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MANAGEMENT PROJECT

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**INSTALLATION, OPERATION
AND MAINTENANCE
OF A FLOATING
CHLORINATOR
A TRAINING/JOB MANUAL**

BY

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LABORATORY TECHNICIAN

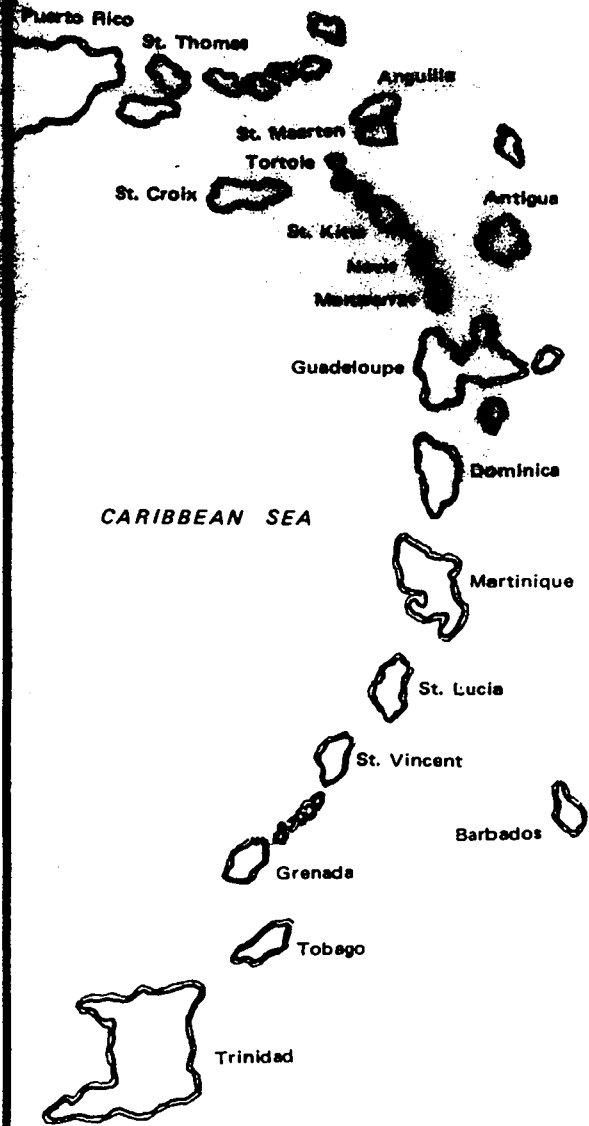
MONTSERRAT WATER AUTHORITY

A JOINT-VENTURE PROJECT OF THE GOVERNMENTS OF:

ANGUILLA, ANTIGUA, BRITISH VIRGIN ISLANDS, BARBADOS,
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ST. LUCIA, ST. VINCENT, CANADA, UNITED KINGDOM

AND

THE PAN AMERICAN HEALTH ORGANIZATION



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IN



*The chlorinator
afloat*



*Filling the column
with tablets*

PHOTOGRAPHS TAKEN BY THE
MONTSERRAT WATER AUTHORITY
TO ILLUSTRATE THE TYPE
OF LOCALLY MADE CHLORINATOR
WHICH IS BEING USED INSIDE
THEIR COVERED RESERVOIRS

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CARIBBEAN BASIN WATER MANAGEMENT PROJECT
*INSTALLATION, OPERATION & MAINTENANCE OF A
FLOATING CHLORINATOR*

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PREFACE

PURPOSE OF TRAINING/JOB MANUAL

MAINTAINING EFFECTIVE AND EFFICIENT ON-THE-JOB PERFORMANCE SHOULD BE THE AIM OF NOT ONLY EVERY SUPERVISOR AND FOREMAN BUT ALSO OF EVERY WORKER. FREQUENTLY SOME IMPROVEMENT IN PERFORMANCE IS NOTED AFTER TRAINING. OVER TIME, HOWEVER, PERFORMANCE OFTEN DECREASES TO, OR BELOW THE ORIGINAL LEVEL. ONE WAY TO SET STANDARDS OF PERFORMANCE AND TO SUGGEST METHODS OF ATTAINING THE DESIRED PERFORMANCE SO THAT IT IS CLEAR TO THE WORKER, THE SUPERVISOR OR FOREMAN AS WELL AS THE TRAINER, IS TO PROVIDE A TRAINING/JOB (T/J) MANUAL WHICH CLEARLY STATES THE DESIRED PERFORMANCE AND SUGGESTS PROCEDURES FOR THE WORKER TO ATTAIN THIS LEVEL OF PERFORMANCE. THE FOLLOWING T/J MANUAL DOES JUST THIS.

HOW TO USE THE TRAINING/JOB MANUAL

THE MATERIALS THAT FOLLOW CAN BE USED IN A NUMBER OF DELIVERY SYSTEMS, DEPENDING ON THE NATURE OF PERFORMANCE THAT NEEDS TO BE IMPROVED. IF THE TRAINEES ARE NEW TO THE SUBJECT MATTER, THE T/J MANUAL CAN BE USED IN A FORMAL TRAINING SYSTEM. THERE ARE SUFFICIENT DETAILED DESCRIPTIONS OF SUPPLIES AND MATERIALS AS WELL AS TRAINING ACTIVITIES TO GUIDE THE TRAINER.

A SUPERVISOR, FOREMAN OR TRAINER REQUIRED TO DIAGNOSE PERFORMANCE DEFICIENCIES, CAN USE THE OPERATION BREAKDOWN SHEET AS A REFERENCE TO IDENTIFY THE AREA OF PERFORMANCE DEFICIENCY. HE CAN THEN CONCENTRATE TRAINING ON THIS PARTICULAR AREA BY USING THE APPROPRIATE SECTIONS OF THE T/J MANUAL AS A GUIDE.

PREFACE (Cont'd)

WORKERS WHO ARE EAGER TO MOVE AHEAD IN ACQUIRING NEW KNOWLEDGE AND SKILLS COULD USE THE T/J MANUAL, ALONG WITH ASSISTANCE FROM FELLOW WORKERS WHO ARE KNOWLEDGEABLE IN THE SUBJECT AREA, TO STUDY THE MATERIAL ON THEIR OWN.

THE T/J MANUAL IS DESIGNED TO BE USED ON-THE-JOB AS A READY REFERENCE AS NEEDED. IN MANY CASES, JOB-AIDS CAN BE LIFTED FROM THE MANUAL AND POSTED DIRECTLY AT THE SITE WHERE THE PERFORMANCE IS TO TAKE PLACE AS A CONSTANT REMINDER TO THE WORKER OF THE PROPER PROCEDURE FOR A TASK.

WHERE TO GET MORE INFORMATION

THIS T/J MANUAL IS ONE OF MANY BEING DEVELOPED BY THE CARIBBEAN BASIN WATER MANAGEMENT PROJECT TO IMPROVE THE PERFORMANCE OF PERSONNEL IN THE WATER UTILITIES OF THE EASTERN CARIBBEAN. MANUALS WILL BE DEVELOPED IN MANY ASPECTS OF WATER UTILITY OPERATION, MAINTENANCE, AND ADMINISTRATION. FOR MORE DETAILS ON MANUAL AVAILABILITY AND OTHER ASPECTS OF THIS PROJECT CONTACT:

ENGR. NEIL. F. CAREFOOT, MANAGER
CARIBBEAN BASIN WATER MANAGEMENT PROJECT
PAHO/WHO
BRIDGETOWN, BARBADOS.

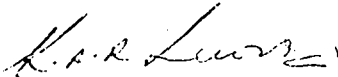
PREFACE (Cont'd)

Acknowledgements

Whilst it would be difficult to make acknowledgement by name to all who were instrumental in aiding me with advise, criticisms and references, I deem it most necessary to:

Declare my sincere thanks and appreciation to the Manager, Foreman and Assistant Foreman of the Montserrat Water Authority, PAHO, Graphic Artist Miss Rosemary Deane, and all others too numerous to mention, without whom the complete success of the venture would not have been possible.

Signed.



K. Lewis

SUPPLEMENTAL NOTE

The Reader will appreciate that a certain amount of experimentation is required to obtain the desired chlorine residual under varying conditions of water use, water quality, reservoir size, etc.

UNIT

INSTALLATION AND OPERATION OF A
FLOATING CHLORINATOR

WHAT IS THIS UNIT ALL ABOUT?

health aspects?

This Unit concerns the suggested method of installing (for the first time) the Floating Chlorinator designed for controlling the rate at which SANURIL 115 tablets will dissolve in small covered reservoirs with capacities ranging from 10,000 to 300,000 gallons.

WHY DOES THE TRAINEE NEED TO LEARN THIS?

Although Sanuril tablets are slow dissolving they dissolve fairly rapidly when fully immersed in water and results in super chlorination. *the volume is*

WHAT DOES THE TRAINEE NEED TO KNOW BEFORE BEGINNING?

A basic knowledge of chemistry, properties of chlorine and safety precautions when dealing with chlorine. Also a knowledge of the importance of treatment by chlorination.

WHAT EQUIPMENT AND SUPPLIES ARE NEEDED?

ITEM	LESSONS				
	1	2	3	4	5
Size 10 Inner Tube	x				
Hand Pump	x				
Pocket air pressure gauge	x				
Floating Chlorinator Unit		x	x	x	x
Plastic Hammer		x			x
A Reservoir of Water		x	x		x
Screw Driver			x		
Thin Rod				x	
Sanuril 115 Tablets				x	
Gloves				x	
Cap					x

WHAT SUPPLEMENTARY MATERIAL WILL HELP?

None.

WHAT ARE THE OBJECTIVES?

The trainee will be able to:

1. Inflate tube.
2. Remove cap and lower unit on to water surface.
3. Adjust vertical column.
4. Fill the column with tablets and settle them.
5. Cover and float the loaded unit.

NUMBER OF LESSONS AND TOTAL INSTRUCTIONAL TIME?

Total Lessons: 5

Total Time: 2 hrs 20 mins.

TRAINING/JOB MANUAL

Installation, Operation and
Maintenance of a Floating
Chlorinator

UNIT 1

Installation, Operation of a
Floating Chlorinator

LESSON 1



INFLATING THE TUBE

ESTIMATED TIME

30 minutes.

PREREQUISITES

A knowledge of what a car tube is
for, means of inflating it and
also the importance of chlorination.

PERFORMANCE OBJECTIVE:

- The trainee will be able to:
inflate tube.
- Under the following condition:
given the supplies and equipment mentioned previously.
- To this standard:
*tube must be firm but not bulging at any weak spots,
and should contain at least 10 P.S.I. air pressure.*

TRAINING RESOURCES

L1:IS:01, L1:IS:02, L1:IS:03.

TRAINING ACTIVITIES

TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Explain the importance of the inflated tube in the functioning of the unit.	1. Takes notes.
2. Distribute handouts.	2. Read Handouts.
3. Demonstrate the entire procedure step by step as outlined in Operation Breakdown Sheet.	3. Observe procedures.

Principles of Operation

Sanuril 115 chlorine tablets are slow dissolving tablets which do so at fairly constant rates when exposed to water.

The vertical column of that Chlorination Unit regulates the number of tablets exposed to water at any one time.

The dissolving rate varies somewhat with temperature, flow and chemical content of the water, the effect of flow and turbulence around the tablets is minimised by the rubber inner tube. The effect of temperature in the tropics is insignificant. Chemical content has some effect but this can only be demanded from an analysis of each water supply.

The adjustment of the depth of the vertical column i.e. greater depth for larger volume and vice versa allows control of the chlorine ^{dropping} residual. A formula for this is yet to be worked out and must be based on the results of experimental work. The required depth can then be extrapolated from a graph of results. *for guidance*

The floating rope has no effect on the flotation of the chlorinator and allows easy ^{re}retrieval at any level. Its limited length prevents over ~~dosing~~ dosing when the water volume drops close to the bottom of the reservoir.

The change in weight and therefore the depth in floating caused by the alteration in the number of tablets is insignificant. The surface area and arrangement of the tablets in the column will alter the rate of dissolution but can be controlled by taking due care as outlined in Unit 1 Lesson 4.

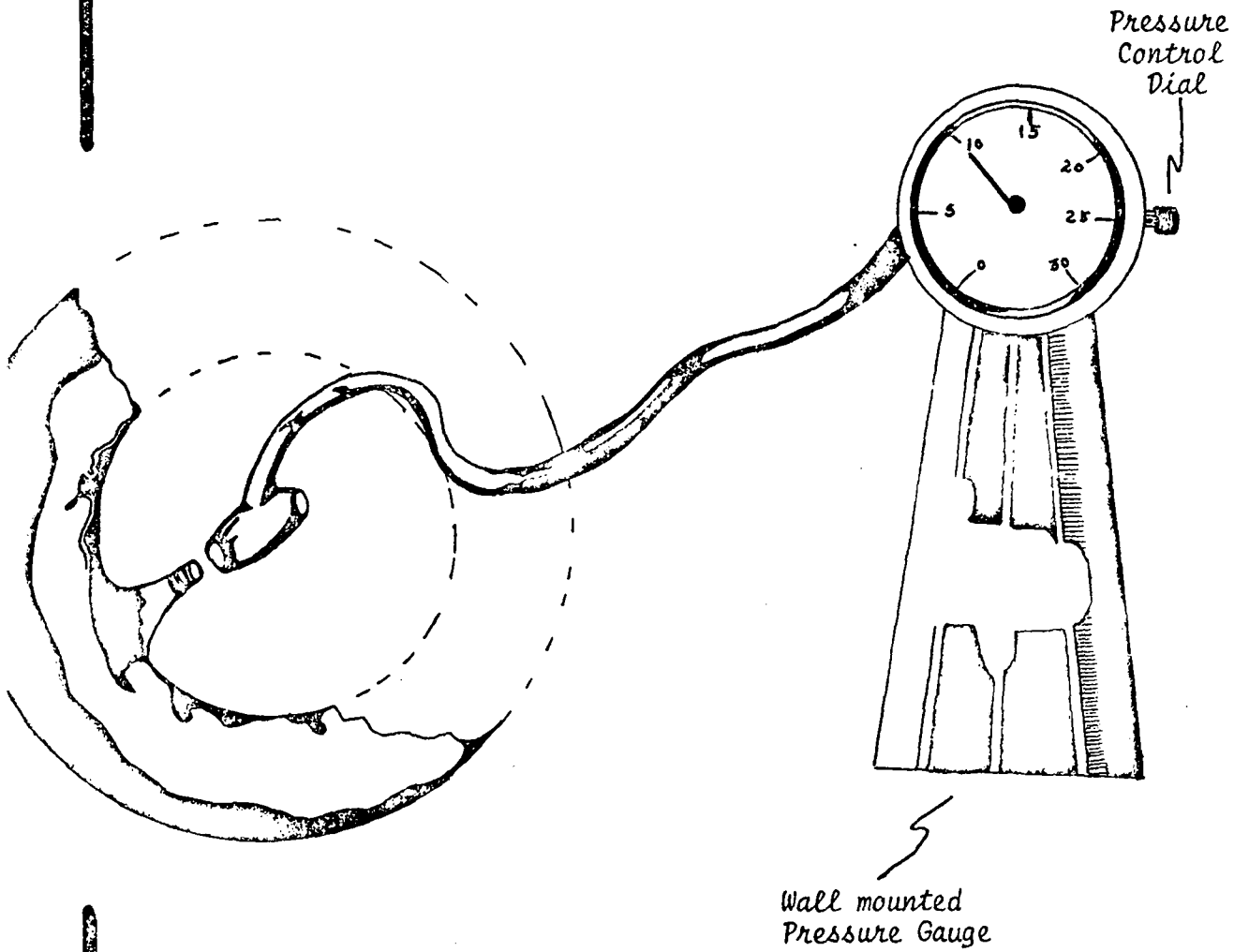
Principles of Operation Cont'd

The maintenance checks outlined in Unit 2 have proven satisfactory and the equipment has a life time yet to be determined. Regular lubrication of the clamps will prolong their life span.

OPERATION BREAKDOWN SHEET

POSITION: Chlorination Assistant TASK: Installs ChlorinatorOPERATION: Inflates Tube

<p>Important STEPS in the operation.</p> <p>STEP: a significant action which advances the operation towards completion.</p>	<p>KEY POINTS: the key to doing the steps correctly, efficiently or accurately.</p>
<p>HOW HE DOES IT (Step)</p>	<p>POINTERS TO BE OBSERVED IN PERFORMING THE STEP</p>
<p>1. Remove valve cap.</p> <p>2. Attaches pump connection to valve.</p> <p>3. Applies air to tube. (Manipulates Pump.)</p> <p>4. Detaches pump connection.</p> <p>5. Checks pressure in tube.</p> <p>6. Replaces valve cap.</p>	<p>1. Turn anticlockwise. Store in a safe place.</p> <p>2. Clip on connection. The connection must be secured so that no air is lost while filling the tube.</p> <p>3. Manipulate pump handle up and down. Add air until the tube is firm.</p> <p>4. This step must be done very quickly preventing loss of air.</p> <p>5. The pressure should be 10 P.S.I. Adjust if necessary by adding or expelling air from tube; use pocket pressure gauge.</p> <p>6. Turn clockwise. The cap should be hand tight.</p>



INFLATING THE TUBE.

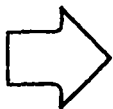
TRAINING/JOB MANUAL

Installation, Operation and
Maintenance of a Floating
Chlorinator

UNIT 1

Installation and Operation
of a Floating Chlorinator

LESSON 2



REMOVING CAP AND LOWERING UNIT
ON TO THE WATER SURFACE

ESTIMATED TIME

30 minutes

PREREQUISITES

Lesson 1 and a knowledge of what
the basic tools are used for.

PERFORMANCE OBJECTIVE:

- The trainee will be able to:
remove cap and lower unit on to the water surface.
- Under the following condition:
given the supplies and equipment previously mentioned.
- To this standard:
*there must be no damage done to the cap or column,
and the unit must not be submerged more than its
weight causes it to be. The unit must float upright.*

TRAINING RESOURCES

L2:IS:01, L2:IS:02, UI:L1:IS:02.

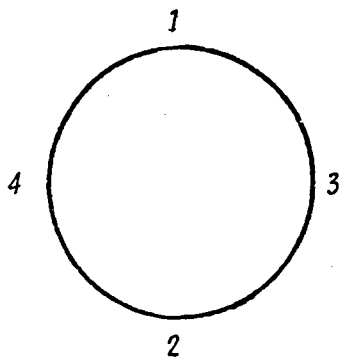
TRAINING ACTIVITIES

TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Outline the procedure for removing the cap and precautions to be taken.	1. Take notes.
2. Demonstrate the operations as outlined.	2. Observe, perform operation as instructed.

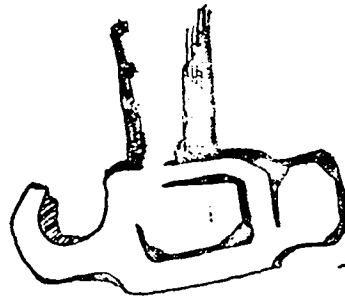
OPERATION BREAKDOWN SHEET

POSITION: CHLORINATION ASSISTANT TASK: Installs ChlorinatorOPERATION: Removes Cap and lowers Unit on to water surface

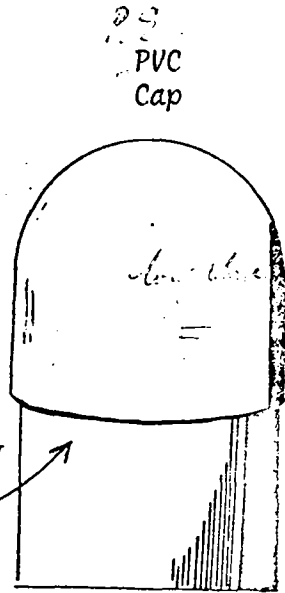
<p>Important STEPS in the operation.</p> <p>STEP: a significant action which advances the operation towards completion.</p>	<p>KEY POINTS: the key to doing the steps correctly, efficiently or accurately.</p>
<p>HOW HE DOES IT (Step)</p>	<p>POINTERS TO BE OBSERVED IN PERFORMING THE STEP</p>
<p>1. Remove the cap.</p> <p>2. Lower the unit on to the water surface.</p>	<p>1. Using a plastic hammer lightly tap the cap upwards as shown in diagram attached.</p> <p>2. This must be done slowly and gently so that the water mark left at the bottom of the vertical column will be caused by the weight of the unit.</p> <p><u>NOTE:</u> This operation is more easily done when the reservoir is full. But it can also be preset using any open water surface.</p>



Tapping Sequence



Plastic Hammer



Vertical Column

REMOVING CAP
FROM VERTICAL COLUMN

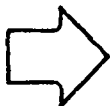
TRAINING/JOB MANUAL

Installation, Operation and
Maintenance of a
Floating Chlorinator

UNIT 1

Installation and Operation of
a Floating Chlorinator

LESSON 3



ADJUSTING THE VERTICAL COLUMN

ESTIMATED TIME

30 minutes.

PREREQUISITES

A basic knowledge of hose clamp
operation, and Lesson 2.

PERFORMANCE OBJECTIVE

- The trainee will be able to:
adjust the vertical column.
- Under the following condition:
*given a complete unit - a screw driver - a reservoir
of water.*
- To this standard:
*the final adjustment should result in a disolution rate
of 1 tablet in 30,000 gallons of water producing a
residue of 0.3 ppm over 24 hrs.*

TRAINING RESOURCES

L3:IS:01, L3:IS:02.

TRAINING ACTIVITIES

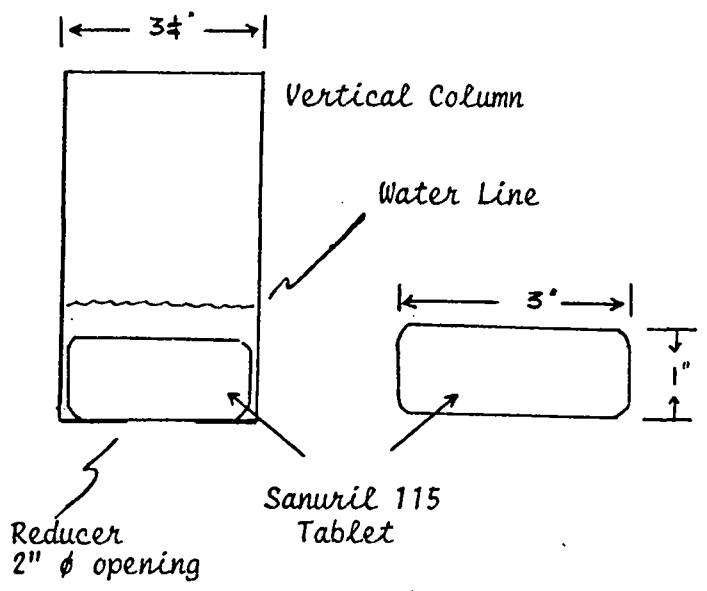
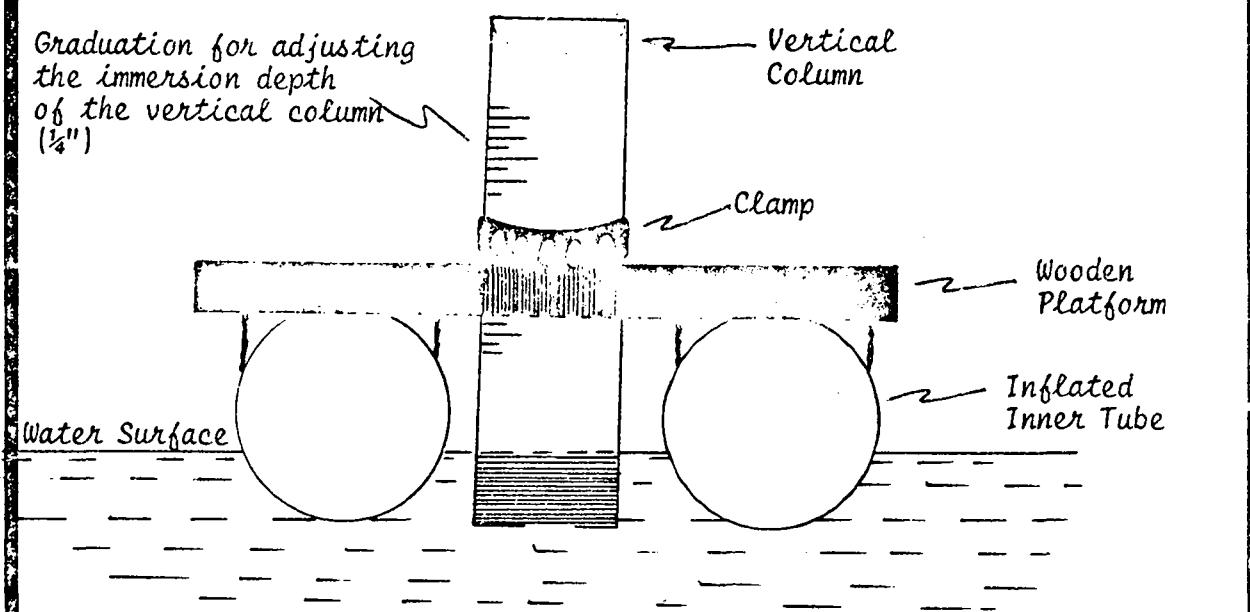
TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Explain the importance of the operation.	1. Take notes.
2. Distribute handouts, and explain.	2. Read handouts.
3. Demonstrate loosening clamp, adjusting column and retightening clamp.	3. (a) Observe trainers actions. (b) Practice the operation to increase skill.

OPERATION BREAKDOWN SHEET

POSITION: Chlorinator Assistant TASK: Installs Chlorinator

OPERATION: Adjusts Vertical Section

<p>Important STEPS in the operation.</p> <p>STEP: a significant action which advances the operation towards completion.</p>	<p>KEY POINTS: the key to doing the steps correctly, efficiently or accurately.</p>
<p>HOW HE DOES IT (Step)</p>	<p>POINTERS TO BE OBSERVED IN PERFORMING THE STEP</p>
<ol style="list-style-type: none"> 1. Observe immersion depth on the vertical column. 2. Loosen clamp. 3. Adjust vertical section. 4. Retighten clamp. 	<ol style="list-style-type: none"> 1. The depth of immersion will dictate how slowly or rapidly each chlorine tablet will dissolve and consequently the chlorine residual. (See Note below.) 2. Using a flat screw driver turn clamp screw anticlockwise. 3. Raise or lower vertical section as required leaving clamp rising on the platform. 4. Using the flat screw driver turn clamp screw clockwise until it can no longer shift.
<p>NOTE: By experimenting w/ the unit floating on a known volume* of water and adjusting the tablet immersion depth for each trial one can determine:</p> <p>(a) the appropriate depth of immersion for the desired chlorine residual and</p> <p>(b) the rate at which a tablet will dissolve.</p> <p>By proportion, using data from the experiments, chlorine residuals can be calculated for reservoirs where the floating unit is to be used.</p> <p>*Am empty oil drum can be used.</p>	



ADJUSTING VERTICAL COLUMN

TRAINING/JOB MANUAL

Installation, Operation and
Maintenance of a Floating
Chlorinator

UNIT 1

Installation and Operation of a
Floating Chlorinator

LESSON 4



FILLING COLUMN WITH TABLETS

ESTIMATED TIME

20 minutes

PREREQUISITES

Lesson 3.

PERFORMANCE OBJECTIVE:

- ④ The trainee will be able to:
fill column with tablets and settle them.
- ④ Under the following condition:
*given a complete unit, tablets, a thin rod and
handout with diagrams.*
- ④ To this standard:
*the tablets must be flat one on each other and
must not be broken.*

TRAINING RESOURCES

L4:IS:01, L4:IS:02

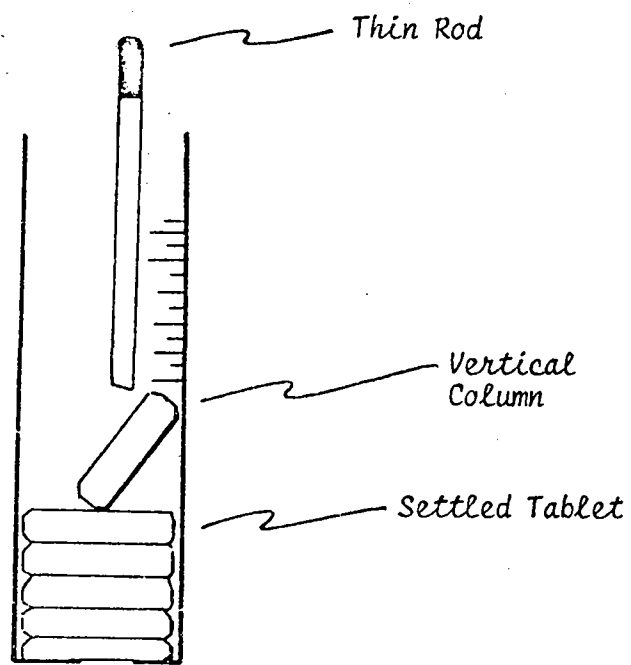
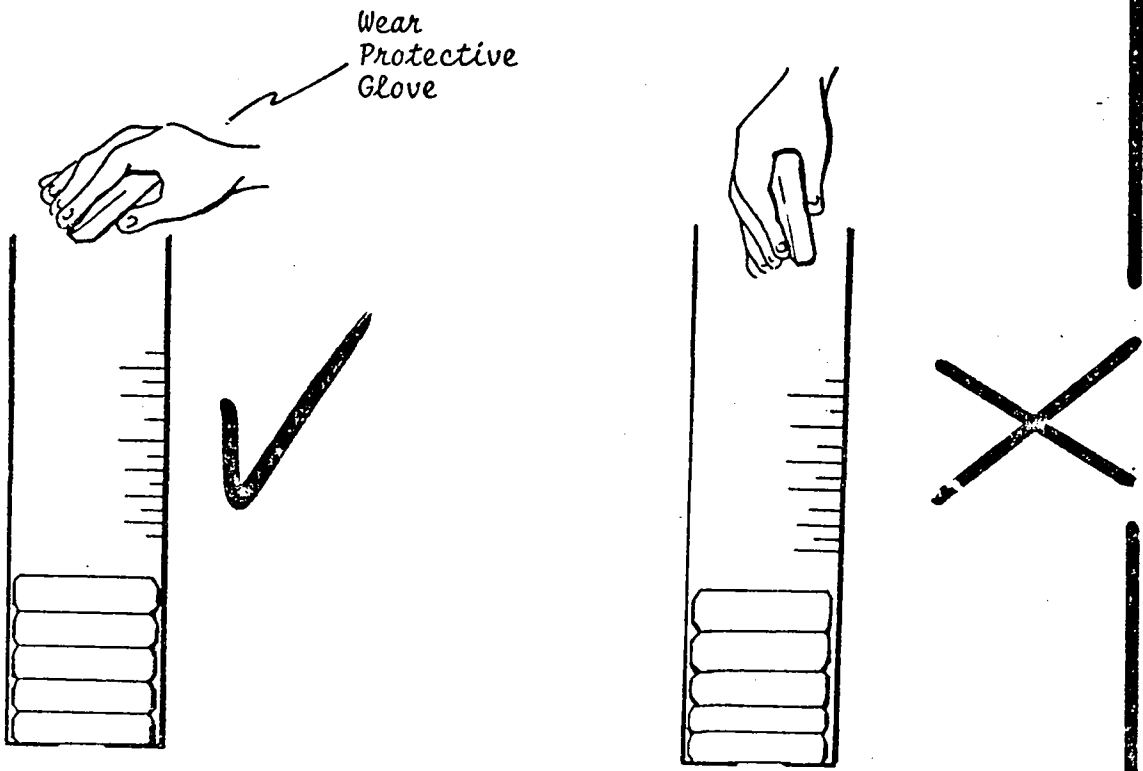
TRAINING ACTIVITIES

TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Explain the precautions taken when handling chlorine tablets.	1. Take note of precautions.
2. Distribute handout.	2. Read handout.
3. Demonstrate filling and settling procedure.	3. Perform operation as instructed and in accordance with handout.

OPERATION BREAKDOWN SHEET

POSITION: CHLORINATOR ASSISTANT TASK: Installs ChlorinatorOPERATION: Fills column with tablets

<p>Important STEPS in the operation.</p> <p>STEP: a significant action which advances the operation towards completion.</p>	<p>KEY POINTS: the key to doing the steps correctly, efficiently or accurately.</p>
<p>HOW HE DOES IT (Step)</p>	<p>POINTERS TO BE OBSERVED IN PERFORMING THE STEP</p>
<ol style="list-style-type: none"> 1. Drops tablets into the vertical column. 2. Settles tablets. 3. Finalise settlement of tablets. 	<ol style="list-style-type: none"> 1. The tablets must lie flat one on the other as shown in diagram. 2. Shake the vertical section until tablets lie flat. 3. Using a thin rod lightly tap tablets into position without causing damage. Shown in diagram.



FILLING COLUMN WITH TABLETS

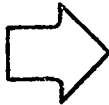
TRAINING/JOB MANUAL

Installation, Operation and
Maintenance of a Floating
Chlorinator

UNIT 1

Installation and Operation
of a Floating Chlorinator

LESSON 5



COVERING AND FLOATING THE LOADED
UNIT

ESTIMATED TIME

30 minutes.

PREREQUISITES

Lesson 4.

PERFORMANCE OBJECTIVE:

- The trainee will be able to:
*cover vertical column and lower the unit on to the
water surface.*
- Under the following condition:
*given the complete unit loaded, and with rope attached.
the cap and plastic hammer.*
- To this standard:
*the unit must float upright and the cap should be
water tight.*

TRAINING RESOURCES

L5:IS:01, L5:IS:02.

TRAINING ACTIVITIES

TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Distribute handout before going on the reservoir.	1. Read handout.
2. Take trainees on to the reservoir with all equipment then demonstrate covering the column and floating the unit.	2. Accompanies trainer on to the reservoir and observes the operation.
	3. Perform the floating operation individually.

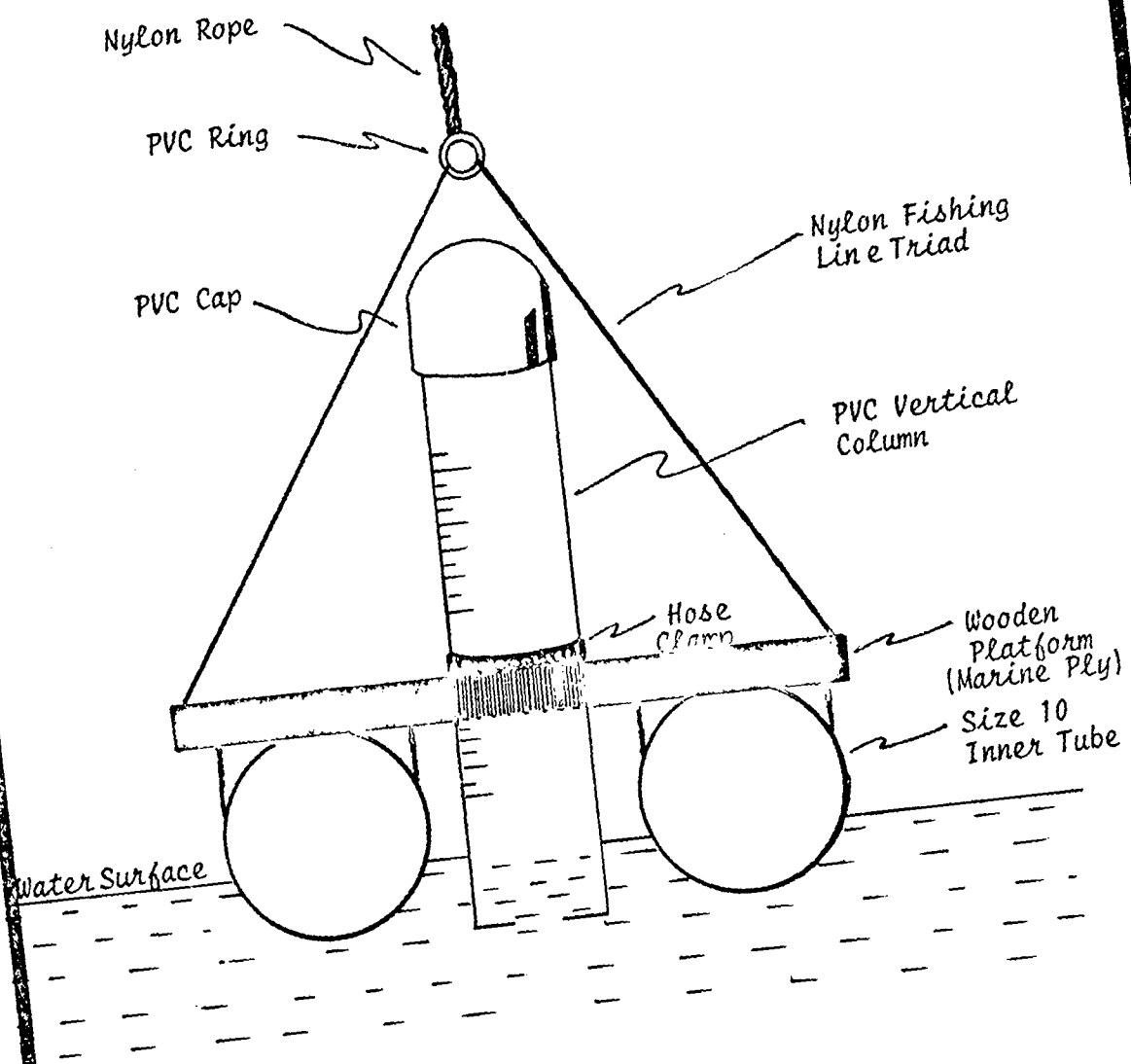
OPERATION BREAKDOWN SHEET

POSITION: CHLORINATOR ASSISTANT TASK: Installs Chlorinator

OPERATION: Covers and floats the loaded unit.

<p>Important STEPS in the operation.</p> <p>STEP: a significant action which advances the operation towards completion.</p>	<p>KEY POINTS: the key to doing the steps correctly, efficiently or accurately.</p>
<p>HOW HE DOES IT (Step)</p>	<p>POINTERS TO BE OBSERVED IN PERFORMING THE STEP</p>
<p>1. Places cap on vertical column and taps it down with plastic hammer.</p> <p>2. Float unit.</p>	<p>1. The cap must be secure but not tight. It must not be hammered excessively. Just a few light taps.</p> <p>2. Slowly lower unit into the reservoir by the attached rope ensuring that the unit floats upright.</p> <p><u>NOTE</u>; The length of the rope should be 3' less than the height of the tank or reservoir.</p>

UI:L5:IS:02
AND UI:L5:OH:01



FLOATING THE CHLORINATOR

UNIT



MAINTENANCE OF A FLOATING CHLORINATOR

WHAT IS THIS UNIT ALL ABOUT?

This Unit concerns the suggested method of installing (for the first time) the Floating Chlorinator designed for controlling the rate at which SANURIL 115 tablets will dissolve in small reservoirs with capacities ranging from 10,000 to 300,000 gallons.

WHY DOES THE TRAINEE NEED TO LEARN THIS?

Although Sanuril tablets are slow dissolving they dissolve fairly rapidly when fully immersed in water and results in super chlorination.

WHAT DOES THE TRAINEE NEED TO KNOW BEFORE BEGINNING?

A basic knowledge of chemistry properties of chlorine when dealing with chlorine. Also a knowledge of the importance of treatment by chlorination period.

WHAT EQUIPMENT A SUPPLIES ARE NEEDED?

ITEM	LESSON					
	1	2	3	4	5	6
Floating Chlorinator Unit	x	x			x	x
Hammer (Plastic)	x					x
Note pads + pencils	x	x		x		
A reservoir of water	x					x
Cleaning devise (stick)		x				
Hose clamps (old + new)			x			
Lubricants, Rust Remover			x			
Screw Driver			x			
Pocket air pressure gauge				x		
Sanuril 115 Tablets					x	
Gloves					x	
Thin Rod					x	
Cap						x

WHAT ARE THE OBJECTIVES?

The Trainee will be able to:

1. Withdraw a floating chlorinator from a reservoir and remove the cap from the vertical column.
2. Clear all deposits of precipitate from the vertical column and lower end of unit.
3. Lubricate a hose clamp.
4. Check and record the tube pressure.
5. Reload the unit.
6. Recover and refloat floating chlorinator.

TRAINING/JOB MANUAL

Installation, Operation and
Maintenance of A Floating
Chlorinator

UNIT 2

Maintenance of a Floating
Floating Chlorinator

LESSON 1



WITHDRAWING CHLORINATOR FROM
RESERVOIR AND REMOVING CAP

ESTIMATED TIME

30 minutes.

PREREQUISITES

Unit 1, A knowledge of the
importance of chlorination, and
of the use of basic tools -
Hammer, Screw-driver, and handpump.

PERFORMANCE OBJECTIVE:

- The trainee will be able to:
withdraw unit from reservoir and remove cap.
- Under the following condition:
*given a complete unit with rope attached, a reservoir of
water, a hammer, and a diagram of the tapping sequence.*
- To this standard:
*The unit should not be damaged in any way while
performing this operation.*

TRAINING RESOURCES

L2:IS:01, L1:IS:02.

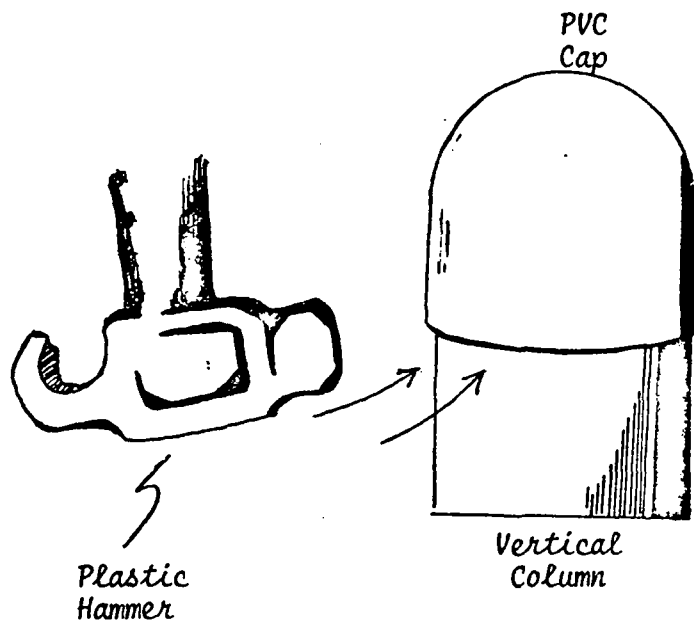
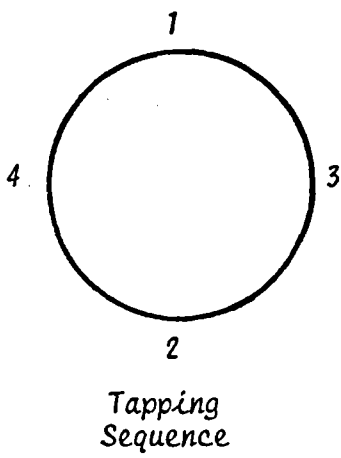
TRAINING ACTIVITIES

TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Explain reasons for withdrawing the unit, outlining all precautions to be taken.	1. Takes notes of precautions to be taken.
2. Give a detailed demonstration of the procedure of withdrawing the unit and removing the cap by tapping sequence.	2a. Observe procedures and make note of tapping sequence. b. Performs steps to withdraw unit and remove cap.

OPERATION BREAKDOWN SHEET

POSITION: CHLORINATION ASSISTANT TASK: Maintaining ChlorinatorOPERATION: Withdrawing Unit from the Reservoir and removing cap

<p>Important STEPS in the operation.</p> <p>STEP: a significant action which advances the operation towards completion.</p>	<p>KEY POINTS: the key to doing the steps correctly, efficiently or accurately.</p>
<p>HOW HE DOES IT (Step)</p>	<p>POINTERS TO BE OBSERVED IN PERFORMING THE STEP</p>
<ol style="list-style-type: none"> 1. <i>the unit out of the Reservoir.</i> 2. <i>Tap the cap upwards until it comes off.</i> 	<ol style="list-style-type: none"> 1. <i>Holding the attached rope, care must be taken not to allow the tube to rub against any rough surfaces which could cause punctures.</i> 2. <i>The cap should be tapped in a gentle manner to prevent damage and in a cross sequence.</i>



REMOVING CAP
FROM VERTICAL COLUMN

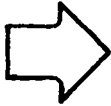
TRAINING/JOB MANUAL

Installation, Operation and
Maintenance of a Floating
Chlorinator

UNIT 2

Maintenance of a Floating
Chlorinator

LESSON 2



CLEANING DEPOSITS OF PRECIPITATES
FROM REDUCER AND COLUMN

ESTIMATED TIME

30 minutes

PREREQUISITES

Lesson 1 and a knowledge of basic
tools - hammer, screw driver, Hand
pump.

PERFORMANCE OBJECTIVE:

- The trainee will be able to:
*clean deposits of precipitate from around the reducer
and vertical column.*
- Under the following condition:
*given a complete unit, water for washing and a stick
designed for cleaning the deposits.*
- To this standard:
*at least 95% of the deposits must be removed to allow
free movement of the tablets.*

TRAINING RESOURCES

L2:IS:01, L2:IS:02, L2:WS:01.

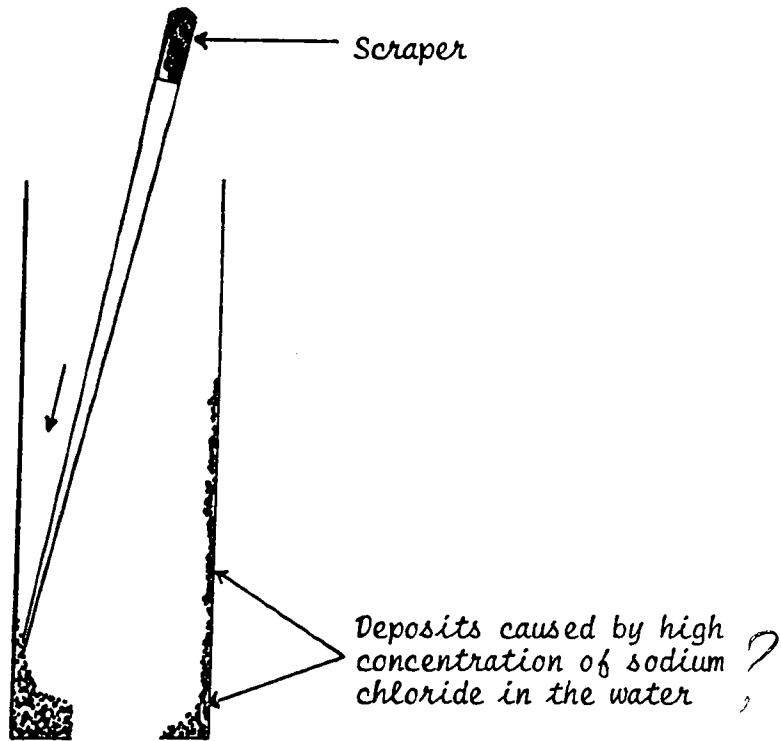
TRAINING ACTIVITIES

TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Explain the cause of precipitate, and its appearance. Also the dangers of precipitate to the functioning unit.	1. Take notes.
2. Distribute handout with pictures of vertical column and indicate the operation of cleaning deposits.	2. Study handouts.

OPERATION BREAKDOWN SHEET

POSITION: CHLORINATION ASSISTANT TASK: Maintains ChlorinatorOPERATION: Cleans all deposits on reducer and column

<p>Important STEPS in the operation.</p> <p>STEP: a significant action which advances the operation towards completion.</p>	<p>KEY POINTS: the key to doing the steps correctly, efficiently or accurately.</p>
<p>HOW HE DOES IT (Step)</p>	<p>POINTERS TO BE OBSERVED IN PERFORMING THE STEP</p>
<ol style="list-style-type: none"> 1. Scrape the inside of the column and reducer with a thin stick. 2. Wash off loose deposits. 	<ol style="list-style-type: none"> 1. Any deposits left will hamper movement of the tablets down the column. 2. This can be done at the reservoir inlet.



CLEANING DEPOSITS
FROM REDUCER & COLUMN

Quiz for Lesson 2 Unit 2

1. Where would lime deposits build up on the unit?
2. What colour are these deposits?
3. How can these deposits be removed?

TRAINING/JOB MANUAL

Installation, Operation and
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LESSON 3



LUBRICATION OF HOSE CLAMP

ESTIMATED TIME

20 minutes.

PREREQUISITES

A knowledge of the operation of a
hose clamp and use of a screw
driver. Use of lubricants.
Lesson 2.

PERFORMANCE OBJECTIVE:

- The trainee will be able to:
lubricate hose clamp.
- Under the following condition:
*given rust remover, screw driver, hose clamp,
grease (lubricant).*
- To this standard:
*the screw section of the clamps should turn with very
little effort from the screw driver.*

TRAINING RESOURCES

L3:IS:01.

TRAINING ACTIVITIES

TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Explain the reason for lubricating hose clamp.	1. Take notes.
2. Outline use of rust remover and methods of application.	2. Take notes.
3. Demonstrate the entire lubricating procedure of a rusty hose clamp.	3. Trainee will be allowed to use lubricants and tools to lubricate their assigned hose clamps.

OPERATION BREAKDOWN SHEET

POSITION: CHLORINATION ASSISTANT TASK: Maintains ChlorinatorOPERATION: Lubricates Hose Clamp

Important STEPS in the operation. STEP: a significant action which advances the operation towards completion.	KEY POINTS: the key to doing the steps correctly, efficiently or accurately.
HOW HE DOES IT (Step)	POINTERS TO BE OBSERVED IN PERFORMING THE STEP
<ol style="list-style-type: none"> 1. Loosen base clamp with a screw driver. 2. Applies rust remover to section of the clamp. 3. Apply a thin film of grease to section. 4. Manipulates (screw) for a while. 5. Retighten clamp. 	<ol style="list-style-type: none"> 1. It may be necessary to apply a lot of pressure when loosening screw. This case must be taken when positioning hands. TURN SCREW ANTICLOCKWISE. 2. Any excess rust must be removed before the unit is refloated. Avoid dropping any such chemicals into the water. 3. Heavy greases take longer to penetrate the threads. 4. The screw should turn quite freely after lubrication. Thus making adjustments easy. Turn screw clockwise and anticlockwise. 5. Turn screw clockwise.

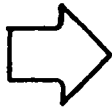
TRAINING/JOB MANUAL

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LESSON 4



CHECKING TUBE PRESSURE

ESTIMATED TIME

15 minutes.

PREREQUISITES

Knowledge of how a tube operates
and Lesson 3.

PERFORMANCE OBJECTIVE:

- The trainee will be able to:
check air pressure in tube.
- Under the following condition:
*given an inflated inner car tube - a pocket pressure
gauge.*
- To this standard:
the pressure in the tube should be at least 10 P.S.I.

TRAINING RESOURCES

L4:IS:01, L4:IS:02.

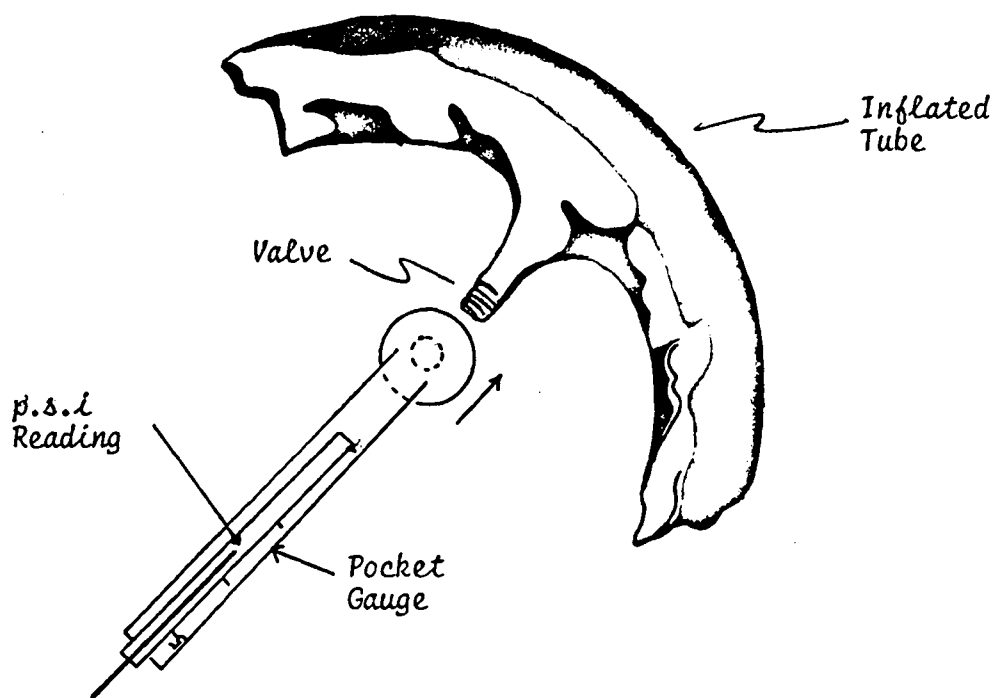
TRAINING ACTIVITIES

TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Explain the use of this operation.	1. Take notes.
2. Distribute handouts.	2. Read handout.
3. Demonstrate removal of valve cap and the attaching and detaching of gauge and zeroing it also.	3. Observe demonstration.
4. Show trainee how pressure is recorded.	4. Trainee will practice attaching and detaching pressure gauge, reading the pressure recorded and zeroing the gauge afterwards.

OPERATION BREAKDOWN SHEET

POSITION: CHLORINATION ASSISTANT TASK: Maintains ChlorinatorOPERATION: Checks Tube Pressure

<p>Important STEPS in the operation.</p> <p>STEP: a significant action which advances the operation towards completion.</p>	<p>KEY POINTS: the key to doing the steps correctly, efficiently or accurately.</p>
<p>HOW HE DOES IT (Step)</p>	<p>POINTERS TO BE OBSERVED IN PERFORMING THE STEP</p>
<ol style="list-style-type: none"> 1. Remove valve cap. 2. Record pressure. 3. Replace valve cap. 	<ol style="list-style-type: none"> 1. TURN ANTICLOCKWISE. Place valve cap in a safe place. 2. Attach gauge then detach and read. If pressure is less than 10 P.S.I. Inflate as necessary. (Use a pocket pressure gauge). 3. SCrew on cap clockwise.



CHECKING TUBE PRESSURE

TRAINING/JOB MANUAL

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LESSON 5



RELOADING UNIT

ESTIMATED TIME

30 minutes.

PREREQUISITES

Lesson 4.

PERFORMANCE OBJECTIVE:

- The trainee will be able to:
drop tablets into column and position them.
- Under the following condition:
given tablets, a complete unit and the thin rod.
- To this standard:
the tablets must lie flat one on each other, in the vertical column (as shown in handout).

TRAINING RESOURCES

L5:IS:01, L5:IS:02.

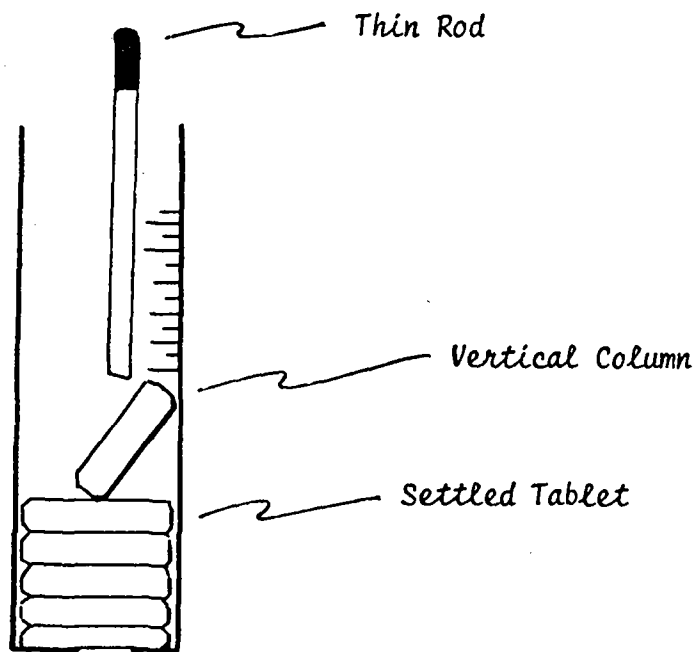
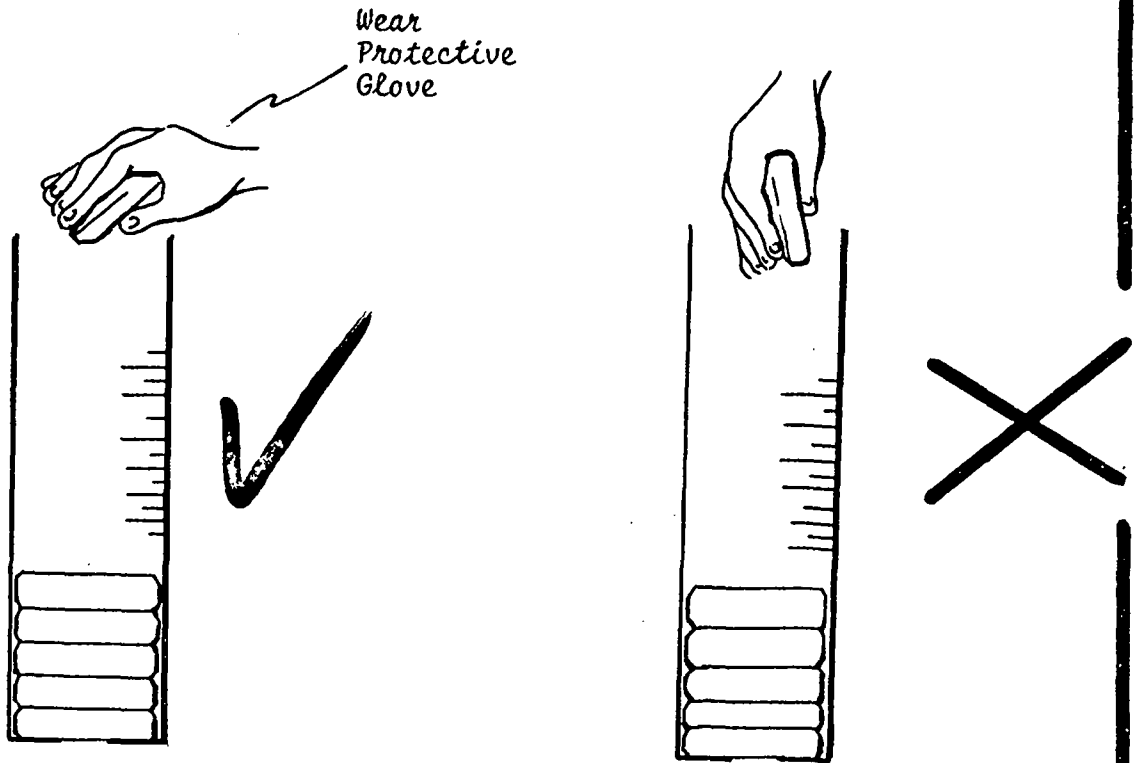
TRAINING ACTIVITIES

TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Distribute handout.	1. Read handout.
2. Explain precautions taken when handling tablets and settling them.	2. Take notes.
3. Demonstrate the procedure.	3. Practice filling the vertical column and settling tablets with thin rod.

OPERATION BREAKDOWN SHEET

POSITION: CHLORINATION ASSISTANT TASK: Maintains ChlorinatorOPERATION: Reloads Unit

<p>Important STEPS in the operation.</p> <p>STEP: a significant action which advances the operation towards completion.</p>	<p>KEY POINTS: the key to doing the steps correctly, efficiently or accurately.</p>
<p>HOW HE DOES IT (Step)</p>	<p>POINTERS TO BE OBSERVED IN PERFORMING THE STEP</p>
<ol style="list-style-type: none"> 1. Drop tablets into vertical column. 2. Settle tablets. 3. Finalise settlement of tablets. 	<ol style="list-style-type: none"> 1. The tablets must lie flat one on the other as shown in diagram. 2. Shake the vertical column until tablets lie flat. 3. Using a thin rod lightly tap tablets into position without causing damage.



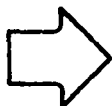
TRAINING/JOB MANUAL

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Chlorinator

LESSON 6



REFLOATS UNIT

ESTIMATED TIME

20 minutes

PREREQUISITES

Lesson 5.

PERFORMANCE OBJECTIVE:

- The trainee will be able to:
cover vertical column and lower unit on to the water surface.
- Under the following condition:
given the complete unit loaded with tablets with rope attached. The cap and plastic hammer.
- To this standard:
the unit must float upright and the cap should be water tight.

TRAINING RESOURCES

L6:IS:01, L6:IS:02.

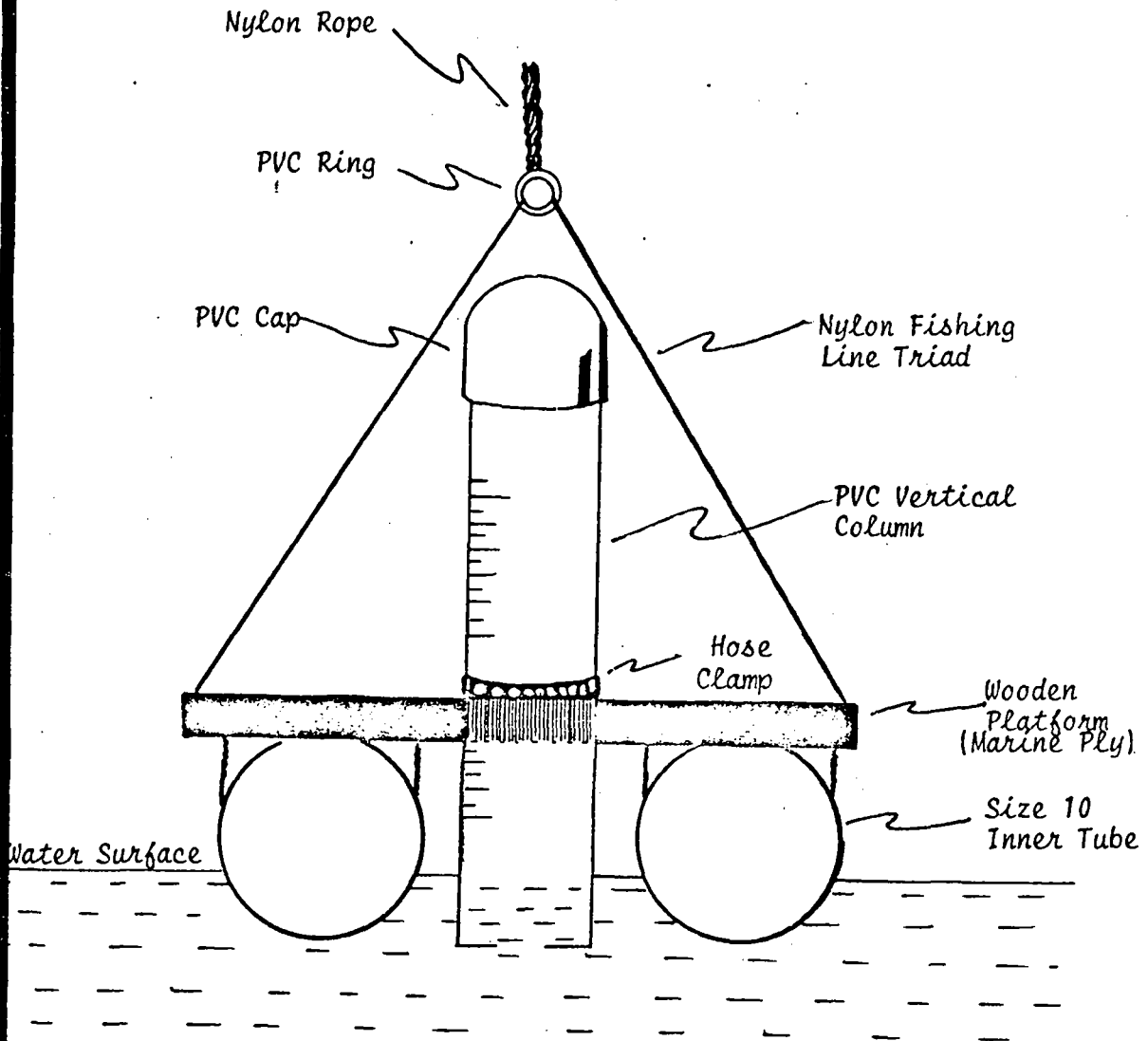
TRAINING ACTIVITIES

TRAINER ACTIVITY	TRAINEE ACTIVITY
1. Distribute handout before going on the reservoir.	1. Read handout.
2. Take trainees on the reservoir with all equipment then demonstrate covering column and infloating the unit.	2 (a) Accompany trainer to the reservoir observe the operation.
	(b) Perform the refloating operation individually.

OPERATION BREAKDOWN SHEET

POSITION: CHLORINATION ASSISTANT TASK: Maintains ChlorinatorOPERATION: Refloats Unit

<p>Important STEPS in the operation.</p> <p>STEP: a significant action which advances the operation towards completion.</p>	<p>KEY POINTS: the key to doing the steps correctly, efficiently or accurately.</p>
<p>HOW HE DOES IT (Step)</p>	<p>POINTERS TO BE OBSERVED IN PERFORMING THE STEP</p>
<ol style="list-style-type: none"> 1. Place cap on top end of column. 2. (Taps) cap downwards with hammer (gently) 3. Lowers unit into the water surface by the rope attached 	<ol style="list-style-type: none"> 1. The cap should be positioned level. 2. Hammering the cap could cause damage to it. 3. The unit must float upright and the other end of the rope must be attached to the reservoir



FLOATING THE CHLORINATOR