be worn where there is danger of spillage on the hands. The heavy rubber gloves observed in the plants are cumbersome. A lighter weight, more form fitting type of glove is recommended for the lab work involved. Suitable eye protection should be used by personnel when handling any of the chemicals. Lighter weight chemical goggles with better peripheral vision are available and recommended over the heavy industrial or combat goggles presently in use. The chemicals goggles used for water plant purposes may be ventilated but the perforations should be guarded by baffles to protect against splash. Other chemicals currently being used are listed below with recommendations for minimum protective equipment:

*- will check on*  
*Ordered*  
*Select*  
*proof*

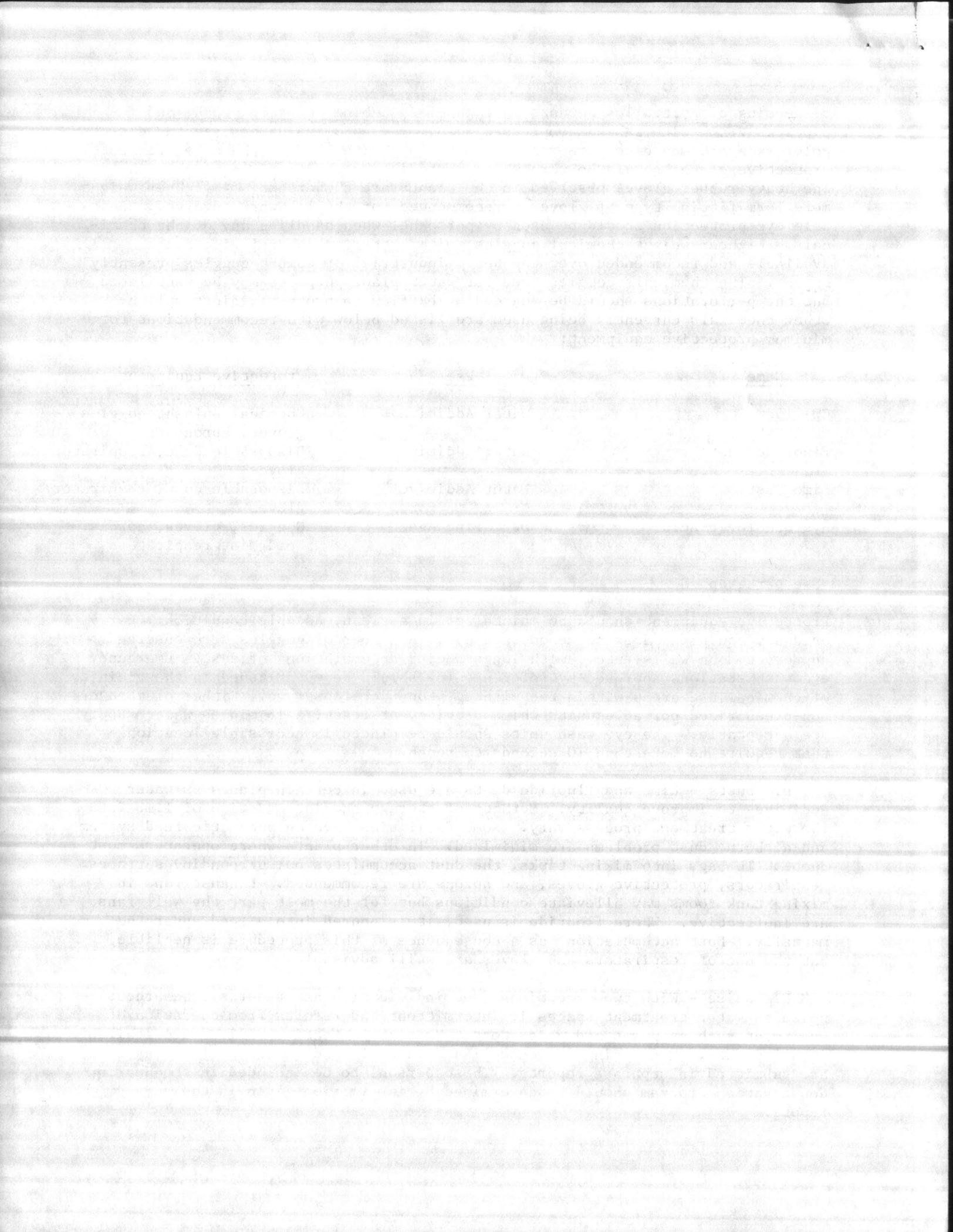
<u>Name</u>	<u>Use</u>	<u>Protective Equipment</u>
CW-119	Water Additive	Chemical splash, goggles, gloves, aprons
Fluoride Dust	Water Additive	Disposable dust, respirator gloves
Lime Dust	Water Additive	Disposable dust, respirator gloves
*Hydrochloric Acid	Descaling Agent	Goggles, gloves, aprons, Acid Mist respirators

\* See paragraph G

Protective equipment should be maintained in a clean, useable condition. Dirty or dusty equipment does not encourage use. A number of goggles were observed unprotected on walls, etc., with longstanding accumulations of dust. Emergency eye wash stations approved by reference (c) should be established in the vicinity of chemical use areas within the plants. None were observed. Either plumbed or non-pressurized portable units which provide, at least, a 15 minute water supply are acceptable. The eye wash units should be placed in accessible locations that require no more than 10 seconds to reach.

D. Dusts - Lime and fluoride dusts are used in certain plants as water additives to improve quality. Methods of storage and introduction of lime into the water treatment process vary. Some facilities have an automatic feed system and airborne dust problems are minimized. In other plants where operators must dump 50 lb bags into mixing tanks, the dust accumulates on surrounding surfaces. Respirators, protective gloves, and aprons are recommended. Exhaust fans in mixing tank rooms may alleviate conditions but for the most part the wall fans are ineffective. Where flouride is used, it is poured into a feed apparatus manually. Dust accumulations as a consequence of this procedure is negligible but the use of respirators and gloves are still advisable.

E. Noise - With two exceptions (see individual plant reports), hazardous noise in water treatment spaces is intermittent and results from operation of equipment such as pumps and generators. Hearing protective devices are available in all plants. Monitoring is accomplished annually and noise level survey data are submitted in separate reports. Those persons to be included in the Hearing Conservation Program should be determined by information given in the survey report.



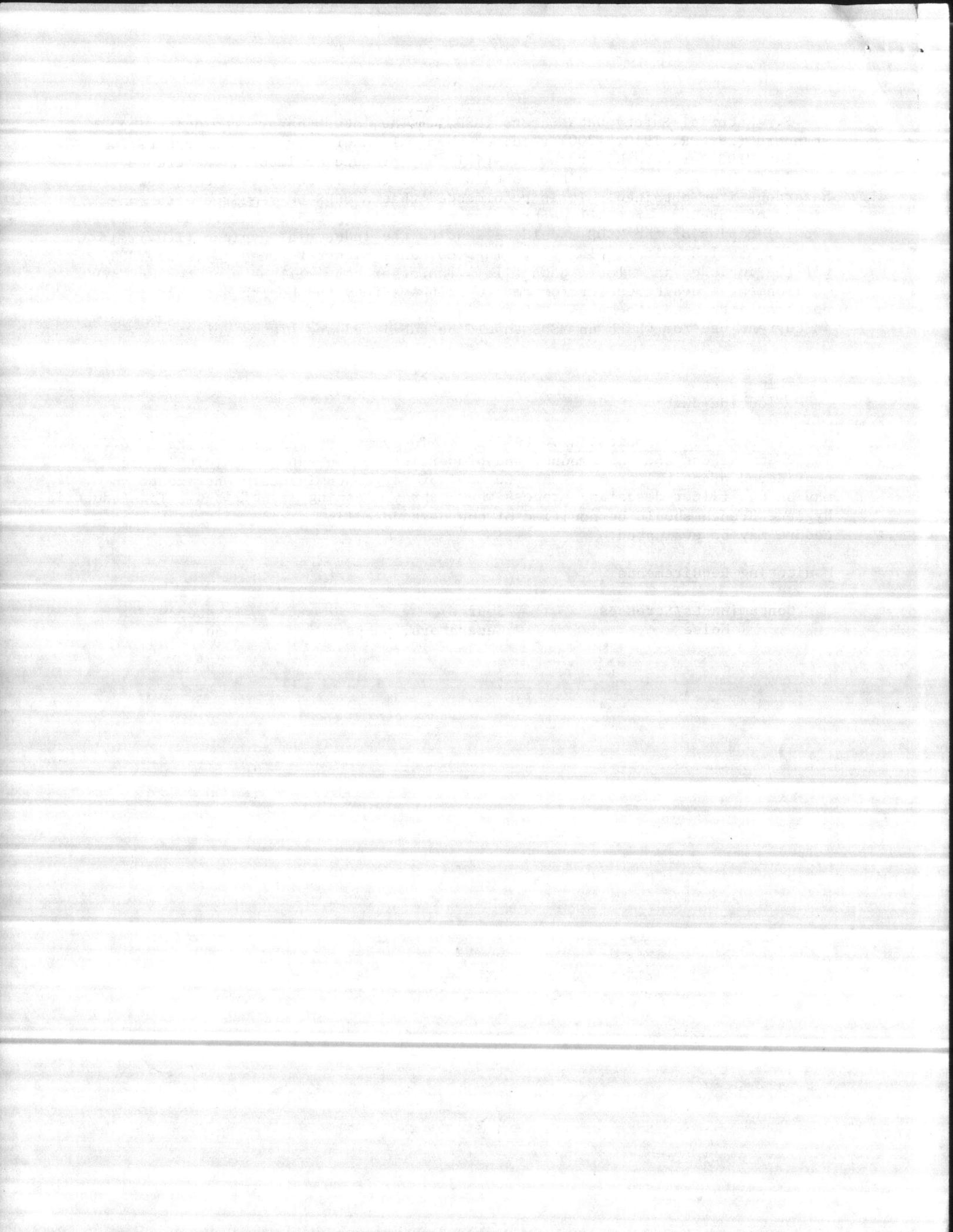
F. Material Safety Data Sheets (MSDS). The latest hazard communication standard (29 CDR, 1910, 1200) requires chemical manufacturer and importers to develop MSDS for each hazardous material they produce or import. Reference (c) requires that all DOD activities obtain a MSDS from industry with each new hazardous item obtained. It is recommended that a MSDS be required as a condition of purchase from all contractors for locally procured hazardous items. Two (2) copies of the MSDS should be sent to the Industrial Hygiene (I.H.) Branch, Naval Hospital, Bldg #65. In accordance with reference (d), one MSDS will be included in a local data file. The other copy will be sent to the Navy Environmental Health Center for review of the safety and health data and incorporation into their technical information service repository. Those chemicals in current use for which an MSDS should be submitted are listed below:

CW-319  
Lime dust  
Flouride dust

G. Work Place Monitoring. Due to the intermittent and brief tasks involving chemical use and the amounts and properties of the substances, it is not considered practical or necessary to monitor for contaminants. One exception may be the filter descaling process where spray cleaning is utilized. The Industrial Hygiene Branch should be notified of the next descaling period so that the procedure may be evaluated.

Monitoring Requirements

<u>Contaminants/Stresses</u>	<u>Source</u>	<u>Frequency</u>
Noise	Generators, pumps	Annual



Occupational Hazards  
Individual Water Treatment  
Plants

I. Bldg AS-110, MCAS(H), New River - 9 Oct 1984  
(1 operator plus a helper during day shift - 24 hour manning)

A. Lime Room (2d deck) - There are heavy dust accumulations. Personnel should wear dust respirators working in the space. The problem should be alleviated upon completion of a new Lime Feed System. *Labeled*

*New goggles ordered*  
B. Lab Bench. Two pair of plastic glasses kept at this location were not approved for chemical splash. They should be moved to prevent inadvertant use.

*H.T.H. Relocated TO UPSTAIRS  
Oil Jugs Labeled*  
C. HiLift Pump Room - HTH Chlorine powder was stored on the deck next to petroleum products. Mixtures of chlorine and petroleums, detergent, water, vinegar or ammonia can result in release of toxic gases and/or combustion. HTH should be stored in a cool, dry area apart from substances which may cause dangerous reactions. Lubeoil and other substances were being stored in milk containers. The containers should be properly labeled.

D. Lime Feed Room (1st deck) - Continuous noise hazard area. Should be posted as such. - *POSTED BY Base Safety - 1-7-85*

E. Chlorine Regulator Room - Opens into main plant. ?

II. Bldg BB-190 Court House Bay - 11 Dec 1984  
(1 part time operator cares for Onslow Beach, also)

A. Chlorine Room

1. The exhaust fan is broken. *Been working NOT broken*
2. The exhaust fan switch is inside the room. - *NOT correct*
3. The ammonia bottle is kept inside the room. - *will check on with Junior*

B. Lime Room

1. There were significant accumulations of lime dust on all surfaces. Respirators should be worn by personnel working in the room. *Door TO Lime Room Labeled - Wear RespiTOR + safety goggles*

III. Bldg - 20, Hadnot Point - 11 Dec 1984  
(1 operator)

A. Chlorine Room

1. There is no exhaust fan. *NOT correct*
2. The chlorine room opens directly into the main plant. ?
3. The ammonia leak test solution is kept in the room. - *will check with Junior on*

B. Respirators

1. A seal on the gas mask cannister was broken. The cannister should be replaced. *Been Replaced*
2. The Scott Air Pak gauge indicated, only, 2/3 full. The plant operator was made aware of this condition. The reason for the shortage of

*Fire DEPT will Only Fill  
Cylindrom 2/3 Full AS recommended By MANTO.*

Faint, illegible text in the upper section of the page.

Faint, illegible text in the middle section of the page.

Faint, illegible text in the lower section of the page.

compressed air could not be determined. The equipment should be leak tested.

C. Lab Bench

*Existing Eye wear is Being Cleaned - The eye wear suggested - Not Available in Self Service - unit order IS ON ORDER*

1. The protective eye wear was maintained in a dirty condition.

IV. Bldg - 670, Holcomb Blvd, 10 Jan 1985

(1 operator x 24 hours; 6 additional persons working in or out of Bldg)

A. Chlorine Room

1. The ammonia leak test solution is kept in the room. *needs checking on*

B. Lime Feed Apparatus

1. The sound resulting from the "hammer" of this equipment has been determined to be noise hazardous. Signs should be posted at all accesses to this area to warn of the hazard and hearing protective devices should be conveniently available. *Labeled by Base Safety*

C. Respirators

1. The gas mask cannister seal was broken. The cannister should be replaced. *has been replaced*

2. There were only 10lbs of air remaining in the supplied air tank. The unit should be leak tested and the tank replaced. *Tank Replaced + Cylinder re-filled*

V. Bldg -TT-38, Tarawa Terrace - 11 Jan 1985

(1 part time operator - cares for Camp Johnson, also)

A. Chlorine Cylinder Room/Storage Area

1. The door opens into the main plant.
2. Bags of lime dust stacked near the chlorine cylinders were "leaning" and in danger of falling on the chlorine lines. The stack should be relocated.

- Relocated*
- B. Lime Mixing Room - Bags of lime are added manually in this plant and accumulated dust on surfaces indicates the inadequacy of the wall exhaust fan. Dust could be felt in the mouth after being in the room for a few minutes. Reportedly, operation of this water plant will be discontinued in the near future. In the interim, the use of dust respirators while in the space is recommended. If the plant is continued in operation for an extended period of time, separation of the lime mixing area and the adjacent walkway is recommended.

VI. Bldg M-178, Camp Johnson - 15 Jan 1985

(1 part time operator - See V)

A. Chlorine Room

1. The door opens directly into the main plant. ?

B. Respirators

1. Pressure in the supplied air tank was low. The equipment should be leak tested and the tank refilled/replaced. *Respirator was repaired + Cylinder refilled*



VII. Bldg BA-138, Onslow Beach - 10 Jan 1985  
(1 part time operator - See II)

A. Chlorine Room

1. An inner door from this room which leads directly into the main plant was open at the time of survey. ?

2. The chlorine cylinder lines were badly corroded and the greenish discoloration of the regulator surfaces is suggestive of past leaks. The cause of the corrosion was not definitely determined but may be due to high moisture conditions at this location. Safety precautions regarding the handling/operation of the chlorine system at this plant should be strongly emphasized. Signs should be posted on the outside door directing persons entering the building to the office. Until such time as the room is separated from the rest of the plant, both doors should be kept closed when not in use.

3. Because of the corroded lines, personnel changing chlorine tanks or working on this system should be required to wear (at the least) a chlorine gas mask. *masks are presently required when changing Cl<sub>2</sub> cyl*

B. Respirators

1. There was no exhalation valve cap on the gas mask cannister. It should be replaced. *Bea. Replaced*

2. There was no air supplied respirator available in the building.

C. Protective Equipment

1. The protective goggles observed were very dusty/dirty and stored in an unprotected manner. *Goggles cleaned - SPLASH PROOF ON ORDER*

VIII. Bldg RR-85, Rifle Range - 11 Dec 1984

A. Lime Mixing Room

1. Accumulated dust on surfaces. Gloves, aprons, and dust respirators should be worn by personnel working in the room. *Presently required*

B. Water Quality Testing

1. Protective eye wear should be worn during testing procedures. Reportedly, this is not the practice, at present.

