Drinking Water Operator Qualification Program

Operator of Groundwater CatchmentStation and Treatment by Addition of Chemicals and Filtration (with or without disinfection)

Job P3b

Apprenticeship and Evaluation Booklet

EQ-5050-02A (11-2005)

August 2004

Emploi-Québec, in collaboration with the *Comité sectoriel de main-d'œuvre de l'Environnement*, has produced this guide in order to describe the skills required to qualify as an Operator of Groundwater Catchment Station and Treatment by Addition of Chemicals and Filtration with disinfection (with or without disinfection) (P3b)

OUR SPECIAL THANKS TO THE SPECIALISTS WHO HELPED DEVELOP THE P3b JOB PROFILE AND LEARNING & ASSESSMENT GUIDE. SINCE THIS BOOKLET WAS PART OF THE P4a AND P3a BOOKLETS, ALL THOSE WHO TOOK PART IN THE DEVELOPMENT OF THESE BOOKLETS ARE ALSO INCLUDED IN THIS LIST

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Note on the protection of personal information

① The information collected in this guide is subject to the *Act respecting access to documents held by public bodies and the protection of personal information*

② The information is being collected for the purposes of administering the Emploi-Québec Drinking Water Operator Qualification Program

③ For any questions regarding access to documents and the protection of personal information, please contact Emploi-Québec

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Introduction

This learning guide is made up of modules for on-the-job training as an Operator of Groundwater Catchment Station and Treatment by Addition of Chemicals (with or without disinfection), Job P3b.

Using this guide, apprentices will learn all about the occupation under the supervision of experienced workers, called journeymen, and gain recognition of their new skills. The journeymen will evaluate their performance at each stage of the apprenticeship and ensure that their skills meet the prescribed standards.

The modules and tasks can be taught in the order deemed most appropriate at any given plant.

Suggestions and explanations on how to use this learning guide are incorporated into the Journeyman's Guide.

Once the apprentice is deemed to have acquired the job skills in question, the journeyman is to sign the Apprenticeship and Evaluation Booklet in certification thereof.

IMPORTANT

Apprentices are responsible for the safekeeping of this guide, as it is the only document recording the details of their apprenticeship.

Certificate of Qualification

Certificates of qualification are issued to those who have mastered the skills required to operate a groundwater Catchment Station and Treatment by Addition of Chemicals (with or without disinfection), Job P3b. They certify that the holder is qualified to practice the occupation.

Certification can be granted once the apprentice has fully mastered all steps of every task in each module and the journeyman has completed an assessment based on the performance indicators in the Guide.

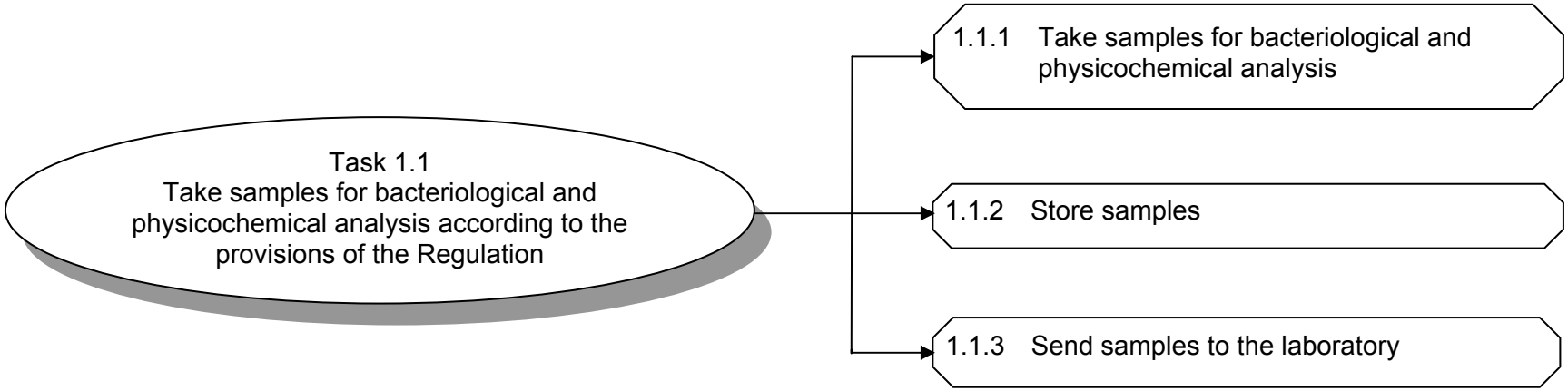
Emploi-Québec issues certificates of qualification to individuals who have mastered the skills set out in this Apprenticeship and Evaluation Booklet.

Two certificates are available:

- Operator of a groundwater Catchment Station and Treatment by Addition of Chemicals with disinfection. (Passed all training modules)
- Operator of a groundwater Catchment Station and Treatment by Addition of Chemicals without disinfection. (Passed training modules 1, 2, 3, 5, 6, 7, 8 and 9)

Module 1
Taking Water Samples

Job Skill:
Take water samples according to the provisions of the Regulation



1. **THE APPRENTICE HAS TAKEN SAMPLES IN THE FOLLOWING SITUATIONS. TICK OR SPECIFY:**

   – Regulatory samples ☐
   – Other _____
   _____
   _____
   _____

2. **COMMENTS OR DETAILS:**

   _____
   _____
   _____
   _____
   _____
   _____

Job Skill: Take water samples according to the provisions of the Regulation

Task 1.1 Take samples for bacteriological and physicochemical analysis according to the provisions of the Regulation		
	Steps	**References & Work Aids**
1.1.1 Take samples for bacteriological and physicochemical analysis		
☐	At each faucet, let the water run for at least five minutes before taking a sample	**T** Sample taking and storing procedures **R** Sampling program
☐	Ensure that the water is not pretreated with a water softener or filter (even at the faucet)	
☐	Take samples according to the sampling and sample conservation method set out in the Regulation	
1.1.2 Store samples		
☐	Explain proper storage and preservation conditions and how quickly the samples must be sent to the laboratory	**T** Sample taking and storing procedures
☐	Store the samples according to the reference materials provided by the Ministère de l'Environnement	
1.1.3 Send samples to the laboratory		
☐	Fill out the test request form(s) according to the established protocol	**R** Test request forms provided by an accredited laboratory
☐	Send the samples to an accredited laboratory by the time and as per the procedures set out in the Regulation	**T** Sample taking and storing procedures

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

We, the undersigned, hereby certify that the Apprentice has mastered Module 1

"Taking Water Samples"

Signature of the Apprentice _____

Signature of the Journeyman _____

Date _____ **Signature of the Employer** _____

Module 2
Chemical Reagents Dosing System

Job Skill:
Operate the chemical reagents dosing system

Task 2.1
Conduct an inspection tour of the chemical reagents dosing equipment

- 2.1.1 Check the condition and adjustment of each piece of dosing equipment
- 2.1.2 Compute and record any noteworthy data concerning operations carried out on the dosing equipment

Task 2.2
Prepare and inject the chemical reagents

- 2.2.1 Determine the desired concentration of chemical reagents
- 2.2.2 Prepare the stock solution
- 2.2.3 Inject the chemical reagents
- 2.2.4 Regenerate the filtering material (greensand, ionic) or proceed with the chemical cleansing of the filtering membrane (if used)

Task 2.3
Check water quality at every step of the treatment

- 2.3.1 Proceed with the quality control of the water at each step of the treatment
- 2.3.2 Adjust dosage as necessary
- 2.3.3 Record all dosing data

1. **THE APPRENTICE HAS WORKED WITH THE FOLLOWING TYPES OF EQUIPMENT AND CHEMICAL REAGENTS. TICK OR SPECIFY:**
   Enter the dosed product and type of equipment in the spaces provided, e.g., sodium carbonate/diaphragm pump

Equipment Products	Dosing Pump	Volumetric Feeder	Saturator Feeder	Injection System (Gas)	Parameter to Be Adjusted
Water softener: sodium carbonate, etc.	/	/	/	/	/
	/	/	/	/	/
Oxidizing agent: chlorine, ozone, etc., potassium permanganate	/	/	/	/	/
	/	/	/	/	/
pH correcting agent: sodium hydroxide, lime, sodium carbonate, sodium bicarbonate, sulfuric acid, etc.	/	/	/	/	/
	/	/	/	/	/
Corrosion inhibitor: orthophosphate, polyphosphate, silicate, etc.	/	/	/	/	/
	/	/	/	/	/
Regeneration products: NaCl, etc.	/	/	/	/	/
	/	/	/	/	/
Other	/	/	/	/	/
	/	/	/	/	/

2. **THE APPRENTICE HAS LEARNED THIS TASK WHILE DOSING FOR THE FOLLOWING:**

   Processes:

   Sequestration ☐
   pH adjustment ☐
   Corrosion reduction ☐
   Regeneration of filtering material ☐
   Chemical cleansing ☐
   Other: _____
   _____
   _____

Job Skill: Operate the chemical reagents dosing system

Task 2.1 Conduct an inspection tour of the chemical reagents dosing equipment		
	Steps	**References & Work Aids**
2.1.1 Check the condition and adjustment of each piece of dosing equipment		
☐	Describe the operation of each piece of chemical reagents dosing equipment in the station	**R** Manufacturer's manual **T** Chemical reagents **T** Chemical reagents dosing equipment
☐	Set calibration curves for each type of dosing systems (drop test) used in the station	**R** Calibration procedure
☐	Inspect each piece of equipment according to the established testing procedure	
☐	Describe the appropriate action needed in case of malfunction or discrepancy in normal values and follow instructions	**R** Manufacturer's manual
☐	Describe the preventive maintenance to be provided for each piece of chemical reagents dosing equipment	
2.1.2 Compute and record any noteworthy data concerning operations carried out on the dosing system		
☐	Compute and record accurately, precisely and legibly the information about the operation of each piece of dosing equipment	**R** Tour report

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

Task 2.2 Prepare and inject the chemical reagents		
	Steps	**References & Work Aids**
2.2.1	**Determine the desired concentration of chemical reagents**	
☐	Describe each of the chemical reagents used	**T** Chemical reagents
☐	Describe the health and safety risks associated with the use of each chemical reagent	**R** Technical spec sheets
☐	Compute the necessary quantities to be mixed to obtain the desired concentration according to needs	**T** Computation guide for stock solution
2.2.2	**Prepare the stock solution**	
☐	Use the necessary protection equipment	**R** OSH regulations
☐	Prepare the stock solution mix according to the established procedure	**T** Computation guide for stock solution **T** Technical spec sheets **R** Manufacturer's manual
2.2.3	**Inject the chemical reagents**	
☐	Compute the required dosage of chemical reagents necessary for the treatment	**T** Dosage computation guide **R** Established procedure (drop test)
☐	Proceed with dosing each of the chemical reagent types	**T** Chemical reagents **R** Manufacturer's manual
2.2.4	**Regenerate the filtering material (greensand, ionic) or proceed with the chemical cleansing of the filtering membrane (if used)**	
☐	Describe the regeneration process for the filtering material or chemical cleansing of the filtering membrane	**R** Manufacturer's manual
☐	Proceed with the regeneration of the filtering material or chemical cleansing of the filtering membrane	

Journeyman's initials:		**Apprentice's initials:**	

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Task 2.3 Check water quality at every step of the treatment		
	Steps	**References & Work Aids**
2.3.1 Proceed with the quality control of the water (pH, alkalinity, etc.) at each step of the treatment		
☐	Describe each step of water quality control in the process	**R** Operator's procedure
☐	Determine the parameters of the water to be controlled according to the process control step	**T** Chemical reagents
☐	Describe the effects of adding the chemical reagents used in the process on the water treatment of the station	
☐	Record in the operating log the results obtained in the control steps	**R** Operating log
2.3.2 Adjust dosage as necessary		
☐	Analyze the samples taken during the various steps of the treatment and compare the results with the operator's objectives	**R** Operator's procedure
☐	Adjust dosage according to the results obtained	**R** Established procedure (drop test)
2.3.3 Record all dosing data		
☐	Provide a detailed, accurate and legible listing of all noteworthy data on the dosage adjustments report	**T** List of noteworthy data **R** Operating log

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W: Work aids provided by the journeyman or trainer

We, the undersigned, hereby certify that the Apprentice has mastered Module 2

"Chemical Reagents Dosing System"

Signature of the Apprentice _____

Signature of the Journeyman _____

Date _____ **Signature of the Employer** _____

Module 3
Groundwater Extraction and Pumping System

Job Skill:
Operate the groundwater extraction and pumping system

Task 3.1
Conduct an inspection tour of groundwater extraction facilities

- 3.1.1 Inspect and verify the integrity of the site, facilities and equipment
- 3.1.2 Inspect and verify groundwater extraction structures (wells, boreholes or galleries)
- 3.1.3 Inspect and verify any raw water storage tanks (open surface or hydropneumatic) and control and measuring instruments

Task 3.2
Conduct an inspection and verification tour of groundwater pumping facilities
.

- 3.2.1 Inspect and verify pumps and any related measuring or control instruments
- 3.2.2 Verify and test pump flow rate or the number of active pumps according to the extraction system's operating capacity and the distribution network's needs
- 3.2.3 Inspect and test valve operation
- 3.2.4 Inspect and test air bleed valve operation

1. THE APPRENTICE HAS WORKED WITH THE FOLLOWING TYPES OF EQUIPMENT. TICK OR SPECIFY:

PUMPS	STORAGE TANKS	VALVES (Main valves in use, e.g., guillotine, pressure release, self-regulating, etc.)	AIR BLEED VALVES
Submersible:	**Open surface:**		
Dry well:	**Hydropneumatic:**		

2. THE APPRENTICE HAS LEARNED TO USE THE FOLLOWING INSTRUMENTS. TICK OR SPECIFY:

- Piezometer ☐
- Flowmeter ☐
- Pressure indicator ☐
- Water level alarm or float ☐
- Water level measuring devices ☐
- Other _____
  _____

3. REMARKS OR DETAILS CONCERNING FACILITIES AND INSTRUMENTS:

_____

_____

_____

_____

Job Skill: Operate the Groundwater Extraction and Pumping System

Task 3.1 Conduct an inspection tour of groundwater extraction facilities		
	Steps	**References & Work Aids**
3.1.1	**Inspect and verify the integrity of the site, facilities and equipment**	
✔	**A- Check the integrity of the groundwater extraction site, facilities and equipment**	
☐	Describe the operation of the groundwater extraction and pumping system	
☐	Locate the groundwater extraction facilities on the network map	**R** Map of network and facilities
☐	Explain the water flow and renewal mode and the protection modes of the groundwater resource	
☐	Define the extraction site protection parameters	**R** Groundwater extraction regulation
☐	Determine the potential contamination risks to the groundwater extraction facilities, list the means to detect them as well as the systematic controls to be applied	**T** Groundwater extraction facilities **R** Groundwater extraction regulation
☐	Describe the inspection tour procedure, including frequency, route and order of verifications	**R** Inspection manual or Tour sheet
☐	Conduct an inspection tour of the site, observe and identify all abnormal or critical situations	
☐	Draw conclusions from the data collected and take any appropriate corrective action	**T** Groundwater extraction facilities
✔	**B- Appropriately assess what corrective measures must be taken to address potential risks**	
☐	Identify abnormalities that may pose a risk, analyze the possible causes, diagnose the problem and take the appropriate corrective measures	**T** Groundwater extraction facilities

Journeyman's initials:		**Apprentice's initials**:	

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T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
3.1.2	**Inspect and verify groundwater extraction structures (wells, boreholes or galleries)**	
✓	**A- Inspect the groundwater extraction structure (well, borehole or gallery)**	
☐	Describe the types of extraction structures and explain how they work	
☐	Locate the extraction structure on the map of groundwater extraction facilities	**R** Map of groundwater extraction facilities
☐	Describe the factors or indications of a structure's deterioration and the consequences of leakage	**T** Groundwater extraction facilities
☐	Visually inspect the extraction structure	
☐	Take readings from all available instruments	**T** Measuring instruments
☐	Take a pumped raw water sample if applicable	**T** Raw water sampling **T** Sample taking and storing procedures
☐	Draw conclusions from the data collected and take any appropriate corrective action	**T** Groundwater extraction facilities
✓	**B- Appropriately assess what corrective measures must be taken to address potential risks**	
☐	Identify abnormalities that may pose a risk, analyze the possible causes, diagnose the problem and take the appropriate corrective measures	**T** Groundwater extraction facilities
✓	**C- Record any noteworthy information on the condition of the extraction structure**	
☐	Provide a detailed, accurate and legible listing of all noteworthy data on the condition of the extraction structure	**T** Groundwater extraction facilities **R** Daily log or Tour report

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

	Steps	References & Work Aids
3.1.3	**Inspect and examine any raw water storage tanks (open surface or hydropneumatic) and control and measuring instruments**	
✔	**A- Verify that water storage tanks meet the prescribed standards**	
☐	Locate water storage tanks on the map of groundwater extraction facilities	**R** Map of groundwater extraction facilities
☐	Identify the possible causes of physical deterioration of the raw water storage tanks and explain the potential risk of contamination and its effect on water quality	**T** Storage tanks
☐	Check the physical integrity of storage tanks, draw conclusions from the data collected and take any appropriate corrective action according to the established procedure	**T** Storage tanks **R** OHS confined spaces regulation
☐	Make a list of used measuring and control instruments and explain their role in the whole drinking water production process	**T** Measuring Instruments
☐	Periodically ensure that measuring and control instruments are working properly and take any appropriate corrective action	**R** Manufacturer's manual
☐	Take readings from measuring and control instruments in raw water storage tanks and verify that the results are within established critical water levels	**T** Measuring Instruments
☐	Adjust flow rate accordingly	
✔	**B- Appropriately assess what corrective measures must be taken to address potential risks**	
☐	Identify abnormalities that may pose a risk, analyze the possible causes, diagnose the problem and take the appropriate corrective measures as per established procedures	**T** Storage tanks
✔	**C- Record any noteworthy information on the raw water storage tanks**	
☐	Provide a detailed, accurate and legible listing of all noteworthy data on water levels in the raw water storage tanks	**R** Daily log or Tour report

Journeyman's initials:		**Apprentice's initials:**	

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T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

Task 3.2 Conduct an inspection and verification tour of groundwater pumping facilities		
	Steps	**References & Work Aids**
3.2.1	**Inspect and verify pumps and any related measuring or control instruments**	
✓	**A- Check the pumps**	
☐	Locate the groundwater pumping facilities on the network map	**R** Map of distribution network **R** Map of groundwater pumping facilities
☐	Describe the types of pumps and their main components	
☐	Explain normal pump operation (capacity and range of operation) and the consequences of malfunction	
☐	Identify the measuring and control instruments associated with the pumps and explain their basic operating principles	**T** Measuring Instruments
☐	Take readings from measuring and control instruments and compare the results with reference values to verify that they are working properly	**R** Manufacturer's manual (pump curve)
☐	Evaluate the production and electromechanical process parameters for each pump	**T** Raw water extraction pumps **R** Manufacturer's manual
☐	Assess pump operation based on process parameters and take any corrective measures required according to established procedures	
✓	**B- Appropriately assess what preventive and corrective measures must be taken to ensure the pumps operate properly**	
☐	Describe the preventive maintenance needed to identify potential problems with the extraction pumps	**W** Maintenance chart (Module 3) **R** Manufacturer's manual
☐	Identify potential pump malfunctions, explain the possible causes, diagnose the problem and take the appropriate corrective measures	**T** Raw water extraction pumps **R** Manufacturer's manual
✓	**C- Record any noteworthy information on pump operating parameters**	
☐	Provide a detailed, accurate and legible listing of all noteworthy data on pump operations	**R** Daily log or Tour report **T** Raw water extraction pumps

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T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
3.2.2	**Verify and test pump flow rate or the number of active pumps according to the extraction system's operating capacity and the distribution network's needs**	
✓	**A- Verify the output and pressure of the raw water pumping units**	
☐	Describe the extraction system's operating capacity and the flow rate needed to meet the distribution network's needs	
☐	Explain the consequences of a raw water pumping facility malfunction	
☐	Either onsite or by remote sensing, identify which pumps are active and which are inactive	**R** Map of network and map of groundwater pumping facilities
☐	Assess the flow rate and pressure according to the extraction system's operating capacity and the distribution network's needs	**T** System of units
☐	Verify whether the number of active pumps is sufficient to meet the extraction system's operating capacity and the distribution network's needs	
☐	Verify that pumps can be activated and de-activated to meet the extraction system's operating capacity and the distribution network's needs	
☐	Draw conclusions from the data collected, analyze the effect on drinking water production volumes and take any corrective measures required	**T** Raw water extraction pumps
✓	**B- Appropriately assess what corrective measures must be taken to address situations affecting pump flow rate**	
☐	Identify potential problems that may affect drinking water production volumes, explain the possible causes, diagnose the problem and take the appropriate corrective action	**T** Raw water extraction pumps
✓	**C- Record any noteworthy information on pump operating capacity**	
☐	Provide a detailed, accurate and legible listing of all noteworthy data on pump operating capacity	**R** Daily log or Tour report **T** Raw water extraction pumps

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

	Steps	References & Work Aids
3.2.3	**Inspect and test valve operation**	
✔	**A- Check valve operation**	
☐	Locate groundwater pumping system valves on the map of the distribution network	**R** Map of distribution network
☐	Describe how valve-related devices work and explain the optimum operating conditions	**T** Valves **R** Manufacturers' manuals
☐	Ascertain that the valves are properly positioned for the pressure and flow rate requirements at time of inspection	
☐	Examine the condition of the valves (maneuverability, pressure required, seal, noise)	
☐	Verify and adjust self-regulating valves, if any, to obtain the required pressure or flow rate	
☐	Draw conclusions from the data collected, assess possible consequences and take any corrective measures required	**T** Valves
✔	**B- Appropriately assess what preventive and corrective measures must be taken to ensure proper valve operation**	
☐	Describe the preventive maintenance needed to identify potential problems with the valves	**W** Maintenance chart (Module 3) **R** Manufacturer's manual
☐	Identify valve malfunctions that may affect drinking water production volumes, explain the possible causes, diagnose the problem and take the appropriate corrective measures	**T** Valves

Journeyman's initials:		**Apprentice's initials:**	

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T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

	Steps	References & Work Aids
3.2.4	**Inspect and test air bleed valve operation, if applicable**	
✓	**A- Verify that air bleed valves are working properly**	
☐	Locate air bleed valves on the map of groundwater pumping facilities	**R** Map of groundwater facilities
☐	Explain how air bleed valves work and describe their role in the process	
☐	Explain how the presence of air affects pumps and pipes	
☐	Describe the annual preventive maintenance required to eliminate potential air bleed valve problems	
☐	Record any noteworthy information after inspecting air bleed valves	**R** Tour report

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

We, the undersigned, hereby certify that the Apprentice has mastered Module 3

"Groundwater Extraction and Pumping System"

Signature of the Apprentice _____

Signature of the Journeyman _____

Date _____ **Signature of the Employer** _____

Module 4

Disinfection Systems

Job Skill:
Operate one or more disinfection systems (using sodium or calcium hypochlorites, chlorine gas or ozone, if applicable)

4 A - Sodium or Calcium Hypochlorite Disinfection System (if applicable)

4 B - Chlorine Gas Disinfection System (if applicable)

4 C – Ozone Disinfection System (if applicable)

1. THE APPRENTICE HAS WORKED WITH THE FOLLOWING DISINFECTION SYSTEMS:

	MAJOR EQUIPMENT
4. A Hypochlorites - **Sodium** ☐ - **Calcium** ☐	
4. B Chlorine gas ☐	
4. C Ozone ☐	

2. THE APPRENTICE HAS LEARNED TO USE THE FOLLOWING INSTRUMENTS:

Compulsory according to the Regulation (with disinfection):

- ◊ Integrated chlorine analyzer ☐
- ◊ pH meter ☐
- ◊ Flowmeter ☐
- ◊ Thermometer ☐
- ◊ Scale ☐
- ◊ Rotameter ☐
- ◊ Residual ozone analyzer ☐
- ◊ Dew point analyzer ☐
- ◊ Pressure indicator ☐

Other _____

_____

_____

Note**:** All measuring instruments used must comply with the requirements indicated in the reference book titled “Standard Methods for Examination of Water and Wastewater”

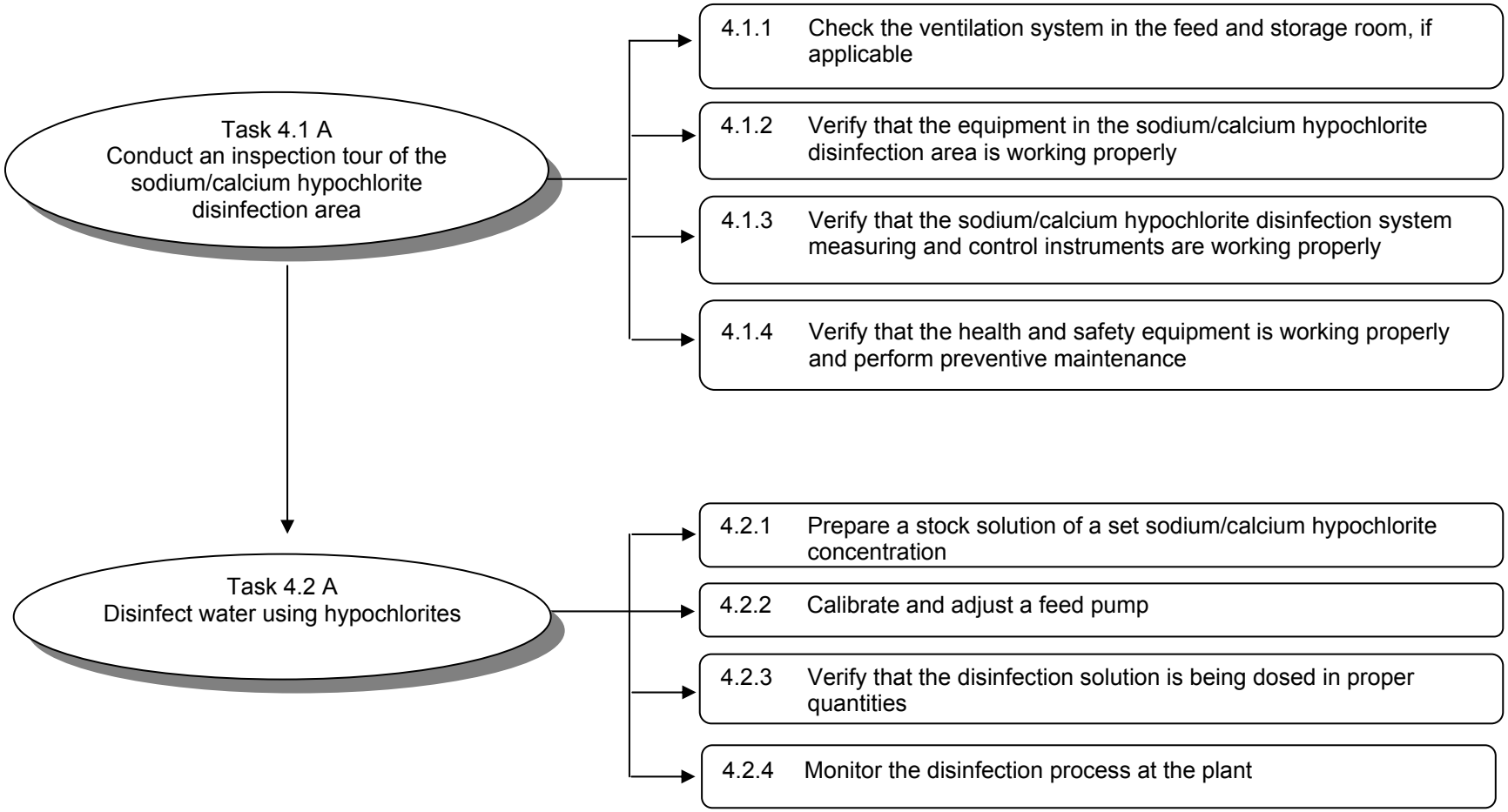
3. COMMENTS OR DETAILS:

_____

_____

_____

4. A- Sodium or Calcium Hypochlorite Disinfection System (if applicable)



4. A - Sodium or Calcium Hypochlorite Disinfection System

Task 4.1 A Conduct an inspection tour of the sodium/calcium hypochlorite disinfection area			
Steps		**References & Work Aids**	
4.1.1 Check the ventilation system in the feed and storage room, if applicable			
☐	Describe the risks related to improper ventilation in feed and storage areas	**R**	OSH regulations
☐	Ensure that the ventilator is working properly and that the feed and storage room is well aerated	**R** **R**	Manufacturer's manual OSH regulations
☐	Describe the preventive maintenance needed to identify potential problems with the ventilation system	**W** **R**	Maintenance chart (Module 4) Manufacturer's manual
Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

	Steps	References & Work Aids
4.1.2	**Verify that the equipment in the sodium/calcium hypochlorite disinfection area is working properly**	
✓	**A. Ensure that the equipment is working properly**	
☐	Locate the chlorination equipment on the map of the station	**R** Map of station
☐	Give a general explanation of how the equipment works	
☐	Check the physical integrity of the hypochlorite solution storage tanks (e.g., salt deposits)	
☐	Verify the hypochlorite level in the disinfection section storage tanks	
☐	Find the number of active pumps, assess their operational level and flush them as required	
☐	Find the active valves and measure and check their percentage of opening	
☐	Inspect the release valve and pipes and verify that the full dosage of hypochlorite solution is injected into the water to be treated	
☐	Identify potential malfunctions and take the appropriate corrective measures	**W** Hypochlorite disinfection equipment **R** Manufacturer's manual
☐	Describe the preventive maintenance to be provided on the disinfection equipment	**W** Maintenance chart (Module 4) **R** Manufacturer's manual
✓	**B. Record any noteworthy information on disinfection equipment**	
☐	Provide a detailed, accurate and legible listing of all operating parameters of the disinfection equipment examined	**W** Hypochlorite disinfection equipment **R** Operating report

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
4.1.3 Verify that the sodium/calcium hypochlorite disinfection system measuring and control instruments are working properly		
☐	Describe each of the measuring and control instruments used (integrated and portable chlorine analyzers, pH meter, flowmeter, etc.) and check their operation according to the manufacturer's instructions	**W** Measuring instruments
☐	Describe malfunctions and appropriate measures	**R** Manufacturer's manual
☐	Carry out a reliability test on an integrated and on a portable chlorine analyzer	
☐	Calibrate the integrated chlorine analyzer according to the manufacturer's instructions	
☐	Calibrate the pH meter according to the manufacturer's instructions	
☐	Describe the preventive maintenance required for the chlorine analyzers and pH meter	**R** Manufacturer's manual **W** Maintenance chart (Module 4)

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
4.1.4	**Verify that the health and safety equipment is working properly and perform preventive maintenance**	
☐	Check the operation and accessibility of all required health and safety equipment: shower, eyewash, safety goggles, self-contained breathing apparatus, extinguisher, apron, etc.	**R** Health and safety procedures in effect (handling drinking water treatment equipment, facilities and products)
☐	Describe the preventive maintenance needed for health and safety equipment	**W** Maintenance chart (Module 4)

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

Task 4.2 A Disinfect water using hypochlorites			
	Steps	**References & Work Aids**	
4.2.1 Prepare a stock solution of a set sodium/calcium hypochlorite concentration			
☐	Describe the risks associated with handling a hypochlorite solution and the required safety conditions (wearing gloves, goggles, apron, etc.)	**R** WHMIS, OSH regulations	
☐	Periodically drain and clean the disinfection solution tank		
☐	Compute the amount of disinfectant required to reach the desired concentration level and meet the network's needs	**T** Calculating effective dosage	
☐	Prepare the hypochlorite stock solution from a concentrated hypochlorite solution according to the disinfection procedure		
Journeyman's initials:		**Apprentice's initials:**	
4.2.2 Calibrate and adjust a feed pump			
☐	Identify the type of pump and its mode of operation (variable or single speed, presence of needle valve, instrument loop, types of controls, etc.)	**R** Manufacturer's manual	
☐	Calibrate the pump for various operating range levels		
☐	Determine the proper disinfectant solution flow rate	**T** Calculating effective dosage	
☐	Identify the optimum working capacity of each type of pump and adjust it accordingly	**R** Manufacturer's manual	
☐	Following calibration or adjustment, verify that the hypochlorite dosage is as required		
Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
4.2.3	**Verify that the disinfection solution is being dosed in proper quantities**	
✔	**A. Check dosage of disinfectant solution in compliance with the standard set out in the Regulation in effect**	
☐	Describe the effects of the chlorine water solution on microorganisms	
☐	Describe the effects and consequences of nitrogenous and organic matter on water chlorination	
☐	Describe the impact of pH, temperature and contact time on the disinfecting action of chlorine	
☐	Verify and adjust the disinfectant solution to ensure that standards are being met (amount of free residual chlorine leaving the station)	**R** Regulation respecting the quality of drinking water **T** Calculating effective dosage
☐	Verify the quality of the chlorine provided (e.g., agreement with supplier, test when in doubt)	
☐	Describe possible dosing equipment malfunctions and appropriate corrective action	**W** Hypochlorite disinfection equipment
✔	**B. Record any noteworthy information on dosage**	
☐	Provide a detailed, accurate and legible listing of all noteworthy data on dosage	**W** Hypochlorite disinfection equipment **R** Operating report

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

Important: Additional and mandatory task accomplished when using disinfection process with sodium or calcium hypochlorite and chlorine gas

4.2.4 Monitor the disinfection process at the plant.		
	Steps	**References & Work Aids**
✔	**A- Determine the residual chlorine concentration in water leaving the treatment plant, as per the frequency required**	
☐	Take a sample of drinking water and measure the concentration of residual chlorine using the appropriate instruments and prescribed methods	**R** Regulation respecting the quality of drinking water
☐	Compare the free residual chlorine levels with the distribution network's water quality objectives	
☐	In the case of noncompliance, adjust and fine-tune the dosage to obtain the chlorine concentrations required to meet the distribution network's quality standards	**R** Regulation respecting the quality of drinking water
☐	Provide a detailed, accurate, and legible listing of all required information at the frequency set out in the Regulation	**R** Official Register **R** Regulation respecting the quality of drinking water
☐	Verify whether the register has been kept up as per the Regulation	
✔	**B- Measure the pH level and temperature of water leaving the treatment plant, as per the frequency required**	
☐	Take a sample of drinking water as per the prescribed procedures and frequency and test its pH level and temperature	**R** Regulation respecting the quality of drinking water
☐	Compare pH readings with the prescribed standards	
☐	Explain and, if required, take any remedial action if levels exceed the standards	
☐	Provide a detailed, accurate, and legible listing of all required information at the frequency set out in the Regulation	**R** Official Register **R** Regulation respecting the quality of drinking water
☐	Verify whether the register has been kept up as per the Regulation	

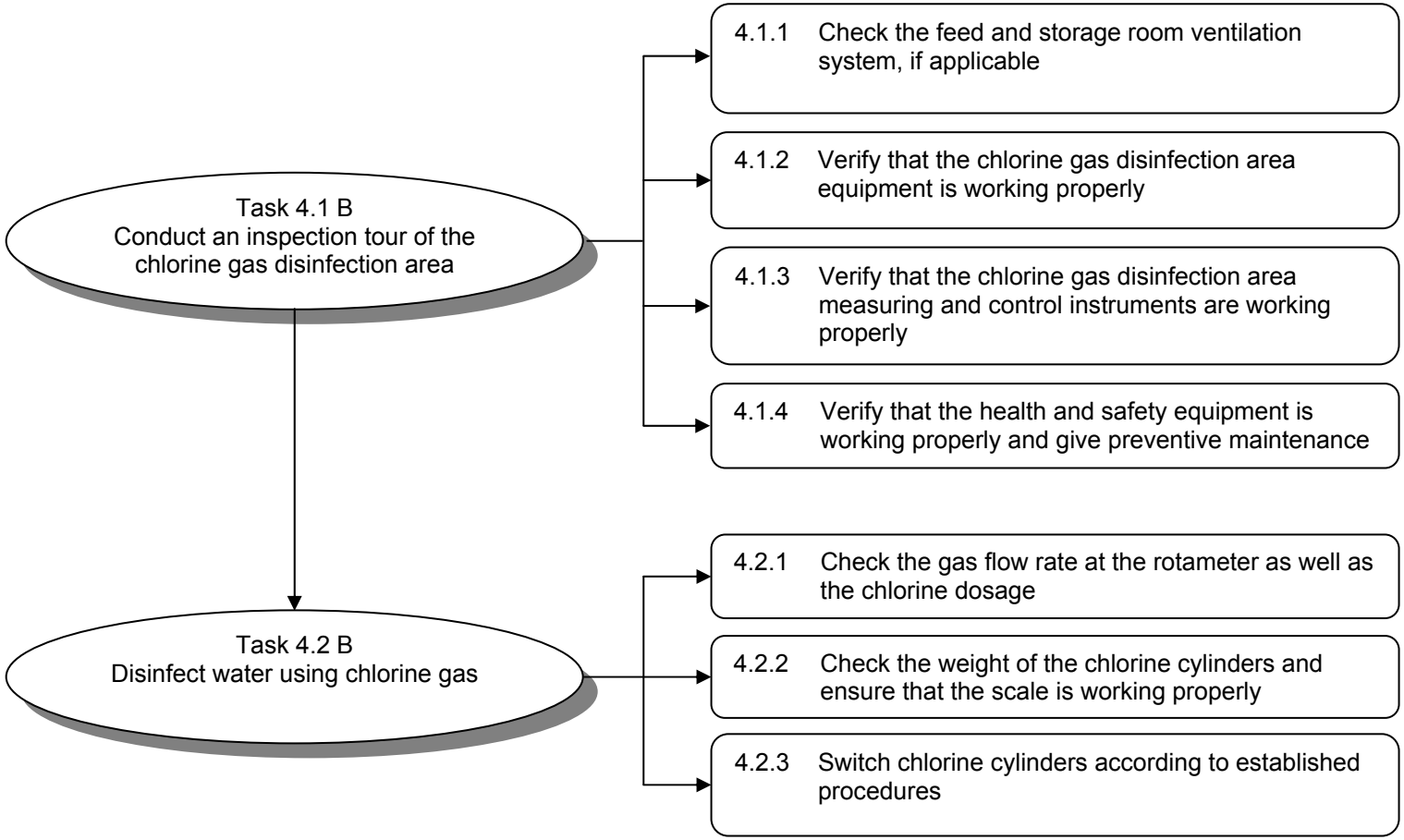
Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided during the prerequisite training**

W: **Work aids provided by the journeyman or trainer**

4. B- Chlorine Gas Disinfection System (if applicable)



4. B - Chlorine Gas Disinfection System

Task 4.1 B Conduct an inspection tour of the chlorine gas disinfection area		
	Steps	**References & Work Aids**
4.1.1 Check the feed and storage room ventilation system, if applicable		
☐	Describe the risks associated with poor aeration in feed and storage rooms	**R** OSH regulations
☐	Ensure that the ventilator is working properly and that the feed and storage room is well aerated	**R** Manufacturer's manual **R** OSH regulations
☐	Describe the preventive maintenance needed to identify potential problems with the ventilation system	**W** Maintenance chart (Module 4) **R** Manufacturer's manual

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

	Steps	References & Work Aids
4.1.2	**Verify that the chlorine gas disinfection area equipment is working properly**	
✔	**A. Verify the gas cylinder switchover operation**	
☐	Test the switchover operation as specified by the manufacturer and as per existing procedures	**R** Manufacturer's manual
☐	Identify any possible malfunction, analyze the causes and indicate the appropriate corrective measures	
✔	**B. Check the chlorine gas leak detector and the chlorine regulating vent**	
☐	Describe how the chlorine gas leak detector, regulator vent and related equipment work	**R** Manufacturer's manual
☐	Use detection procedures to periodically verify that the system reacts to the presence of chlorine gas	**R** OSH regulations
☐	Verify that the vacuum regulator vent and associated equipment do not emit chlorine into the air	
☐	Describe possible malfunctions and appropriate corrective action	**R** WHMIS and OSH regulations **R** Manufacturer's manual (leak procedure)
✔	**C. Verify the chlorine injection system**	
☐	Describe how the chlorine gas injector works	**R** Manufacturer's manual
☐	Check the chlorine injection system and related equipment (e.g., venturi, pressurization pump)	
☐	Check for malfunction and take any remedial action necessary	

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
4.1.3	**Verify that the chlorine gas disinfection system measuring and control instruments are working properly**	
☐	Describe each of the measuring and control instruments used (integrated and portable chlorine analyzers, pH meter, flowmeter, etc.) and check their operation according to the manufacturer's instructions	**W** Measuring instruments
☐	Describe malfunctions and appropriate measures	**R** Manufacturer's manual
☐	Carry out a reliability test on an integrated and on a portable chlorine analyzer	
☐	Calibrate the integrated chlorine analyzer according to the manufacturer's instructions	
☐	Calibrate the pH meter according to the manufacturer's instructions	
☐	Describe the preventive maintenance required for chlorine analyzers and the pH meter	**R** Manufacturer's manual **W** Maintenance chart (Module 4)

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

	Steps	References & Work Aids
4.1.4	**Verify that the health and safety equipment is working properly and give preventive maintenance**	
☐	Check the operation and accessibility of all required health and safety equipment: shower, eyewash, safety goggles, self-contained breathing apparatus, extinguisher, apron, etc.	**R** Health and safety procedures in effect (handling drinking water treatment equipment, facilities and products)
☐	Describe the preventive maintenance needed for health and safety equipment	**W** Maintenance chart (Module 4)

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

Task 4.2 B Disinfect water using chlorine gas		
	Steps	**References & Work Aids**
4.2.1 Check the gas flow rate at the rotameter as well as the chlorine dosage		
☐	Take readings of the gas flow rate	
☐	Verify and calibrate the gas flow rate to ensure proper dosage	**R** Manufacturer's manual
☐	Inspect the bottom of the cylinders for signs of frost	
☐	Calculate the amount of gas remaining and the number of cylinders in stock	
☐	Check for possible malfunctions and take any remedial action necessary	**R** Manufacturer's manual
☐	Describe the preventive maintenance needed for the rotameter	**W** Maintenance chart (Module 4) **R** Manufacturer's manual
☐	Provide a detailed, accurate and legible listing of dosage values attained	**R** Daily log or Tour report **W** Chlorine gas disinfection equipment
4.2.2 Check the weight of the chlorine cylinders and ensure that the scale is working properly		
☐	Ensure that the scale is working properly	**R** Manufacturer's manual
☐	Check the weight of the cylinders to determine how much chlorine has been used	
☐	Describe malfunctions and remedial measures	
☐	Describe the preventive maintenance needed to identify potential problems with the scale	**W** Maintenance chart (Module 4) **R** Manufacturer's manual
☐	Provide a detailed, accurate and legible listing of the weight measurements taken	**R** Daily log or Tour report **W** Chlorine gas disinfection equipment

	Steps	References & Work Aids
4.2.3	**Switch chlorine cylinders according to established procedures**	
☐	Describe the risks associated with handling chlorine gas and the required safety conditions (wearing gloves, goggles, apron, etc.)	**R** WHMIS, OSH, emergency measures plan
☐	Handle cylinders using the tools and accessories indicated in the manufacturer's instructions and safety regulations	**R** Manufacturer's manual **R** Safety regulations (WHMIS, OSH)
☐	Describe possible malfunctions and appropriate action	

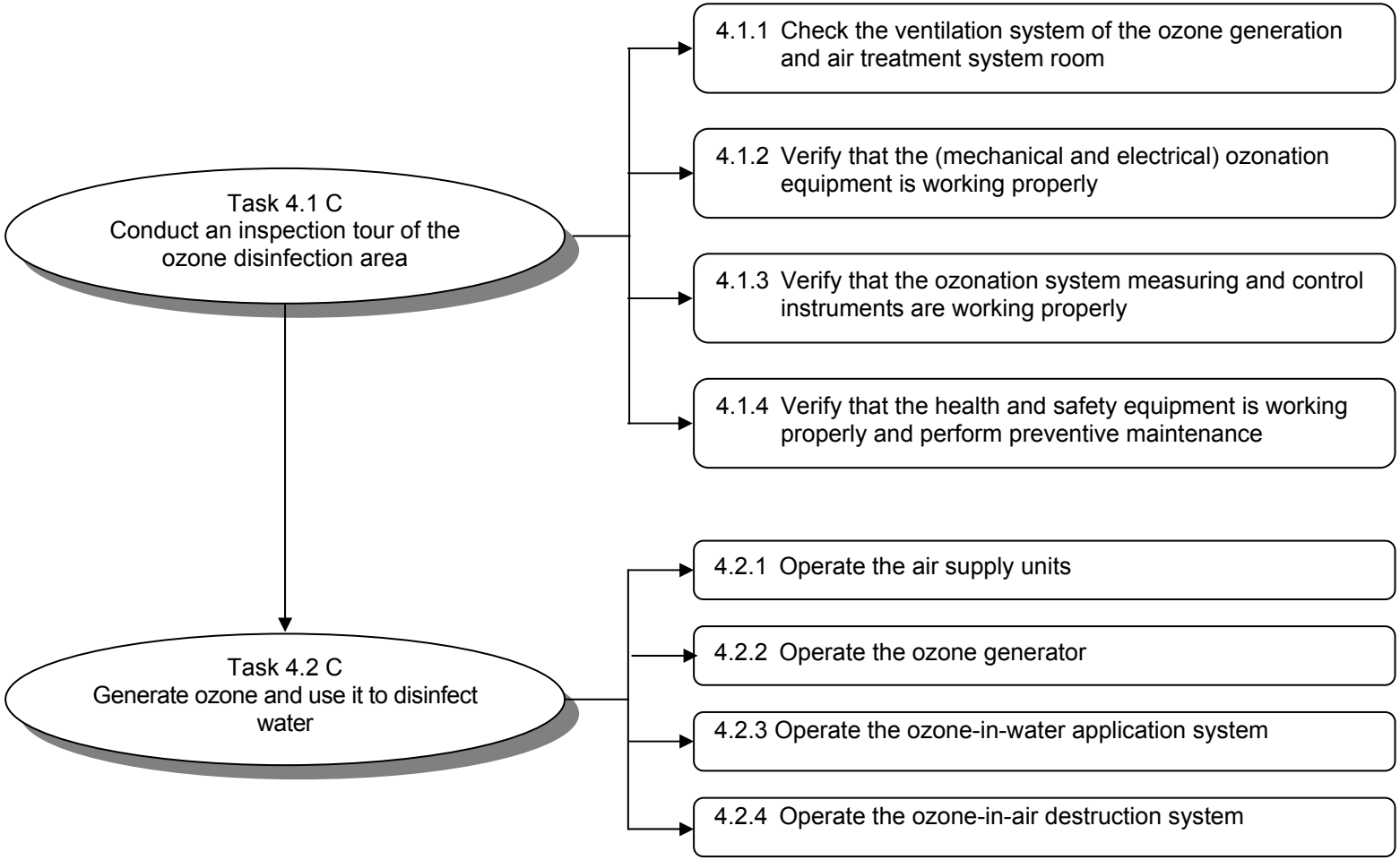
Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

4 C- Ozone Disinfection System (if applicable)



4 C - Ozone Disinfection System

Task 4.1 C Conduct an inspection tour of the ozone disinfection area		
	Steps	**References & Work Aids**
4.1.1 Check the ventilation system of the ozone generation and air treatment system room		
☐	Describe the risks related to improper ventilation or temperature in the ozone generation and air treatment system room	**R** OSH regulations
☐	Ensure that the ventilator is working properly and that the ozone generation and air treatment system room is well aerated	**R** Manufacturer's manual **R** OSH regulations
☐	Describe the preventive maintenance needed to identify potential problems with the ventilation system	

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

4.1.2 Check the operation of the (mechanical and electrical) ozonation equipment		
✔	**A. Check the mechanical and electrical ozonation equipment**	
☐	Describe each piece of ozonation system equipment and its role in the disinfection process	**R** Map of station
☐	Give a general explanation of how each piece of ozonation equipment works	**R** Manufacturer's and user's manual **R** Tour report **R** Production chart
☐	Check the physical integrity of the ozone generator	
☐	Check residual ozone concentration in the storage tanks	
☐	Check the operating parameters of each piece of ozonation equipment according to the established procedure	
☐	Describe possible malfunctions for each piece of ozonation and ozone destruction system equipment and appropriate corrective actions	
☐	Describe the preventive maintenance needed for each piece of ozonation and ozone destruction equipment	
✔	**B. Record any noteworthy information on the ozonation system equipment**	
☐	Provide a detailed, accurate and legible listing of all operating parameters of the ozonation system equipment	**R** Tour report

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
4.1.3	**Check the operation of the ozonation system measuring and control instruments (temperature and pressure sensors, detectors, analyzers, etc.)**	
☐	Make a list of each of the measuring and control instruments used and describe their role in the ozonation system	
☐	Describe the normal operating conditions of each measuring and control instrument	**R** Manufacturer's and user's manual
☐	Check the operating condition of each measuring and control instrument according to established procedures	
☐	Compare the values obtained to the reference values set for proper operation and describe appropriate measures needed in case of malfunction	
☐	Calibrate the measuring and control instruments	
☐	Describe the preventive maintenance for each of the measuring and control instruments used in the ozonation system	

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
4.1.4	**Check the operation of the health and safety equipment and provide preventive maintenance**	
✔	**A. Check the ozone leak detector**	
☐	Indicate the limits of ozone concentration in the air to which a worker may be exposed	**R** WHMIS regulations
☐	Describe the operation of the ozone leak detector, regulating vent and associated equipment	
☐	Make sure the system reacts to the presence of ozone according to the detection methods	**R** Manufacturer's manual
☐	Measure residual ozone concentration in the air	**R** OSH regulations
☐	Describe possible malfunctions and take any appropriate corrective action	**R** WHMIS and OSH regulations **R** Manufacturer's manual (leak procedure)
✔	**B. Proceed with health and safety equipment operational tests according to the established procedure**	
☐	Check the operation and accessibility of all required health and safety equipment	**R** Health and safety procedures in effect (handling drinking water treatment equipment, facilities and products)
☐	Describe the preventive maintenance needed for health and safety equipment	**W** Maintenance chart (Module 4)

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

Task 4.2 C Generate ozone and use it to disinfect water			
	Steps	**References & Work Aids**	
4.2.1 Operate the air supply units			
☐	Describe the operation of the ozone generators' air supply units and their role in the process		
☐	Describe the risks associated with the use of liquid oxygen	**R** WHMIS regulations	
☐	Describe the normal operating conditions of air supply units	**R** Manufacturer's manual	
☐	Operate the liquid oxygen supply system according to the manufacturer's recommendations		
☐	Measure and adjust the operating parameters of the air supply units as needed		
Journeyman's initials:		**Apprentice's initials:**	
4.2.2 Operate the ozone generator			
☐	Describe the operation of the ozone generator and its role in the process		
☐	Describe the risks associated with the operation of the ozone generator	**R** WHMIS regulations	
☐	Describe the normal operating conditions of the ozone generator	**R** Operation manual	
☐	Operate the power equipment according to the manufacturer's recommendations	**R** Manufacturer's manual	
☐	Adjust the voltage according to the desired residual		
☐	Adjust the air or liquid oxygen flow rate, temperature and pressure		
☐	Adjust the cooling water flow rate		
☐	Check the concentration of the ozone produced, if applicable		
☐	Check the ozone transfer efficiency in water		
Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

4.2.3	Operate the ozone-in-water application system	
✓	**A. Check ozone dosage in compliance with the standard provided by the Regulation in effect**	
☐	Describe the effects of ozone-in-water on microorganisms	
☐	Describe the operation of the ozone-in-water application system and explain its role in the process	**R** WHMIS regulations
☐	Describe the effect of temperature and contact time on the disinfecting action of ozone	**R** Manufacturer's manual
☐	Check and adjust ozone dosage to guarantee that disinfection objectives are met	**R** Regulation respecting the quality of drinking water
☐	Operate the ozone application equipment according to the manufacturer's recommendations	**R** Manufacturer's manual
☐	Describe the possible malfunctions of the ozone application equipment and identify appropriate corrective action	
✓	**B. Record any noteworthy information on dosage**	
☐	Provide a detailed, accurate and legible listing of all noteworthy data on ozone-in-water dosage	**R** Operating report

Journeyman's initials:		**Apprentice's initials:**	

4.2.4	Operate the ozone-in-air destruction system	
☐	Describe the ozone to oxygen decomposition process	
☐	Identify the ozone concentration limits at the vent	**R** WHMIS regulations
☐	Operate the equipment according to the manufacturer's recommendations	**R** Manufacturer's manual
☐	Check, if applicable, the residual ozone concentration at the effluent of the destructor	

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

We, the undersigned, hereby certify that the Apprentice has mastered Module 4

"Disinfection Systems"

Signature of the Apprentice _____

Signature of the Journeyman _____

Date _____ **Signature of the Employer** _____

Module 5
Filtration and Cleaning Systems

Job Skill:
Operate the filtration and cleaning systems

Task 5.1
Conduct an inspection tour of the filtration and cleaning facilities and equipment

- 5.1.1 Check and control the operational condition of the facilities and mechanical or electrical equipment
- 5.1.2 Check and control the operational condition of the measuring and control instruments
- 5.1.3 Record any noteworthy information on the operation of the facilities and filtration and cleaning equipment

Task 5.2
Check and control the station's filtration and cleaning processes

- 5.2.1 Check and control the filtration quality parameters
- 5.2.2 Clean the filters or filtering membrane
- 5.2.3 Take the water samples necessary to control the treatment
- 5.2.4 Record any noteworthy information on the filtration and cleaning processes

1. THE APPRENTICE HAS WORKED WITH THE FOLLOWING DISINFECTION SYSTEMS:

◊ Types of filtration processes:

A. Oxidation – Filtration

Filter: ☐

Greensand, with or without anthracites ☐

Sand, with or without anthracites ☐

Other: _____ ☐

_____ ☐

_____ ☐

B. Ion exchange:

With ionic resins ☐

Other: _____

_____

_____

C. Membrane filtration ☐

◊ Equipment:

Actuator ☐

Air injector ☐

Booster ☐

Cleaning pump ☐

Compressor ☐

Other: _____

_____

_____

◊ Types of cleaning:

Water ☐

Air and water ☐

2. THE APPRENTICE HAS LEARNED TO USE THE FOLLOWING INSTRUMENTS:

- Pressure differential ☐
- Flowmeter ☐
- Pressure indicator ☐
- Loss-of-head gauge ☐
- $KMnO_4$ residual analyzer ☐

Other _____

_____

_____

3. COMMENTS OR DETAILS:

_____

_____

_____

Job Skill: Operate the filtration and cleaning systems

Task 5.1 Conduct an inspection tour of the filtration and cleaning facilities and equipment		
	Steps	**References & Work Aids**
5.1.1 Check and control the operational condition of the facilities (filtering units and media, etc.) and mechanical or electrical equipment (valves, compressors, motors, actuators, air booster, air bleed valve, membrane pump, booster pump, etc.)		
☐	Describe the types of facilities and the role of each piece of mechanical or electrical equipment in the filtration and cleaning system	**T** Filtration and cleaning system **R** Manufacturer's manual **R** Operation manual
☐	Check the operating parameters of each facility and mechanical or electrical equipment according to the established procedure	**R** Operation manual
☐	Describe any possible malfunctions of the filtration and cleaning system	**T** Filtration and cleaning system
☐	Describe the established procedure in case of facility or equipment malfunction	**R** Manufacturer's manual
☐	Describe the preventive maintenance needed for the facilities and filtration and cleaning equipment	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
5.1.2	**Check and control the operational condition of the measuring and control instruments (ammeters, voltmeters, pressure gauges (differential pressure, transmembrane pressure, etc.))**	
☐	Make a list of each of the measuring and control instruments used and describe their role in the filtration process of the station	
☐	Describe the normal operating conditions of each measuring and control instrument	**R** Manufacturer's and operation manual
☐	Check the operational condition of each measuring and control instrument according to the established procedure	**R** Manufacturer's manual
☐	Compare the values obtained to the reference values set for proper operation and describe appropriate measures needed in case of malfunction	
☐	Calibrate the measuring and control instruments	
☐	Describe the preventive maintenance for each of the measuring and control instruments used in the filtration system	
5.1.3	**Record any noteworthy information on the operation of the filtration and cleaning facilities and equipment**	
☐	Provide a detailed, accurate and legible listing of all measures taken on the facilities, equipment and measuring and control instruments of the filtration and cleaning system according to the operator's schedule	**T** Filtration and cleaning system **R** Tour report

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

Task 5.2 Check and control the station's filtration and cleaning process		
	Steps	**References & Work Aids**
5.2.1 Check and control the filtration quality parameters (iron, manganese, separation rate, duration of filtration cycle, pressure drop, permeability rate, conductivity, etc.)		
☐	Describe the role of filtration	**T** Filtration and cleaning system
☐	Describe the characteristics of filters and filtering media	**R** Manufacturer's and operation manual
☐	Describe the maximum operating capacity of the filters and the appropriate measures needed in case of discrepancy	**R** Manufacturer's and operation manual **R** Operator's procedure
☐	Check and control the filtration operating parameters according to the established procedure	
☐	Describe the preventive measures needed to ensure optimum filtration process operation	
5.2.2 Clean the filters or filtering membrane		
☐	Describe the cleaning principles and operational modes (counterflow, tangential, etc.)	**R** Manufacturer's and operation manual **T** Filtration and cleaning system
☐	Describe the control parameters for effective cleaning	
☐	Describe the consequences of defective cleaning (filtering medium failure, conglomerate, mud balls, filtering medium expansion, etc.)	
☐	Proceed with cleaning the filters or filtering membrane according to the established procedure	**R** Operation manual
☐	Adjust the cleaning air or water flow rate for optimum cleaning, if applicable	**R** Manufacturer's manual
☐	Adjust the duration of the cleaning steps for optimum cleaning	
☐	Describe the appropriate measures needed in case of discrepancies	
☐	Describe the preventive maintenance required for the filters according to the manufacturer's procedure	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

5.2.3 Take the water samples necessary to control the treatment		
☐	Take a water sample at the filters outlet according to the established procedure	**T** Sample taking and storing procedures
5.2.4 Record any noteworthy information on the filtration and cleaning processes		
☐	Provide a detailed, accurate and legible listing of the quality follow-up parameters of the filtration and cleaning process	**R** Tour report or operating log **T** Filtration and cleaning system

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

We, the undersigned, hereby certify that the Apprentice has mastered Module 5

"Filtration and Cleaning Systems"

Signature of the Apprentice _____

Signature of the Journeyman _____

Date _____ **Signature of the Employer** _____

Module 6

Pumping Drinking Water into the Distribution Network

Job Skill:
Operate the system used for pumping drinking water into the distribution network

Task 6.1
Conduct an inspection and verification tour of the facilities used for pumping drinking water into the distribution network

- 6.1.1 Inspect and verify pumps and associated measuring and control instruments, as the case may be
- 6.1.2 Verify and test the flow rate or the number of active pumps according to the plant's and distribution network's capacity
- 6.1.3 Check and control the operation of the valves, if applicable
- 6.1.4 Verify and test valve operation, if applicable
- 6.1.5 Inspect and verify drinking water tanks (open surface or hydropneumatic) as well as measuring and control instruments, if applicable

1. THE APPRENTICE HAS WORKED WITH THE FOLLOWING TYPES OF EQUIPMENT. TICK OR SPECIFY:

PUMPS	STORAGE TANKS (if applicable)	VALVES (if applicable) (Main valves in use: guillotine, pressure release, self-regulating, etc.)	AIR BLEED VALVES (if applicable)
Submersible:	**Open surface:**		
Dry well:	**Hydropneumatic:**		

4. 2. THE APPRENTICE HAS LEARNED TO USE THE FOLLOWING INSTRUMENTS. TICK OR SPECIFY:

- Flowmeter ☐
- Pressure indicator ☐
- Water level alarm or float ☐
- Water level measuring devices ☐
- Other _____
  _____
  _____

3. COMMENTS OR DETAILS CONCERNING THE FACILITIES AND INSTRUMENTS:

_____
_____
_____

Job Skill: Operate the system used for pumping drinking water into the distribution network

Task 6.1 Conduct an inspection and verification tour of the facilities used for pumping drinking water into the distribution network		
	Steps	**References & Work Aids**
	6.1.1 Inspect and verify pumps and associated measuring and control instruments, as the case may be	
✔	**A- Check the pumps**	
☐	Locate the drinking water pumping facilities on the network map	**R** Map of distribution network
☐	Describe the types of pumps and their main components	
☐	Explain the normal operating conditions of the pumps (capacity and operating range) and the consequences of malfunction	
☐	Identify the measuring and control instruments associated with the pumps and describe how they work	**T** Measuring instruments
☐	Take readings from the measuring and control instruments and compare the results with reference values to verify that the pumps are working properly	**R** Manufacturer's manual (pump curve)
☐	Check the production and electromechanical process parameters for each pump	**T** Drinking water pumps **R** Manufacturer's manual
☐	Assess pump operation based on process parameters and take any corrective measures required according to established procedures	
✔	**B- Appropriately assess what preventive and corrective measures must be taken to ensure proper operation of the pumps**	
☐	Describe the preventive maintenance needed to identify potential problems with the water pumps	**W** Maintenance chart (Module 6) **T** Drinking water pumps **R** Manufacturer's manual
☐	Identify situations that could cause pump malfunction, explain the possible causes, diagnose the problem and take the appropriate corrective measures	
✔	**C- Record any noteworthy information on the operating parameters of the pumps**	
☐	Provide a detailed, accurate and legible listing of all noteworthy data on pump operation	**R** Daily log or Tour report **T** Drinking water pumps

Journeyman's initials:		**Apprentice's initials:**	

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
6.1.2 Verify and test the flow rate or the number of active pumps according to the plant's and distribution network's capacity		
✓	**A- Verify the output and pressure of drinking water pumping facilities**	
☐	Describe the pumping system and the output needed according to network needs	
☐	Explain the consequences of a drinking water pumping facilities malfunction	
☐	Either onsite or by remote sensing, identify which pumps are active and which are inactive	**R** Map of distribution network
☐	Assess the flow rate and pressure according to the pumping system's operating capacity and the distribution network's needs	**T** System of units
☐	Verify whether the number of active pumps is sufficient for the pumping system's operating capacity and the distribution network's needs	
☐	Verify that pumps can be activated and de-activated to meet the pumping system's operating capacity and the distribution network's needs	
☐	Draw conclusions from the data collected, analyze the effect on drinking water production volumes and take any corrective measures required	**T** Drinking water pumps
✓	**B- Appropriately assess what corrective measures must be taken to address situations affecting pump flow rate**	
☐	Identify potential problems that may affect drinking water production volumes, explain the possible causes, diagnose the problem and take the appropriate corrective action	**T** Drinking water pumps
✓	**C- Record any noteworthy information on pump operating capacity**	
☐	Provide a detailed, accurate and legible listing of all noteworthy data on pump operating capacity	**R** Daily log or Tour report **T** Drinking water pumps

Journeyman's initials:		**Apprentice's initials:**	

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W: **Work aids provided by the journeyman or trainer**

	Steps	References and Work Aids
6.1.3	**Check and control the operation of the valves, if applicable**	
✔	**A- Verify valve operation**	
☐	Locate drinking water pumping system valves on the map of the distribution network	**R** Map of distribution network
☐	Describe how valve-related devices work and explain the optimum operating conditions	**T** Valves **R** Manufacturer's manual
☐	Ascertain that the valves are properly positioned for the pressure and flow rate requirements at time of inspection	
☐	Examine the condition of the valves (maneuverability, pressure required, seal, noise)	
☐	Verify and adjust self-regulating valves, if any, to obtain the required pressure or flow rate	
☐	Draw conclusions from the data collected and consequences noted and take any appropriate corrective measures	
✔	**B- Appropriately assess what preventive and corrective measures must be taken to ensure proper valve operation**	
☐	Describe the preventive maintenance needed to identify potential problems with the valves	**W** Maintenance chart (Module 6) **R** Manufacturer's manual
☐	Identify valve malfunctions that may affect drinking water production volumes, explain the possible causes, diagnose the problem and take the appropriate corrective measures	**T** Valves

Journeyman's initials:		**Apprentice's initials:**	

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W: **Work aids provided by the journeyman or trainer**

	Steps	References & Work Aids
6.1.4	**Verify and test air bleed valve operation, if applicable**	
✓	**A- Verify that air bleed valves are working properly**	
☐	Locate the air bleed valves on the map of drinking water pumping facilities	**R** Map of distribution network
☐	Explain how air bleed valves work and describe their role in the process	
☐	Explain how the presence of air affects pumps and pipes	
☐	Describe the annual preventive maintenance required to eliminate potential problems with air bleed valves	**W** Maintenance chart (Module 6)
☐	Record any noteworthy information after inspecting air bleed valves	**R** Tour report

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

	Steps	References & Work Aids
6.1.5	**Inspect and verify drinking water tanks (open surface or hydropneumatic) as well as measuring and control instruments, if applicable**	
✔	**A- Verify water storage tanks as per established procedures**	
☐	Locate water tanks on the map of the distribution network	**R** Map of distribution network
☐	Check for signs of physical deterioration of drinking water storage tanks and explain the potential risk of contamination and its effect on water quality	**T** Storage tanks
☐	Verify the physical integrity of the tanks, draw conclusions from your findings and take any corrective measures required as per established procedures	**R** OHS confined spaces regulation
☐	Make a list of the measuring and control instruments used and explain their role in the drinking water production process	**T** Measuring instruments **R** Manufacturer's manual
☐	Periodically verify that the drinking water level measuring and control instruments are working properly and take any appropriate corrective action	
☐	Take readings from measuring and control instruments in storage tanks and verify that the results are within established critical water levels	
☐	Adjust flow rate accordingly	
✔	**B- Appropriately assess what corrective measures must be taken to address potential risks**	
☐	Identify abnormalities that may pose a risk, analyze the possible causes, diagnose the problem and take the appropriate corrective measures as per established procedures	**T** Storage tanks **W** Maintenance chart (Module 6)
✔	**C- Record any noteworthy information on drinking water storage tanks**	
☐	Provide a detailed, accurate and legible listing of all noteworthy data on water levels in the drinking water storage tanks	**R** Daily log or Tour report

Journeyman's initials:		**Apprentice's initials:**	

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T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

We, the undersigned, hereby certify that the Apprentice has mastered Module 6

"Pumping Drinking Water into the Distribution Network"

Signature of the Apprentice _____

Signature of the Journeyman _____

Date _____ **Signature of the Employer** _____

Module 7
Building Services Systems

Job Skill:
Operate building services systems

Task 7.1
Control the operation of the available building services systems (electricity, heating, ventilation, compressed air)

- 7.1.1 Control the main electric power supply system (Hydro-Québec)
- 7.1.2 Control the standby electrical system (generator)
- 7.1.3 Control the heating and ventilation systems
- 7.1.4 Control the compressed air systems

1. **THE APPRENTICE HAS TAKEN SAMPLES IN THE FOLLOWING SITUATIONS. TICK OR SPECIFY**

   ☐ Main electric power supply system (Hydro-Québec)

   ☐ Standby electrical system (generator)

   ☐ Heating system

   ☐ Ventilation system

   ☐ Compressed air system

2. **COMMENTS OR DETAILS ON THE SYSTEMS USED:**

   _____

   _____

   _____

   _____

   _____

Job Skill: Operate building services systems

Task 7.1 Control the operation of the available building services systems (electricity, heating, ventilation, compressed air)		
	Steps	**References & Work Aids**
7.1.1 Control the main electric power supply system (Hydro-Québec)		
☐	Describe the operation of the station's main electric power supply system	
☐	Use the various indicators (phase, amperage, voltage) to ensure that the main electric power supply system operates properly	
☐	Periodically check the condition of the main electric power supply system components, if applicable	
☐	If possible, describe and apply the electric power supply start/stop procedure	**R** Electrical safety standards
☐	Describe the measures needed and the safety procedure that must be complied with to insulate equipment to be repaired from the power supply system	
Journeyman's initials:		**Apprentice's initials:**
7.1.2 Control the standby electrical system (generator)		
☐	Name the equipment connected to the generator and explain the consequences of a power failure	
☐	Describe the start/stop procedure (simulate a power failure) of the standby electrical system (generator) in case of power failure	**R** Generator start/stop procedure according to manufacturer's manual **R** Electrical safety standards
☐	Take readings from the generator's instruments and on/off indicators and take appropriate corrective action	**R** Manufacturer's manual
☐	Describe the preventive maintenance required for the generator	**W** Maintenance chart (Module 3) **R** Manufacturer's manual
Journeyman's initials:		**Apprentice's initials:**

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

	Steps	References & Work Aids
7.1.3	**Control the heating and ventilation systems**	
☐	Ensure that the heating and ventilation systems work properly and take appropriate corrective action	**R** Manufacturer's manual **W** Maintenance chart (Module 3)
☐	Explain the consequences of defective operation or failure of these systems	
☐	Check the condition of the filters and take appropriate corrective action	
☐	Describe the preventive maintenance required for the heating and ventilation systems	
Journeyman's initials:		**Apprentice's initials:**
7.1.4	**Control the compressed air systems**	
☐	Describe the operation of the compressed air network and its components	**R** Manufacturer's manual
☐	Name the equipment connected to the compressed air system	
☐	Explain the consequences and causes of a malfunction of these systems	
☐	Flush the air storage tank of the compressor and the network air bleed valve, if applicable	
☐	Describe the preventive maintenance required for the compressed air system	**W** Maintenance chart (Module 3)
Journeyman's initials:		**Apprentice's initials:**

R: Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV

T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

We, the undersigned, hereby certify that the Apprentice has mastered Module 7

"Building Services Systems"

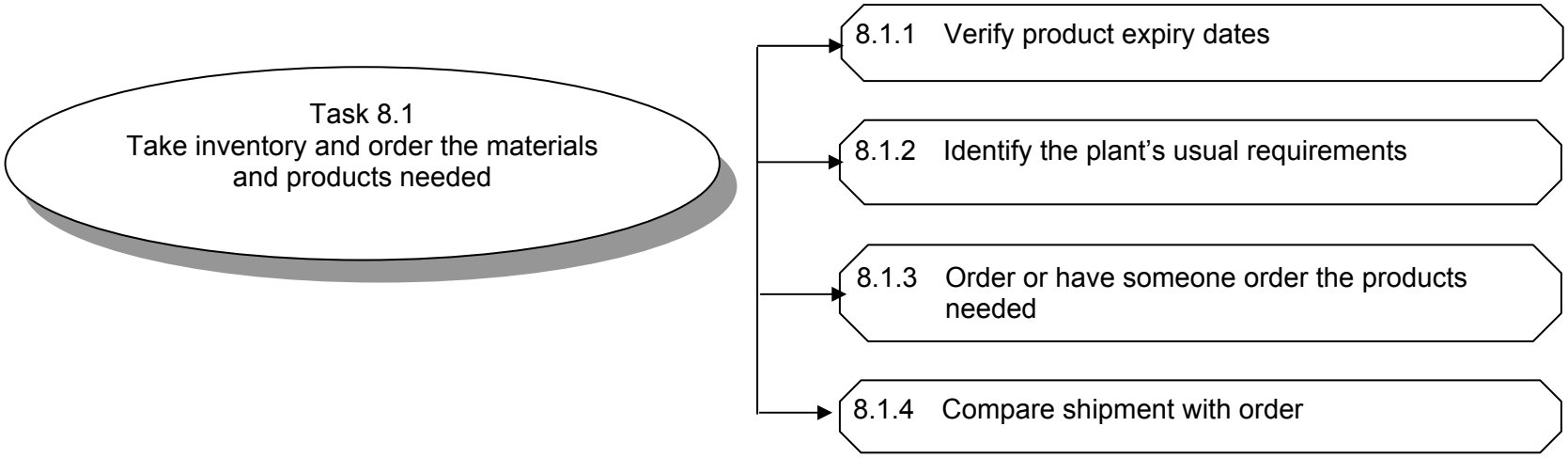
Signature of the Apprentice _____

Signature of the Journeyman _____

Date _____ **Signature of the Employer**_____

Module 8
Stock Management

Job Skill:
Manage inventory



Job Skill: Manage inventory

Task 8.1 Take inventory and order the materials and products needed		
	Steps	**References & Work Aids**
8.1.1 Verify product expiry dates		
☐	Explain the consequences of treating drinking water with expired products	**R** Technical spec sheets provided with the products
☐	Ensure that products are classified and stored according to expiry dates and in adequate storage conditions	
8.1.2 Identify the plant's usual requirements		
☐	Make a list of the materials needed for daily operations: equipment, essential parts, chemicals and testing products, measuring and control instruments	
☐	Explain the basic principles of taking inventory	
☐	Determine the plant's needs and keep the inventory current by verifying stock levels	
8.1.3 Order or have someone order the products needed		
☐	Explain how to prepare a purchase requisition and an order form	
☐	Prepare or have someone prepare an order according to the procedures in effect	**R** Internal procedures in effect
8.1.4 Compare shipment with order		
☐	Verify the quantity and quality of the products received against the order form and invoice	
☐	Ensure stock rotation	

Journeyman's initials:		**Apprentice's initials:**	

R: **Reference materials provided by the plant manager/apprentice; general apprenticeship documents from MENV**

T: **Training aids provided as part of earlier training**

W: **Work aids provided by the journeyman or trainer**

We, the undersigned, hereby certify that the Apprentice has mastered Module 8

"Stock Management"

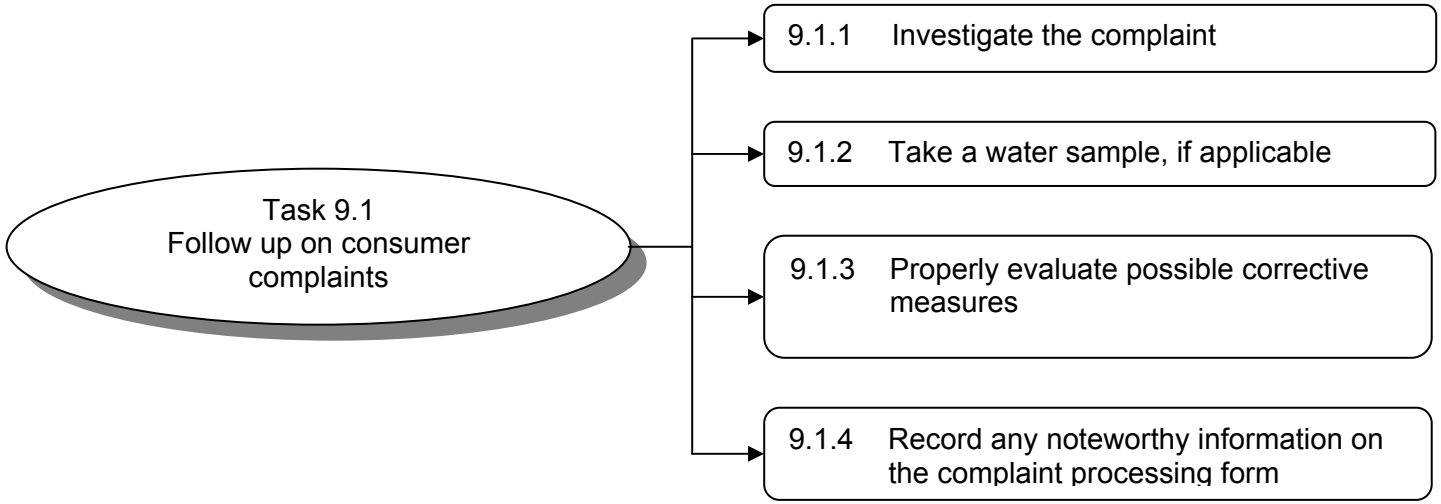
Signature of the Apprentice _____

Signature of the Journeyman _____

Date _____ **Signature of the Employer** _____

Module 9
Processing Complaints

Job Skill:
Process complaints



Job Skill: Process complaints

Task 9.1 Follow up on consumer complaints		
	Steps	**References & Work Aids**
9.1.1 Investigate the complaint		
☐	Explain the importance of processing complaints	
☐	Explain how to identify the problem and assess the seriousness of the complaint (information from the consumer, other similar complaints, supply source, etc.)	**R** Internal procedures
☐	Describe the various types of complaints and their probable causes	**T** Evaluating complaints
☐	Describe the checks to perform for each complaint	
9.1.2 Take a water sample, if applicable		
☐	Take a sample if the situation cannot be corrected immediately	**T** Sample taking and storing procedures
☐	Describe the physicochemical or microbiological parameters to be measured, according to the nature of the complaint	**R** Evaluating complaints
☐	Send the sample to the laboratory along with the form listing the required tests	**R** Laboratory form
☐	Describe the procedure for notifying consumers of test results	**R** Internal procedures
9.1.3 Properly evaluate possible corrective measures		
☐	Describe the abnormal situations most likely to occur and explain the short term corrective measures or long term preventive measures that should be implemented by the filer of the complaint or plant operator, according to the nature of the complaint	**T** Evaluating complaints
9.1.4 Record any noteworthy information on the complaint processing form		
☐	Provide a detailed, accurate and legible listing of all noteworthy data in order to properly document the complaint	**R** Complaint processing form

Journeyman's initials:		**Apprentice's initials:**	

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T: Training aids provided as part of earlier training

W: Work aids provided by the journeyman or trainer

We, the undersigned, hereby certify that the Apprentice has mastered Module 9

"Processing Complaints"

Signature of the Apprentice _____

Signature of the Journeyman _____

Date _____ **Signature of the Employer** _____

TABLES

SUMMARY TABLE (P3b)

JOB SKILL	STEPS				
1. Take water samples according to the provisions of the Regulation	1.1 Take samples for bacteriological and physicochemical analysis according to the provisions of the Regulation				
2. Operate the chemical reagents dosing system	2.1 Conduct an inspection tour of the chemical reagents dosing equipment	2.2 Prepare and inject the chemical reagents	2.3 Check water quality at every step of the treatment		
3. Operate the groundwater extraction and pumping system	3.1 Conduct an inspection tour of groundwater extraction facilities	3.2 Conduct an inspection and verification tour of groundwater pumping facilities			

SUMMARY TABLE (P3b)

JOB SKILL	STEPS				
4. Operate one or more disinfection systems (using sodium or calcium hypochlorites, chlorine gas or ozone, if applicable)	4.1 A Conduct an inspection tour of the sodium/calcium hypochlorite disinfection area	4.2 A Disinfect water using hypochlorites			
	4.1 B Conduct an inspection tour of the chlorine gas disinfection area	4.2 B Disinfect water using chlorine gas			
	4.1 C Conduct an inspection tour of the ozone disinfection area	4.2 C Generate ozone and use it to disinfect water			

SUMMARY TABLE (P3b)

JOB SKILL	STEPS				
5. Operate the filtration and cleaning systems	5.1 Conduct an inspection tour of the filtration and cleaning facilities and equipment	5.2 Check and control the station's filtration and cleaning processes			
6. Operate the system used for pumping drinking water into the distribution network	6.1 Conduct an inspection and verification tour of the facilities used for pumping drinking water into the distribution network				
7. Operate building services systems	7.1 Control the operation of the available building services systems (electricity, heating, ventilation, compressed air)				

JOB SKILL	STEPS				
8. Manage inventory	8.1 Take inventory and order the materials and products needed				
9. Process complaints	9.1 Follow up on consumer complaints				

Name of Apprentice:	Emploi-Québec File #:

WORKPLACE APPRENTICESHIP PROGRAM

MODULE TITLE					
	To Acquire	To Be Assessed	Signature of Emploi-Québec Representative	Date	Agreement #
Taking Water Samples					
Chemical Reagents Dosing System					
Groundwater Extraction and Pumping System					
Disinfection System					
Filtration and Cleaning Systems					
Pumping Drinking Water into the Distribution Network					
Building Services Systems					
Stock Management					
Processing Complaints					

EMPLOYER		
Name		
Address		
City	Postal Code	Phone
Name of Journeyman		
Agreement	Start Date	End Date

EMPLOYER		
Name		
Address		
City	Postal Code	Phone
Name of Journeyman		
Agreement	Start Date	End Date