



COURSE OUTLINE

WO 003

Hypochlorination & Disinfection

PREPARED BY: _____
Robert Rondeau, Instructor

DATE: _____

APPROVED BY: _____
Shelagh Rowles, Dean

DATE: _____

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Course Outline prepared by Robert Rondeau, 2011

Yukon College
P.O. Box 2799
Whitehorse, YT
Y1A 5K4

Course Outline

Hypochlorination & Disinfection

INSTRUCTOR:	ROBERT RONDEAU
COURSE OFFERING:	JANUARY 18 TO 19, 2011

Course Description

This 2 day course provides information about hypo chlorination theory, safe handling and storage procedures, how chlorine based chemicals disinfects, residual chlorine testing, chlorine monitoring, troubleshooting hypo chlorinators, as well as practical training on the operation and maintenance of several different brand names of hypo chlorinator (Prominent, LMI, Grundfos, and Stenner).

Course Pre-requisites

There are no pre-requisites for this course

CEU Credit

This course is not registered with EOCP at this time.

Course Duration

2 day
8:30 am to 4:00 pm
1 hour lunch break
Morning and afternoon break (15 minutes each)

Course Agenda and Learning Outcomes

By the end of the course, the student will:

Early Discovery and Historical Recorded Beginnings of Chlorination

Understand some brief history about the discovery and historical beginnings of chlorination.

Microorganisms, Waterborne Pathogens, & Diseases

Comprehend the types of microorganisms typically found in raw water sources.

Recognize what makes some microorganisms pathogenic.

Become familiar with the 3 basic types of pathogens (bacteria, viruses, protozoa).

Chlorination, Disinfection, and Sterilization

Define disinfection and the purpose of chlorination.

Understand the difference between disinfection and sterilization.

Recognize the disinfection power of hypochlorous acid from chlorine based chemicals.

Comprehend the dissociation of hypochlorous acid.

Identify the methods of testing chlorine residuals.

Understand the 3 forms of chlorine residuals (free, total, and combined).

Comprehend the terms chlorine demand, chlorine dosages, and breakpoint chlorination.

Determine Ct value for bacteria, viruses, and protozoa.

Explain disinfection by-products (THMs).

Understand several factors effecting chlorination.

Comprehend the advantages and disadvantages of using chlorine based chemicals for disinfection.

Understand the function of a hypo chlorinator and troubleshoot operational problems.

Regulations and Guidelines

Recognize the Yukon Government Drinking Water Regulations and the Guidelines for Canadian Drinking Water Quality as it pertains to disinfection.

Sodium Hypochlorite: Properties, Handling, & Storage

Understand the physical and chemical properties, decomposition, transportation, handling, first aid, handling fires, and storage of sodium hypochlorite.

Calcium Hypochlorite: Properties, Handling, & Storage

Understand the physical and chemical properties, decomposition, transportation, handling, first aid, handling fires, and storage of calcium hypochlorite.

Chlorination and Disinfection of Wells

Identify sources and types of coliform bacteria.

Comprehend aerobic and anaerobic zones of a ground well.

Understand the results of shock chlorinating a well without a cleaning process.
Understand the types of biofilms and how they react with chlorination

Chlorination Math

Comprehend the chlorine dosage formula as well as the numerical value for chlorine based chemicals.

Practical Training

Perform water analysis on free chlorine residual, total chlorine residual, pH, iron, manganese, hardness, and bleach concentration.

Perform operation and maintenance on hypochlorinators (LMI, Grundfos, ProMinent, and Stenner).

Delivery Methods/Format

Instructional Method	Percentage of Class Time
Lecture/Slides	60%
Demonstration	40%

Materials/Handouts

Course binder provided for curriculum.

For demonstration purposes, water testing equipment and hypochlorinator pumps are supplied.

Course Requirements:

Attendance and participation are required to complete this course.

Evaluation:

Yukon College records will only show a pass or fail result. If the participant doesn't attend the course, records will show a "no show" result.

STUDENTS WITH DISABILITIES OR CHRONIC CONDITIONS:

Reasonable accommodations are available for students with a documented disability or chronic condition. It is the student's responsibility to seek these accommodations. If a student has a disability or chronic condition and may need accommodation to fully participate in this class, he/she should contact the Learning Assistance Centre (LAC) at (867) 668-8785 or lassist@yukoncollege.yk.ca.

Syllabus

DAY 1:

Topic	Time Allocation
Early Discovery and Historical Beginnings of Chlorination	20 min
Microorganisms, Waterborne Pathogens, and Diseases	45 min
Chlorination, Disinfection, and Sterilization	25 min
Morning Break	15 min
Chlorination, Disinfection, and Sterilization	60 min
Regulations and Guidelines	45 min
Lunch Break	60 min
Sodium Hypochlorite: Properties, Handling, & Storage	45 min
Water testing demonstration	45 min
Afternoon Break	15 min
Water Testing demonstration	75 min
Total Minutes	450 min

DAY 2:

Topic	Time Allocation
Calcium Hypochlorite: Properties, Handling, & Storage	45 min
Chlorination and Disinfection of Wells	45 min
Morning Break	15 min
Chlorination Math	105 min
Lunch Break	60 min
Hypochlorinator Pumps Demonstration	90 min
Afternoon Break	15 min
Hypochlorinator Pumps Demonstration	75 min
Total Minutes	450 min