Aloha & Welcome

HAWAII STATE DEPARTMENT OF HEALTH
HEALTHY PEOPLE · HEALTHY COMMUNITIES · HEALTHY ISLANDS

This calendar has been compiled by the Statewide Wastewater Operator Training Center for water and wastewater operators and all supporting personnel such as maintenance and collection personnel. The calendar lists and describes training sessions sponsored by the training center during the coming fiscal year. We hope it will help you plan for your training needs for the coming fiscal year.

The calendar only includes courses planned as of this printing. Training Session Announcements will be sent approximately six weeks prior to the scheduled date. If you have not received an announcement four weeks prior to the scheduled date, please call the training center at 832-5478. As hard as we try not to, unforeseen occurrences may cause a change to the calendar schedule.

Training Session Announcements will give details for each session. Information such as location, dates, times, educational points, instructor, tuition (if applicable), book fee (if applicable), etc. are listed. The prerequisite for intermediate courses is: completion of the Basic Course, CAVI Course, Sacramento–California State University Course, or upon supervisor's approval. Prerequisite for advanced courses is: completion of a related intermediate course, Sacramento-California State University course, or upon supervisor's approval.

A Training Session Registration Application and Request for Public Record form have been included in the back of the calendar for your convenience. These forms are required if you would like to register for a course or if you would like a listing of your Continuing Education Units (CEUs). These forms and other important wastewater operator information are also available on our website at: www.hawaii.gov/wastewater

Should you have any questions or require further information, please feel free to contact us at the Statewide Wastewater Operator Training Center.

Mahalo!

Mission Statement

The Statewide Wastewater Operator Training Center's Mission is to provide quality-training opportunities to the environmental work force in various areas as operation, maintenance, safety, management and regulatory compliance. As more complex and demanding environmental issues evolve, the scope of the SWOTC will continue to evolve and meet the changing needs of the wide range of environmental disciplines.

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Administrative Assistant, Statewide Wastewater Operator Training Center

July 2009

STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 #219 MATH VI-OAHU	2	3	4 Independence Day
5	6	7 #202 ABC REFRESHER - HONO	8	9 #202 ABC REFRESHER - MAUI	10	11
12	13	14 #202 ABC REFRESHER - KAUAI	15	16 #202 ABC REFRESHER - HILO	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August 2009

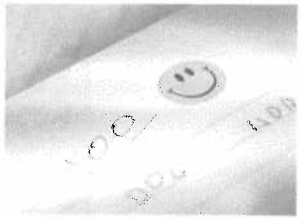
STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5 #218 MATH III - HILO	6 #302 ANAEROBIC DIGESTION - HONO	7	8
9	10	11	12 #217 MATH II - KAUAI	13 #103 PLANT SAFETY - HONO	14	15
16	17	18	19 #216 MATH I - MAUI	20	21	22
23	24	25	26	27	28	29
30	31					

September 2009

STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2 #102 BASIC ELCTRICITY - OAHU	3	4	5
6	7 Labor Day	8	9 #218 MATH III - KAUAI	10 #215 PLANT PHYSICS - KONA	11	12
13	14	15	16 #217 MATH II - MAUI	17 #114 & 106 - HONO	18	19
20	21	22 Autumn begins	23	24	25	26
27	28	29	30			



October 2009

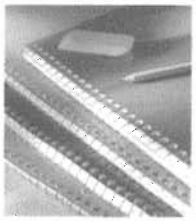
STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 #205 EQUIPMENT OPERATION - OAHU	2	3
4	5	6 #219 MATH VI-HILO	7 #302 ANAEROBIC DIGESTION - KAUAI #218 MATH III - MAUI	8 #204 DIESEL OPS - OAHU	9	10
11	12 Columbus Day (Observed)	13	14	15	16	17
18	19	20	21	22	23	24
25 Daylight Savings Time Ends	26	27	28	29	30	31 Halloween

November 2009

STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

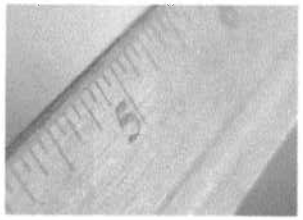
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3 Election Day	4	5 #207 MAINT. FUNDAMENTALS - HILO	6	7
8	9	10	11 Veterans Day	12 #219 MATH VI-KAUAI	13	14
15	16 #219 MATH VI-MAUI	17 #108 & #112 - OAHU	18	19 #301 ACTIVATED SLUDGE - OAHU	20	21
22	23	24	25	26 Thanksgiving	27	28
29	30					



December 2009

STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 #105 WASTEWATER MATH - MAUI	2	3 #306 PROCESS CONTROL LAB - OAHU	4	5
6	7 #101 - OAHU	8	9 #303 CHLORINATION - KAUAI	10	11 #101 - HILO	12
13	14	15	16	17	18	19
20	21 Winter begins	22	23	24	25 Christmas	26
27	28	29	30	31 New Year's Eve		



January 2010

STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 New Year's Day	2
3	4 #202 A & B ABC EXAM REFRESHER - KONA	5	6 #202 ABC REFRESHER - MAUI	7	8	9
10	11 #202 A & B ABC EXAM REFRESHER - OHAU	12	13 #202 ABC REFRESHER - KAUAI	14	15	16
17	18 Martin Luther King, Jr	19	20 #105 WASTEWATER MATH - OAHU	21	22	23
24	25	26	27	28	29	30
31						

February 2010

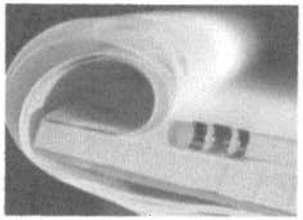
STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2 Groundhog Day	3	4 #210 SLUDGE HANDLING - MAUI	5	6
7	8 #275C LUBING AND BEARINGS - KAUAI	9 #314 LAB FOR MANAGER - KONA	10 #207 MAINTENANCE FUNDAMENTAL - OAHU	11	12 Lincoln's Birthday	13
14 Valentine's Day	15 President's Day	16	17 #308 STABLIZATION PONDS - OAHU	18	19	20
21	22 Washington's Birthday	23	24	25	26	27
28						

March 2010

STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3 **#101 - KAUAI**	4 **#110 - OAHU**	5	6
7	8	9 **#108 & #112 - MAUI**	10 **#302 ANAEROBIC DIGESTION - HILO**	11 **#214 TREATMENT PROCESS - OAHU**	12	13
14	15	16	17 St. Patrick's Day	18	19	20
21	22	23	24	25	26	27
28	29	30	31			



April 2010

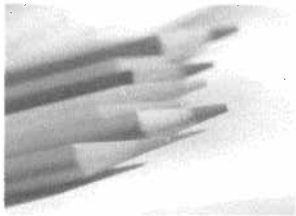
STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 April Fool's Day	2	3
4 Daylight Savings Time Begins	5	6 #116 UV DISINFECTION - OAHU	7 #301 ACT. SLUDGE PROCESS - MAUI	8	9	10
11	12	13 #108 & #112 - KONA	14 #207 MAINT. FUNDAMENTALS - KAUAI #206 PRESSURE & FLOW - OAHU	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

May 2010

STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4 #108 & #112 - HILO	5 #106 & #114 - KAUAI	6 #101 - MAUI	7	8
9 Mother's Day	10	11 #253 WASTEWATER VALVES - OAHU	12	13 #209 RBC, TRICKLING FILTERS & PONDS - OAHU	14	15 Armed Forces Day
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31 Memorial Day (Observed)					



June 2010

STATEWIDE WASTEWATER OPERATOR TRAINING CENTER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2 #108 & #112 - KAUAI	3	4	5
6	7	8 #105 WASTEWATER MATH - HILO	9 #312 ADVANCED LAB - OAHU #215 PLANT SCIENCE PHYSICS - MAUI	10	11	12
13	14 Flag Day	15	16 #258 PIPING - OAHU	17	18	19
20 Father's Day	21	22	23	24	25	26
27	28	29	30			

BASIC COURSES
(100 level)

101 - BASIC COURSE FOR WASTEWATER TREATMENT PLANT OPERATORS Educational Point: One (1)

This training program consists of four units. The Characteristics of Sewage unit of the program provides the student with a basic understanding of the characteristics and composition of sewage. The Natural Biological Treatment Process unit provides the student with the practical background theory of his occupation. This unit deals with the biological process involved in wastewater treatment such as aerobic and anaerobic decomposition; and aerobic, facultative and anaerobic bacteria. The Waste Treatment Methods unit begins with a generalized picture of a conventional wastewater treatment plan, briefly introducing flow and processes. Each process phase is then examined in more detail. Included are introductory discussion on pretreatment, primary treatment variations, and solids handling and disposal. Specifically, this unit covers processes such as activated sludge and trickling filter processes, and distinguished between the different kinds of waste stabilization ponds.

102 - BASIC ELECTRICITY REVIEW AND READING ELECTRICAL DIAGRAMS Educational Point: One (1)

This Basic Electricity Review training program is designed to provide maintenance students with a review of fundamental electrical concepts. The major topics covered in this unit are: the nature of electricity; basic electrical quantities; series and parallel circuits; Ohm's Law; electromagnetism; inductance; and capacitance

The Reading Electrical Diagrams training program is designed to teach students how to read four types of electrical diagrams; block diagrams, single line diagrams, schematics, and wiring diagrams. *Prerequisite: Basic understanding of electricity.*

103 - PLANT SAFETY Educational Point: One (1)

Training material: NUS Training Corporation video-based program. This training program consists of four videos. Fire Safety covers types of fires and the most effective extinguishing techniques and equipment are explained in this unit. Hazardous Substances cover dangerous or toxic substances found in the plant and the safety equipment necessary for mitigating these effects. Personal Safety covers various plant hazards (electrical, eye, machinery, etc.) And personal safety equipment (hard hats, safety shoes, eye wear, etc.). And Respiratory Protection describes various types of respiratory hazards (particulates, gasses, oxygen deficiency) and respiratory protection gear.

104 - WASTEWATER COLLECTION SYSTEMS BASIC COURSE Educational Point: One (1)

This training program is for those already employed as collection systems workers as well as those new to the field. It is an introduction to the operation and maintenance of wastewater collection systems. Several objectives include: (a) describe why the work of a collection system worker is important; (b) describe the three types of wastewater collection systems; (c) identify main types of sewers; (d) describe basic

components of the collection system; (e) describe what is meant by and what should be done about inflow, infiltration, and exfiltration; (f) indicate the importance of dissolved oxygen and microorganisms in wastewater; (g) describe the difference between aerobic and anaerobic decomposition; etc.

105 - WASTEWATER MATHEMATICS Educational Points: Two (2)

This training course is designed to assist the wastewater treatment operator in reviewing and refreshing his or her skills in solving various basic and related mathematics problems countered in everyday activities.

106 - HAZARD COUMMUNICATION PROGRAM Educational Point: One-half point (0.5)
This training course is designed to provide you with information and training on hazardous chemicals in your work area. Employee training will include the location and availability of the written hazard communication program, including the required list of hazardous chemicals and material safety data sheets required. Other topics include: methods and observation that may be used to detect the presence or release of a hazardous chemicals in the work area (such as monitoring conducted by the employer, visual appearance or odor of hazardous chemicals when being released, etc.); the physical and health hazards of the chemicals, and details of the hazard communication program, including an explanation of the labeling system and the material safety data sheet, and how you can obtain and use the appropriate hazard information.

107 – MULTIPLE HEARTH FURNACE Educational point: One (1)

This training course is designed to teach maintenance personnel and operators the theory, operations and basic maintenance procedures of the multiple hearth furnace. (MHF). Objectives of the course includes: the components of a MHF; description of how sludge moves through a MHF; purpose of the furnace refractory; identification of in-hearth, out-hearth, lute cap, drop holes, and castable insulation; purpose of the flap gate; rabbling; variable speed shaft drive mechanisms; purpose of the top and lower bearings; ash handling systems; components of an off-gas systems; goals of furnace operations; furnace zones; safety precautions; examples of energy conservation measures, etc. *Prerequisites: Knowledge of mechanical maintenance.*

108 - NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEMS (NPDES) AND UIC PERMITS AND CWA REGULATIONS
Educational Point: One-half (0.5)

This training course is designed to instruct operators, supervisors, and managers on NPDES/UIC permit requirements and other wastewater operations regulatory requirements. The course will include a discussion of NPDES and UIC permits, what they include and how to read them. Copies of all NPDES and UIC permits in the State of Hawaii will be available for students to look at the permit from his/her plant during these

discussions. The Federal Clean Water Act (CWA) will be discussed and a summary of the important information from it will be provided to each students. Applicable State of Hawaii Revised Statues and Administrative Rules pertaining to wastewater operations will also be discussed and summaries of the important information from these documents will also be provided to each student. If there are any County directives, ordinances, rules or regulations pertaining to wastewater operations, they will also be identified and discussed.

109 – TRAINING THE TRAINER Educational Point: One (1)

This training course is designed to instruct the elements of effective training, planning for effective training, instructing to facilitate learning, methods for teaching skills, methods for teaching information, using visual aids effectively, teaching your first class, and learning about visual aid equipment such as slide projectors, overhead projectors, TV/VCR, and DVD players. Prerequisite: Instructional experience and/or supervisor's recommendation.

110 – PUMP STATION OPERATIONS COURSE Educational Point: One (1)

This course is designed to instruct students the following major subject areas: history of the city and county pumps stations, pump station security and equipment. Pump station equipment includes: wet well, recorder system, pumps, bubbler/float system, flow meters and generator system. Pump station operations include: use of station O&M manuals, use of pump operating curves, optimizing pump use, pump sequencing, wetwell operating levels, and generator systems operations. Bypasses/overflows/spills will include: reporting, flow rate computations, volume computations, contamination monitoring, sample grab technique, warning signs, and clean-up procedures. Emergency operations will include: back-up equipment and standby power generation. Plus records and reports.

111 – PROGRAMMABLE LOGIC CONTROLLERS Educational Point: point 3 (0.3)

This course is designed to give WWTP operators, supervisors and maintenance personnel a basic understanding of programmable logic controllers
(PLCs). The course covers (1) PLC basic fundamental (2) PLC programming (3) basic troubleshooting (4) fundamental of communication and (5) various input and outputs.

112 - STATE REGULATIONS AFFECTING WTW's WORKSHOP Educational Point: One-half (0.5)

This course is designed for WWTP operators and supervisors. Course covers: (1) O&M inspections, (2) spill protocols (for spills reaching surface waters - spills within the confines of a wastewater facility; spills outside of the confines of a wastewater facility, etc.; (3) enforcement policies and types of enforcement; (4) sewage sludge regulations - what is Part 503, land application of sewage sludge, pathogen reduction,

etc.; (5) effluent reuse -classes of reclaim water, allowable uses of reclaim water, design requirements for treatment & distribution systems, engineering and other reports needed for reuse projects, etc. (6) underground injection control (UIC) -regulation, definition of a well, examples of injection well facilities, specifics of regulation and how it affects you, and the future developments; and (7) wastewater operator certification - general rule making, role of the Board of Certification, who must be certified, major responsibilities of operators in "direct responsible charge", enforcement, examination, and proposed changes to rules.

114 - PERMIT-CONFINED SPACE ENTRY Educational Point: One-half (0.5)

The Permit - Confined Space Entry Course is mandated by Federal and State regulations. The course covers the procedures required to ensure the safety of employees entering and working in confined spaces. Class covers: scope, definition of confined space, permit - required confined space, prohibited condition, evaluation of workplace, mandatory training, authorized entrants, permit system requirements of entry supervisor, attendants must know hazards and rescue service.

115 - BLUEPRINT READING Educational Point: One-half (0.5)

This course consists of videotapes and exercises which explain the basics of blueprint reading for the manufacturing and construction industries. The videotapes are: (1) Line and View Interpretation; (2) Dimensions & Tolerance Specifications; and (3) Auxiliary Print Information & Geometric Tolerancing. Using these as a basis, the basics of blueprint reading for wastewater facility construction facilities and projects are demonstrated.

116 - ULTRAVIOLET DISINFECTION Educational Point: One (1)

This course discusses: the three common methods for removing pathogens, operation, and maintenance of the air intake system, fuel system, exhaust system, lubricating oil system, and cooling system. Maintenance jobs commonly performed on each of these systems are explained and demonstrated on stationery and automotive diesel engines. Two units on Preventive and Predictive Maintenance and Maintenance Safety are also to understand how UV rays destroy the genetic material in pathogens; calculate lamp age, intensity, and exposure time for peak efficiency of the system; understand how ozone is generated and used to kill pathogens; and avoiding the many safety hazards of each system. Also includes troubleshooting and a field trip to a treatment plant.

INTERMEDIATE COURSES
(200 Level)

201 - ACTIVATED SLUDGE PROCESS CONTROL (INTERMEDIATE) Educational Point: One (1)

This training program deals with the process control in an activated sludge system. As a plant operator, you know that the success of the treatment system is measured by the quality of the effluent. So, your main concern is to make sure that your effluent meets your regulatory agencies requirement. In many cases the required values for the biochemical oxygen demand (BOD) and suspended solids (SS) are less than 30 mg/l and that for the chemical oxygen demand (COD) is less than 100 mg/l. To maintain these levels and, thus have an effective operation, you must: (a) maintain an adequate number of microorganisms; (b) maintain good settling properties; (c) supply adequate air to the aeration tank; and (d) remove sludge from the clarifier before septic conditions or de nitrification problems occur. Other objectives include: (a) identify the components of aeration and clarification methods; (b) describe the purpose, operation, and maintenance requirements of major components; (c) use checklist to start-up, shut down and troubleshoot a system; and (d) demonstrate knowledge of F/M ratio, respiration rate, and then mean cell retention time for analyzing plant data. *Prerequisite: Successful completion of the Basic Course #101.*

202A - CERTIFICATION EXAMINATION REFRESHER (GRADES 1&2). Educational Point: One (1)

This training course is designed to help operators in all categories and classes for the certification examination. General math and maintenance principles, as well as various process control principles, will be covered to meet the needs of those persons attending.

202B - CERTIFICATION EXAMINATION REFRESHER (GRADES 3&4) Educational Point: One (1)

This training course is designed to help operators in all categories and classes for the certification examination. General math and maintenance principles, as well as various process control principles, will be covered to meet the needs of those persons attending.

204 - DIESEL ENGINE - OPERATION AND MAINTENANCE, PREVENTIVE AND PREDICTIVE MAINTENANCE, AND MAINTENANCE SAFETY AND EFFICIENCY Educational Point: One (1)

Training material: Industrial Training Corporation videotapes and workbooks. This mechanical maintenance program is a comprehensive program that covers basic diesel engine operation including the function, operation and maintenance of the air intake system, fuel system, exhaust system, lubricating oil system, and cooling system. Maintenance jobs commonly performed on each of these systems are explained and demonstrated on stationery and automotive diesel engines. Two units on Preventive and Predictive Maintenance and Maintenance Safety are also covered. *Prerequisite: Knowledge of Mechanical Maintenance.*

205 - EQUIPMENT OPERATION Educational Point: One (1)

Training material: Industrial Training Corporation video-based program. This training program is designed for students to learn the basic techniques and practices involved in equipment operations. The program will provide the students with guidelines and safety considerations for operating equipment, monitoring normal operations, making adjustments to equipment, performing inspections, and responding to problems. The students will also learn the role of the operator in troubleshooting problems and monitoring the operation or repaired equipment. Four (VHS) videotapes will be discussed: (a) Techniques and Practices for Equipment Operators, (b) Valve Operation, (c) Lubrication for Equipment Operators, and (d) Heat Exchangers. *Prerequisite: Knowledge of Mechanical Maintenance.*

206 - PRESSURE MEASUREMENT AND FLUID FLOW MEASUREMENT Educational Point: One (1)

This training program consists of two units. The Pressure and Pressure Measurement unit is designed to provide technicians and operators with a basic understanding of the concept of pressure; the unit commonly used to indicate pressure; and some devices and instruments used to measure changes in pressure. It is also intended to teach students about some of the conditions that may prove harmful to instruments and pressure elements and methods of alleviating these conditions. The Fluid Flow Measurement is designed to teach fundamental information on how differential pressure measurements can be used to determine fluid flow and to teach how several common fluid flow meters are used to measure fluid flow. *Prerequisite: Knowledge of Mechanical Maintenance.*

207 - MECHANICAL MAINTENANCE FUNDAMENTALS FOR OPERATORS Educational Point: One (1)

Training material: Industrial Training Corporation video-based programs. This training course consists of three (3) different topics. The Measuring Instruments Module is a comprehensive program covering the most commonly used measuring instruments such as a steel rule,

vernier caliper, outside micrometer, telescoping gauges and dial indicator. Other modules include Bolting and Fastening, and Mechanical Print Reading.

208 - PUMP CONTROLS, TYPES, OPERATION AND MAINTENANCE (INTERMEDIATE) Educational Point: One (1)

This course is designed to teach students to identify the basic components of pumps and pump processes and to describe the purpose of pumps in the wastewater field. The course is divided into three parts. Part I covers: (a) basic components of the pump assembly; (b) basic types of motors, starters and enclosures; (c) motor controls; and (d) troubleshooting. Part II covers: (a) centrifugal pumps; (b) basic components of centrifugal pumps; and (c) control of centrifugal pumps. Part III covers: (a) positive displacement pumps; and (b) basic components of positive displacement pumps. *Prerequisite: Knowledge of Mechanical Maintenance.*

209-ROTATING BIOLOGICAL CONTACTORS (RBC), TRICKLING FILTERS AND STABILIZATION PONDS Educational Point: One (1)

The Trickling Filters unit discusses waste stabilization ponds, and the treatment process that occurs in them. Topics include: (a) what happens in the waste stabilization pond; (b) indicate why the facultative pond most often is used; (c) describe what happens in the facultative pond; etc. The Trickling Filters unit discusses the treatment process that occurs in the trickling filter. Topics include: (a) describe how treatment occurs in the trickling filter; (b) recall the name of the growth that forms on the filter media; (c) describe the importance of the secondary filter; (d) recall the advantages of recirculating wastewater through the media bed; etc. the RBC unit deals with the equipment involved in the RBC treatment system and the treatment process and how the operator can control the RBC wastewater treatment system. Other topics in the RBC unit include: start-up and shut-down, components and equipment, equipment maintenance, factors affecting the RBC treatment process, trouble-shooting the RBC process, etc. *Prerequisite: Completion of Basic Course.*

210-SLUDGE HANDLING: SLUDGE THICKENING. ANAEROBIC DIGESTION. AEROBIC DIGESTION AND DEWATERING (INTERMEDIATE) Education Point: One (1)

This training program is designed for the operators of wastewater plants who are, or will become, involved in the processing of wastewater sludge. Topics to be discussed include: (a) creation of sludge; (b) the processing of sludge; (c) the thickening of sludge; (d) operational and control procedures in sludge dewatering; and (e) aerobic and anaerobic digestion. *Prerequisite: Completion of Basic Course 101.*

211 - TROUBLESHOOTING PUMPS: BASIC SKILLS Educational Point: One (1)

This course is designed for students to learn ways to investigate a problem, analyze information obtained concerning the problem, repair the problem, and prevent future problems from occurring. The students will learn the importance of understanding normal equipment operations and the equipment background. Specific equipment to be covered include; centrifugal pumps, positive displacement pumps, reciprocating air compressors and pumping principles. *Prerequisite: Completion of Course #208.*

212A - WASTEWATER FACILITY MANAGEMENT SKILL TRAINING COURSE (VOLUME I) Educational Points: ONE AND ONE HALF (1.5)

This course is targeted to supervisors or superintendent of small to medium-sized systems. The training programs are designed for those persons who are or are soon to become supervisors. Each program deals with a specific content area, focusing on those administrative skills required of a supervisor for effective operation of his/her treatment facility. This course contains training programs on: (1) Basic Management Concepts, (2) Budgeting, (3) Personnel Administration, and (4) Public Relations. Prerequisite: Basic understanding of wastewater treatment plant operation.

212B - WASTEWATER FACILITY MANAGEMENT SKILL TRAINING COURSE (VOLUME II) Educational Points: ONE AND ONE HALF (1.5)

This course is targeted to supervisors or superintendents of small to medium-sized systems. The training programs are designed for those persons who are or are soon to become supervisors. Each program deals with a specific content area, focusing on those administrative skills required of a supervisor for effective and efficient operation of his/her treatment facility. This Course contains training programs on five subject areas: (1) Emergency Planning. (2) Safety. (3) Preparing and Presenting Reports. (4) Operations and Maintenance, (5) Selection of New Equipment. *Prerequisite: Completion of Course #212A.*

213 – RESERVED

214 - WASTE TREATMENT PROCESSES, COMMUNITY WASTEWATER SYSTEM, PRE-TREATMENT, AND CLARIFICATION (INTERMEDIATE) Educational Point: One (1)

This course continues the instruction begun in the Basic Course. It begins with a recap of the composition of normal domestic wastewater, and the necessity and importance of treating it. Unit 1 - Introduction and Unit 2 - The Community Wastewater System will provide you with the overall picture of wastewater treatment so that you, the operator, know why your job is so important. Also, these first two units will help you remember the important information from the Basic Course. Unit 3 - Pretreatment discusses bar screens, grit removal, comminutor, prechlorination, flow measuring devices, etc. Unit 4 - Clarification discusses the purpose of clarifier, the clarification process, the two main purposes of clarifier, clarifier efficiencies, description of sludge and scum removal equipment, etc. Plus a water treatment videotape presentation of wastewater collection and primary treatment, intermediate and secondary treatment. *Prerequisite: Completion of Basic Course #101.*

215 - PLANT SCIENCES (PHYSICS) Educational Points: One (1)

This course consists of four major subject areas: Science Fundamentals, Properties of Matter, Heat and Process Dynamics.

Plant Science #1 - Science Fundamentals cover some basic scientific principles and their applications in a process facility are introduced here, along with units of measurement for length, time. mass, pressure, temperature, flow, and level. The relationship between force and motion, the laws that apply to force and motion. the definition of work, and the relationship of work to energy are also covered. The mechanical advantages

of the inclined plane and the lever illustrate a discussion of basic machines, including examples of where the mechanical advantages of these basic machines are used in process equipment.

Plant Science #2 - Properties of Matter focuses on the properties of matter associated with solids, liquids, and gases, and demonstrates how these properties influence process system operation. The molecular structures and related characteristics of solids, liquids, and gases are also discussed. The unit defines and explains mass, weight, density, specific gravity, buoyancy, viscosity, elasticity, and other terms associated with the effects of stress, pressure, and temperature on the three states of matter.

Plant Science #3 - Heat teaches the principles of heat transfer, the effects of heat. The relationship between temperature and thermal energy, and the effects of temperature difference on heat transfer. Sensible heat, latent boiling temperatures are covered. The unit also introduces the three modes of heat transfer and discusses the heat transfer process that takes place between two fluids separated by a solid boundary.

Plant Science #4 - Process Dynamics introduce the principles and operating characteristics of liquid, gas, and vapor systems by describing the main parts of a fluid system and the effects of pressure related to static fluids and steady-state flowing fluids. Other topics covered include energy conversions that take place in fluid systems, the use of pumps to control flow, common devices to measure process variables, and the effects of resistance and capacitance on operating fluid systems. *Prerequisite: High school general science.*

216 - BASIC WASTEWATER OPERATOR MATH I Educational Point: One (1)

Target group covers both elementary and basic math for Wastewater OIT and Grade I operators. Four sections of the workbook cover basic area and volume calculations solving for the unknown. Chlorine dosage, demand and calculations are covered. Fractions, conversion exercises, cancellation of units, scientific notation, whole numbers and decimals are reviewed. ***Prerequisite: High school math or good knowledge of math or Math 105***

217 - BASIC WASTEWATER OPERATOR MATH II Educational Point: One (1)

Target group Grades 1-3. This math workbook manual is designed to provide operators with a range of typical examination industrial treatment math problesm similar to those found on certification examinations. Newly written, this manual contains 14 chapters that provide illustrated math problems in the following categories: areas and volumes, flow and detention time calculations, chemical feed rates, chlorination, removal rates and efficiencies, chemical reactions, chemical solutions, pH calculations, statistical concepts, miscellaneous calculations and a complete set of step-by-step solutions to the problems presented in the manual. ***Prerequisite: Basic Wastewater Operator Math I 216 or Math 105***

218 - ADVANCED WASTEWATER OPERATOR MATH III Educational Point: (0.8) CEU

Target group Grade 3 Wastewater Plant operators. Journeyman and senior level WTPO level process math work; summary of process formulas, conversions. Advanced problems; volumes, pounds formula, sedimentation and clarification, secondary wastewater process units, trickling filters and activated sludge, chemical solutions, tertiary filtration, hydraulics, velocity, waste sludge, effluent disinfection, effluent disposal, gravity thickeners, and digesters. Assorted problems from past state exams. ***Prerequisite: Basic Wastewater Operator MATH II # 217***

219 - ADVANCED WASTEWATER OPERATOR MATH IV Educational Point: (0.8) CEU

Target group Grade 4 Wastewater Plant operators. Journeyman and senior level WTPO level process math work; summary of process formulas, conversions. Advanced problems; volumes, pounds formula, sedimentation and clarification, secondary wastewater process units, trickling filters and activated sludge, chemical solutions, tertiary filtration, hydraulics, velocity, waste sludge, effluent disinfection, effluent disposal, gravity thickeners, and digesters. Assorted problems from past state exams. ***Prerequisite: Basic Wastewater Operator MATH III # 218***

250 - MECHANICAL MAINTENANCE I: AIR COMPRESSORS AND BLOWERS Educational Point: One (1)

This course is designed to teach wastewater maintenance personnel and interested operators the procedures for disassembly inspection, and repair of reciprocating and rotary compressors. The program shows how typical maintenance operations are performed on these two types of machines.

Tape 1 covers: reciprocating air compressors. discharge valve removal and disassembly, and suction valve unloader removal and disassembly.
Tape 2 covers: reciprocating air compressors disassembly, piston and piston rod removal, piston ring installation, piston and piston rod installation, and clearance adjustment.
Tape 3 covers: rotary blower disassembly. removing the timing gears, removing the head plate and shafts, removing the bearings, installing the bearings, installing the timing gears, and adjusting the timing and reassembling the rotary blower. *Prerequisite: Knowledge of mechanical maintenance.*

251 - MECHANICAL MAINTENANCE II: BEARINGS AND LUBRICATION. AND PACKING AND SEALS Educational Point: One (1)

This course consists of five videotapes and textbooks.

Videotape 1 (Bearings and Lubrication) covers: introduction to bearings, disassembling and inspecting a plain journal bearing, checking the oil clearance of a plain journal bearing using a micrometer, performing a bearing contact check, checking the oil clearance of a plain journal bearing using lead wire, and assembling a plain journal bearing.

Videotape 2 (Bearings and Lubrication) covers: introduction to anti-friction journal bearings, maintenance of tapered roller bearings in a gear-type speed reducer. removing the top housing from a speed reducer, removing a shaft and bearing from a gear reducer. removing the bearing inner ring from the shaft, cleaning and inspecting an anti-friction bearing, replacing and assembling the anti-friction bearing, and using a bearing puller.

Videotape 3 (Bearings and Lubrication) covers: introduction to thrust bearings, tilting pad, oil film thrust bearings, disassembling a tilting pad, disassembling and inspecting the thrust bearing assembly, final assembly of a tilting pad, and bearing lubrication.

Videotapes 4 and 5 (Packing and Seals) cover: removing conventional valve packing, installing conventional valve packing, removing preformed chevron packing, installing preformed Chevron packing, fabricating graphite ring packing, removing pump packing, installing pump packing, removing-disassembling and inspecting a mechanical seal, and types of mechanical seals. *Prerequisite: knowledge of Mechanical Maintenance.*

252 - MECHANICAL MAINTENANCE III: GEAR BOXES, MECHANICAL DRIVES, COUPLINGS & ALIGNMENT Educational Point: One (1)

This program consists of four videotapes and textbooks.

Videotape 1 (Gear Boxes) covers: gear boxes, component inspection, performing precision measurements, installing bearings and oil seals, reinstalling the bearing coves and checking shaft runout, checking backlash and tooth contact, and gear designs.

Videotape 2 (Gear Boxes) covers: periodic checks, lubrication, removing and installing the oil seals, wormgearing design, worm shaft end worm gear end play and positioning, and gear box maintenance guidelines.

Videotape 3 & 4 (Mechanical Drives, Couplings and Alignment) covers: couplings and alignment, disassembling couplings and detecting angular misalignment, detecting parallel (offset) misalignment, interpreting alignment measurements, correcting misalignment, assembling the coupling, and removing belts. Prerequisite: *Knowledge of Mechanical Maintenance.*

253 - MECHANICAL MAINTENANCE IV: VALVES Educational Point: One (1)

This program consists of four videotapes and textbooks.

Videotape 1 covers: gate valves construction, disassembling the gate valve, disassembling the gate valve bonnet assembly, inspecting gate valve components, lapping the gate valve disc, reassembling the gate valve bonnet assembly, checking contact between the gate valve disc and seats, and final assembly of the gate valve.

Videotape 2 covers: globe valve construction, removing and disassembling the globe valve bonnet assembly, inspecting globe valve components, reassembling the globe valve bonnet assembly, lapping the globe valve disc, and reassembling the globe valve.

Videotape 3 covers: control valve construction, disassembling the control valve, inspecting control valve components, reassembling the control valve and installing the control valve.

Videotape 4 covers: diaphragm valve construction and disassembly, disassembling the diaphragm valve bonnet assembly, reassembling the diaphragm valve, butterfly valve construction, disassembling the butterfly valve, and inspecting and reassembling the butterfly valve.
Prerequisite: Knowledge of Mechanical Maintenance

254 - MECHANICAL MAINTENANCE V: MOTORIZED VALVE ACTUATORS AND RELIEF VALVES Educational Point: One (1)

This course consists of four videotapes and textbooks.

Videotape 1 (Motorized Valve Actuators) covers: valve actuators, mechanical components, electrical components. removing a valve actuator from a valve. disassembling a motorized valve actuator, and reassembling a motorized valve actuator.

Videotape 2 (Motorized Valve Actuators) covers: limit switch adjustment, torque switch adjustment, operational tests, limit and torque switch adjustment in another actuator design, mechanical troubleshooting, and electrical troubleshooting.

Videotape 3 (Relief Valves) covers: safety valve operation, safety vale disassembly, removing the disc assembly, blue checking the seat and disc, performing a spindle runout, valve reassembly, completing valve assembly and installing and setting the safety valve.

Videotape 4 (Relieve Valves) covers: relive valve operation, relief valve disassembly, removing the pilot valve, blue checking the pilot valve, making valve seat repairs, and valve reassembly and installation. *Prerequisite: Knowledge of Mechanical Maintenance.*

255 - MECHANICAL MAINTENANCE VI: VIBRATION ANALYSIS, SHAFT ALIGNMENT I SHAFT ALIGNMENT II, AND ADVANCED ALIGNMENT Educational Point: One (1)

This course consists of three videotapes.

Videotape 1 (Vibration analysis) covers: introduction to the hand-held vibration meter, using the hand-held vibration meter, storing the hand-held vibration meter, introduction to the vibration analyzer, taking unfiltered readings, taking filtered readings, and taking signature balancing.

Videotape 2 (Shaft Alignment I) covers: alignment theory, measuring and correcting misalignment, preparing for alignment, introduction to rim and face alignment, rim and face alignment (measuring vertical plane misalignment), graphing and correcting plane misalignment, and rim and face alignment (horizontal plane misalignment).

Videotape 4 (Hydraulic Equipment) covers: gear pump disassembly, parts inspection, gear pump disassembly, vane pump disassembly, inspection, and vane pump reassembly. *Prerequisite: Knowledge of Mechanical Maintenance.*

256 - MECHANICAL MAINTENANCE VII: BOILERS AND BOILER EQUIPMENT, AND AUXILIARY STEAM TURBINES Educational Point: One (1)

This course consists of five videotapes and textbooks.

Videotape 1 - Boiler Fundamentals covers principles of operation, types of boilers, fuels and burners, heat transfer, water and fuel flow. and water and steam flow.

Videotape #2 - Basic Boiler Systems covers fuel systems, condensate and feedwater systems. control systems, and instrumentation .

Videotape #3- Boiler Maintenance covers types of boilers, interior furnace components, hot gas path components, the outside of the boiler, and waterside components.

Videotape #4 - Boiler Inspection and Cleaning Unit 1 covers waterwall inspection, techniques, superheater inspection, inspection of baffles, economizers, and ash hoppers, and exterior boiler inspection.

Videotape #5 - Boiler Inspection and Cleaning Unit 2 covers drum and moisture separator inspection, header and tube inspection,waterside cleaning, and fireside cleaning and boiler closure. *Prerequisite: Knowledge of Mechanical Maintenance.*

257 - MECHANICAL MAINTENANCE VIII: COAL AND ASH HANDLING EQUIPMENT, AND HYDRAULIC EQUIPMENT Educational Point: One (1)

This course consists of four videotapes and test books.

Videotape 1 (Coal and Ash Handling Equipment) covers: preparing a conveyor belt for maintenance, cutting a conveyor belt, punching holes in the belt for a bolted fastener, assembling and installing metal fasteners, completing the bolted metal splice, preparing a belt for splicing with riveted solid metal fasteners, completing the riveted solid metal splice, and installing a riveted hinged splice and aligning the belt.

Videotape 2 (Coal and Ash Handling Equipment) covers: re-blading and balancing a pulverizer exhauster, disassembling a control valve, removing the seat and disc, reassembling the control valve, disassembling and inspecting an air piston operator, reassembling an air piston operator, water jet exhauster operation and inspection, and assembling a water jet exhauster.

Videotape 3 (Hydraulic Equipment) covers: basic hydraulic systems, hydraulic cylinder disassembly, shaft runout, cylinder reassembly, control valve disassembly, and control valve inspection and reassembly.

258 - PIPING Educational Point: One (1)

Videotape 1 covers: preparing for tubing system repair, flaring tubing, bending and cutting tubing, tubing connections, pipe cutting, threading pipe, pipe assembly, and union replacement.

Videotape 2 covers: general maintenance and insulation removal, elbow removal, elbow installation, selecting and installing insulation on an elbow, insulating a flange and applying cloth, and plastic-lined piping.

Videotape 3 covers: inverted bucket trap, disassembly and reassembly, float and bellows trap disassembly, float and bellow trap reassembly, impulse steam trap (piston type), impulse steam trap (disc type), the duplex strainer, and the edge type strainer.

Videotape 4 covers; cleaning steam condenser tubes, inspecting and plugging steam condenser tubes, cutting a tube for removal, collapsing a tube for removal, replacing a tube, and gauge glass replacement. *Prerequisite: Knowledge of Mechanical Maintenance.*

259 - ADVANCED PIPE FITTING Educational Point: One (1)

This course consists of four videotapes and textbooks.

Videotape 1 covers: introduction to pipe fitting, blueprints, piping materials, material list and field checks, determining pipe length, fitting measurements, marking a pipe, and cutting methods.

Videotape 2 covers: torch cutting, using an automatic cutting torch, end preparation tool, alignment, checking alignment and tack-welding, installation, and support.

Videotape 3 covers: fabricated joints, mitre joints, riser joints, centering heads, contour markers, field marking and hole projection markers.

Videotape 4 covers: introduction to plastic pipe and cutting, end preparation, end cleaning, joining, plastic welding, fiberglass reinforced plastic pipe cutting and end preparation, making a butt and wrap joint, and program review.

260- HYDRAULIC SYSTEMS I: INTRODUCTION TO HYDRAULIC SYSTEMS, PRESSURE CONTROLS, AND DIRECTIONAL AND FLOW CONTROLS Educational Point: One (1)

This course consists of three videotapes and textbooks.

Videotape 1 (Introduction to Hydraulic Systems) Covers: properties of liquids, hydraulic system components, hydraulic schematic symbols, pressure and flow, system flow and pressure, hydraulic power transmission, hydraulic system efficiency, and hydraulic system safety.

Videotape 2 (Pressure Controls) covers: introduction to pressure control valves, unloading and counterbalance valves, sequence and pressure reducing valves, direct-acting and pilot-operated pressure control valves, external control of pilot-operated valves, spool-type pressure control valves, and pressure reducing valve operation.

Videotape 3 (Directional and Flow Controls) covers: directional control valves, centering conditions, actuating directional control valves, piloting and draining, packed spool valves, flow control valves, flow control valve designs, and flow control applications. *Prerequisite: Knowledge of Mechanical Maintenance.*

261 - HYDRAULIC SYSTEMS II: FLUIDS, FILTERS, AND RESERVOIRS; HYDRAULIC PUMPS, PUMPING PRINCIPLES, AND ACCUMULATORS; AND VARIABLE VOLUME HYDRAULIC PUMPS Educational Point: One (1)

This course consists of three videotapes and textbooks.

Videotape 1 (Fluids, Filters and Reservoirs) covers: functions of hydraulic fluid, characteristics of hydraulic fluid, fluid conditioning in the reservoir, draining and replacing fluid, reducing external contamination filters, filters, and filter maintenance.

Videotape 2 (Hydraulic Pumps, Pumping Principles, and Accumulators) covers: hydraulic power, hydraulic pumps vane pumps, piston pumps, monitoring pump operation, hydraulic accumulators, accumulators maintenance, and precharging an accumulator.

Videotape 3 (Variable Volume Hydraulic Pumps) covers: fixed volume and variable volume pumps, horsepower reduction, variable volume vane pumps, variable volume piston pumps, volumetric efficiency, case drain flow, electrical checks, and reversible pumps.
Prerequisite: Completion of Course #260 Hydraulic Systems I.

262 - HYDRAULIC SYSTEMS III: ACTUATORS, HYDRAULIC SYSTEM TROUBLESHOOTING. AND ELECTROHYDRAULIC SERVO SYSTEMS Educational Point: One (1)

This course consists of three videotapes and textbooks.

Videotape 1 (Actuators) covers: hydraulic cylinders, cylinder regulation, cylinder repair, hydraulic motors, motor regulation, and motor repair.

Videotape 2 (Hydraulic System Troubleshooting) covers: introduction to troubleshooting, using schematic diagrams, flow-related problems, cylinder malfunction, edge guide circuit malfunction, downender malfunction, and traversing circuit malfunction.

Videotape 3 (Electrohydraulic Servo Systems) covers: signal transmission, servo system schematic symbols, spool servo valves, jet pipe servo valves, flapper servo valves, and frequency response tests. *Prerequisite: Completion of Course #261 Hydraulic Systems II.*

263 - LIFTING AND RIGGING Educational Point: One (1)

Rigging and Lifting Module is a comprehensive videotape and text training program. It teaches the procedures for using: hand-operated chain hoists, overhead traveling cranes, forklifts. mobile cranes, scaffolding, and ladders. The program shows the various maintenance activities being performed on actual plant equipment.

Videotape 1 includes hand-operated hoists, planning and equipment selection, hoist inspection, shackle and trolley inspection, etc.

Videotapes 2 includes introduction to overhead traveling cranes, performing an operational inspection on an overhead traveling crane, using a spreader bar, etc.

Videotape 3 includes inspecting a mobile crane, test driving a mobile crane, static and operational inspection of a forklift, removing a pallet from a truck, etc.

Videotape 4 includes components of ladders and ladder selection, climbing and lowering an extension ladder, erecting a fixed scaffold, etc.

264 – RESERVED

265 - MECHANICAL MAINTENANCE X: (FUNDAMENTALS OF INSTRUMENTATION AND CONTROLS) LIQUID LEVEL MEASUREMENTS AND PRESSURE GAUGE AND CALIBRATION Educational Point: One (1)

Videotape 1 - Liquid Level Measurement focuses on the operating principles of simple level measuring instruments, float-actuated instruments, displacers, magnetic float devices and sonic instruments.

Videotape 2 - Liquid level Measurements 2 teaches trainee how to convert pressure measurements into equivalent liquid level measurements. After completing this unit, trainees should understand how indirect level measuring instruments can be used in open tanks, what differential pressure is, how differential pressure is measured, and how D/P devices are connected to open and closed tanks.

Videotape 3 - Pressure Gauges and Calibration 1 demonstrates how to read pressure gauges, remove gauges, and return gauges to service. With sufficient practice, trainees should be able to assemble and disassemble adjustable pointer mechanisms and calibrate rotary-geared pressure gauges containing Bourdon tube or bellows pressure elements.

Videotape 4 - Pressure Gauges and Calibration 2 teaches trainees to calibrate a variety of pressure gauges, including retard gauges, absolute gauges, and compound gauges. Trainees also learn to compensate correctly for static pressures when the level of the gauge is different from the level of the pressure being monitored and to select and install devices to protect a gauge from process it monitors. *Prerequisite: Completion of Course 206.*

266 - MECHANICAL MAINTENANCE XI: (FUNDAMENTALS OF INSTRUMENTATION AND CONTROL: RECORDERS, TEMPERATURE AND TEMPERATURE MEASUREMENT 2, AND INSTRUMENTATION TROUBLESHOOTING AND REPAIR Educational Point: One (1)

Videotape 1 - Recorders covers the construction and operation of typical circular chart and strip chart recorders and shows the variety of designs and types of available recorders, types of inputs, print drive and chart drive sections, and recorder printers. The unit also demonstrates simple maintenance, troubleshooting, and calibration procedures on both pneumatic and electronic recorders.

Videotape 2 - Temperature and Temperature Measurement #2 explains how thermocouples, (RTDs), thermistors, and infrared temperature sensors operate, and how certain electrical properties and temperature are related and applied in electrical temperature-measuring instruments. Trainees are shown how to obtain a temperature reading with each of the devices covered and how to convert a reading in volts or ohms to degrees. Trainees are also shown how to identify thermocouple types and thermocouple lead wires, how to determine polarity in each of the electrical circuits covered, and how to remove and install the instruments safely. Appropriate electronic test equipment is used to check or troubleshoot electrical temperature-measuring instruments.

Videotape 3 - Instrumentation Troubleshooting and Repair introduces the types of diagrams and manuals used in instrumentation troubleshooting and the test equipment used for simulating inputs and measuring outputs. After completing this unit, trainees should be able to identify the problem components in a malfunctioning control loop, given the necessary reference materials. Trainees should also be able to demonstrate good practices for removal, replacement, and repair of process control instruments. *Prerequisite: Completion of Course #265.*

267 - MECHANICAL MAINTENANC XII: PNEUMATIC SYSTEMS AND EQUIPMENT Educational Point: One (1)

Videotape 1 - Pneumatic Actuators and Positioners examine the main parts of a diaphragm actuator, a piston actuator, a force balance positioner, and a motion balance positioner. Also covered are how each of these instruments work. how a force balance positioner is adjusted, and how a diaphragm actuator and a valve are stroked.

Videotape 2 - Pneumatic Control Equipment #2 focuses on the operating principles underlying common types of force balance instruments and motion balance instruments. Trainees are shown how to locate the zero and span or range adjustments on these instruments and how various types of pneumatic relays operate.

Videotape 3 - Pneumatic Control Equipment #3 focuses on the function, purpose, and operation of five pneumatic control instruments: transmitters, recorders, converters, indicators, and hand-auto control stations. This unit explains how to identify correct output conditions, given instrument input conditions, and how to calibrate the instruments. *Prerequisites: Completion of Course #206.*

268 - MECHANICAL MAINTENANCE XIII: (PNEUMATIC SYSTEMS AND EQUIPMENT) Educational Point: One (1)

Videotape 1 - Multi-element Pneumatic Control Systems discusses the operating principles of ratio control systems, cascade control systems, auctioneering control systems, and three-element feedwater control systems. Trainees learn to trace the associated signal paths and explain the symbols used on simplified logic diagrams.

Videotape 2 - Tuning Pneumatic Control Systems. After completing this unit, trainees should be able to tune a controller with the guidance and assistance of an experience supervisor or instrument technician. Correct tuning of systems should be prerequisite to successful completion of this training sequence. Tuning, in the context of this unit, involves identifying process and system characteristics, determining how those characteristics affect the tuning process, interpreting process reaction curves correctly, and adjusting the controller properly.

Videotape 3 - Troubleshooting Pneumatic Instrument Systems. This unit presents the basics of troubleshooting pneumatic instrument systems. After completing this unit, trainees should be able to demonstrate the correct procedure for troubleshooting pneumatic instrument systems when given specific troubleshooting tasks. *Prerequisite: Completion of Course #267 - Pneumatic Systems and Equipment.*

269 - ELECTRICAL MAINTENANCE I Educational Point: One (1)

Videotape 1 - Reading Electrical Diagrams. 2. Connection and Interconnection diagrams, raceway diagrams, and logic diagrams are covered in this unit. Trainees learn how to read a "Raceway Schedule"; a Raceway Notes, Symbols, and Detail book; and truth tables.

Videotape 2 - Troubleshooting and Emergency Repair of AC Systems and Equipment. This unit examines examines AC systems and equipment troubleshooting, with particular emphasis on industrial AC systems, subsystems, units, and components commonly in use. Trainees are taught how to identify and locate grounds, shorts, and opens; how to make simple emergency repairs to AC equipment; and how to be aware of the limitations and safety concerns associated with emergency repairs.

Videotape 3 - Power Supplies. It explains the operation of transformers, rectifiers, filters. regulators, voltage multipliers, and voltage dividers and shows trainees how to identify these devices and circuits on a schematic. *Prerequisite: Completion of Course #102, Basic Electricity Review and Reading Electrical Diagrams.*

270 - ELECTRICAL MAINTENANCE II: (MOTORS AND MOTOR CONTROLLERS) Educational Point: One (1)

Videotape 1 - Three-Phase AC Induction Motor Maintenance. This unit focuses on the basics of three-phase AC induction motor maintenance: how three-phase motors are constructed; how they operate; and how they are tested, maintained, disassembled, inspected, and reassembled.

Videotape 2 - AC Motor Controller Maintenance. This unit shows trainees how to locate controller components using a schematic diagram and a wiring diagram; how to apply the basic steps of troubleshooting; how to perform preventive maintenance procedures; how to test an energized controller for opens; and how to test a de-energized controller for grounds, opens and shorts.

Videotape 3 - Maintenance of High-Voltage Circuit Breakers and Switchgear (4KV and Over). This unit describes the principles of operation of high-voltage breakers and switchgears; how circuit breakers extinguish an arc and how protective systems work in conjunction with the breakers. After completing the unit, trainees should be able to assist an experienced electrician in performing routine maintenance on air circuit breakers and oil circuit breakers, and in performing certain electrical tests on breakers. *Prerequisite: Completion of Course #269.*

271 - ELECTRONIC SYSTEMS AND EQUIPMENT AMPLIFIERS Educational Point: One (1)

Videotape 1 - Operational Amplifiers #1. After completing this unit, trainees should be able to use schematic diagrams to recognize the following basic operational amplifier circuit configurations: voltage followers, reinverted voltage followers, inverting amplifiers, non-inverting amplifiers, differential amplifiers, and instrumentation amplifiers. Given input conditions for these amplifiers circuits, trainees should be able to identify correct circuit output conditions, the basic characteristics of operational amplifiers, and the functions of each of the components within the circuits. They should also be able to recognize the four common operational amplifier package styles.

Videotape 2 - Operational Amplifiers 2. This unit shows trainees how to use schematic diagrams to recognize basic operational ampliers summing amplifers, comparator, integrator, and differentiator circuits. It teaches trainees to identify correct circuit output conditions, given input conditions for these amplifiers circuits, and to perform common routine maintenance and troubleshooting tasks on equipment involving basic operational amplifiers circuits.

Videotape 3 - Using Electronic Test Equipment. This unit on electronic test equipment describes the operation of a Wheatstone Bridge circuit and explains how this circuit relates to the use of resistance decade box, which checks an RTD monitoring system. After completing this unit, trainees should know how to use signal generator, an AC/DC power supply, a vacuum tube tester, and a millivolt potentiometer in common plant applications. *Prerequisite: A general knowledge of electronic systems. Completion of Course 270 is recommended.*

272- ELECTRONIC SYSTEMS AND EQUIPMENT TRANSISTORS. Educational Point: One (1)

Videotape 1 - Transistor Principles. This unit familiarizes trainees with the construction of N-P-N and P-N-P bipolar transistors and explains how a transistor is properly sized, how current flows through a properly biased transistor, and how current flow through a properly biased transistor can be controlled. This unit also covers the construction of a common emitter circuit and explains how this circuit amplifies an electrical signal. After completing the unit, trainees should be able to identify the leads of transistors by their appearance and through the use of a transistor manufacturer's data book. Trainees should also be able to use the data book to select a replacement transistor, and they should be familiar

with several types of transistor test equipment. In addition, they should be able to use a digital multimeter to conduct resistance checks on transistors to determine if they are good or bad.

Videotape 2 - Transistor Amplifiers. This unit explains how transistor amplifier circuit configurations are used as examples to teach trainees about construction, bias, and amplification characteristics. In addition, trainees are shown how to identify the three basic methods of transistor amplifier coupling and how to multistage amplifier operates. A typical procedure for troubleshooting a faulty amplifier circuit, including initial in-unit testing, visual inspection, and signal checks, is demonstrated.

Videotape 3 - Transistor Oscillators. This unit covers basic operating principles of oscillators and how these principles specifically apply to different oscillators. Included are the Armstrong oscillators, the Hartley oscillators, and multivibrators. After completing this unit, trainees should be able to perform simple troubleshooting procedures on a transistor oscillator by applying the techniques discussed in this unit for Armstrong oscillators and astable oscillators. *Prerequisite: Completion of Course #271.*

273 - COLLECTION SYSTEM MAINTENANCE Educational Points: one (1)

This course covers various collection system operation and maintenance to include: Basic system designs, collection system inspection, system testing, pipe cleaning and repair, underground repairs and safety procedures. Backhoe operation and safety videos. Basic open trench and trenching procedures and safety are covered as well.
Prerequisite: basic collection system knowledge

275A- MECHANICAL MAINTENANCE: INDUSTRIAL GEARING, GEAR REDUCERS, CENTRIFUGAL PUMPS Educational Point: One (1)

This new training program from Tel-A-Train, Inc., covers mechanical maintenance in three sections: A, B, and C. Part A uses six videos and associated readings and class discussions to cover:

Basic Terms of Maintenance: Maintaining and Troubleshooting Industrial Gearing: Maintaining and Troubleshooting Gear Reducers: Maintaining Centrifugal Pumps: Monitoring Centrifugal Pumps: Troubleshooting Centrifugal Pumps

Prerequisite: Knowledge of Mechanical Maintenance.

275B - MECHANICAL MAINTENANCE: VALVES, FLEXIBLE DRIVES (BELTS & CHAINS), BRAKES AND CLUTCHES Educational Point: One (1)

This new training program from Tel-A-Train, Inc., covers mechanical maintenance in three sections: A, B, and C. Part B uses six videos and associated readings and class discussions to cover:

Maintaining Valves: Maintaining V-Belts: Maintaining and Troubleshooting Brakes and Clutches: Maintaining Flexible Drives: Roller Chain and Silent Chain: Maintaining Flexible Drives: Flat Belts, V-Belts and Timing Belts: Maintaining Flexible Drives: Chain other than Roller Chain

Prerequisite: Knowledge of Mechanical Maintenance.

275C - MECHANICAL MAINTENANCE: LUBRICATION, BEARINGS, COUPLINGS, AND LASER ALIGNMENT
Educational Point: One (1)

This new training program from Tel-A-Train, Inc., covers mechanical maintenance in three sections: A, B, and C. Part C uses six videos and associated readings and class discussions to cover:

Lubrication Techniques: Bearing Installation: Bearing Maintenance: Couplings: Coupling Alignment Techniques: Laser Alignment

Prerequisite: Knowledge of Mechanical Maintenance.

278A - INDUSTRIAL HYDRAULIC TECHNOLOGY Educational Point: One (1)

This new training program from Tel-A-Train covers industrial hydraulics in two sections: A and B. Part A uses seven videos and an instructional text and class discussions to cover:

The Physical World of a Machine: Hydraulic Transmission of Force and Energy: Petroleum Base Hydraulic Fluids: Fire Resistant Hydraulic Fluids Operation at the Suction Side of a Pump: Hydraulic Actuators: Control of Hydraulic Energy

Prerequisite: Knowledge of Mechanical Maintenance.

278B - INDUSTRIAL HYDRAULIC TECHNOLOGY Educational Point: One

This new training program from Tel-A-Train covers industrial hydraulics in two sections: A and B. Part B uses seven videos and an instructional text and class discussions to cover:

Accumulators and Cylinders: Flow Control Valves: Directional Control Valves: Pressure Control Valves: Pilot Operated Pressure Control Valves: Hydraulic Pumps: Hydraulic Motors: Reservoirs, Coolers and Filters

Prerequisite: Knowledge of Mechanical Maintenance.

ADVANCED COURSES

(300 Level)

301 - ACTIVATED SLUDGE SKILLS TRAINING COURSE (ADVANCED) Educational Point: One (1) CEU for the two-day course. Two (2) CEUs for the 2 1/2-day course.

This training program deals with the process control in an activated sludge system. As a plant operator, you know that the success of the treatment system is measured by the quality of the effluent. So, your main concern is to make sure that your effluent meets your regulatory agencies requirement. In many cases the required values for the biochemical oxygen demand (BOD) and suspended solids (SS) are less than 30 mg/l and that for the chemical oxygen demand (COD) is less than 100 mg/l. To maintain these levels and, thus have effective operation, you must maintain an adequate number of microorganisms; maintain good settling properties; supply adequate air to the aeration tank; and remove sludge from the clarifier before septic conditions or denitrification problems occur. Other objectives include identifying the components of aeration and clarification methods; describing the purpose, operation, and maintenance requirements of major components; use checklists to start-up, shut down and troubleshoot a system; and demonstrating knowledge of F/M ratio, respiration rate, and the mean cell retention time for analyzing plant data. Advance activated mathematic problems will also be covered. *Prerequisite: Successful completion of Course #201 or completion of Volume I - Ken Kerri's correspondence course of the California State University, Sacramento.*

302 - ANAEROBIC DIGESTION SKILLS TRAINING COURSE (ADVANCED) Educational Point: One (1)

This training course is divided into three parts. Chapter One, you will work through an overview of both the actual digestion process and the equipment that is used in the system. This includes learning about the two stages of digestion, where and how they occur, and about the most important pieces of equipment like digesters, heat exchanger, gas lines and sludge lines. Chapter Two deals with the equipment in more detail. You will learn to identify the components of the various pieces of equipment used in this process. Also. you will learn the part each piece of equipment plays in the digestion process. Chapter Three discusses normal operating procedures and process control; all you need to know to keep the digestion system working effectively. You will have an opportunity to practice the calculations that will provide information for process control. *Prerequisite: Successfully completed the Basic Course and Course #210 or completion of Volume I - Ken Kerri's Course.*

303 - CHLORINATION SKILLS TRAINING COURSE (ADVANCED) Educational Point: One (1)

This training course consists of two parts. Part A contains information on the uses, properties and hazards of chlorine; dosage, residual and feed rate calculation; and feed rate calculation; and identification and function of gas chlorination components. Part B contains a guide for hands-on training that should be conducted in a gas chlorination workshop (if possible). *Prerequisite: Completion of Course #101 or Volume I - Ken Kerri's Course.*

304 - ELECTRICAL MAINTENANCE COURSE: LOW AND MEDIUM VOLTAGE MOTOR CONTROLS AND STARTERS. BY MULTI-AMP INSTITUTE OF DALLAS, TEXAS Educational Point: One (1)

This training course consists of circuit layout, connections and symbols; control pilot devices; basic control circuits; AC reduced voltage starters; three-phase, multispeed controllers; wound rotor (slip ring) motor controllers; synchronous motor controls; direct-current controllers; methods of deceleration; and motor drives.

306 - PROCESS CONTROL LABORATORY COURSE Educational Points: Two (2)

This training course is ideally suited to prepare operators with the necessary training to perform laboratory sampling and testing. Laboratory procedures covered include: measurement of pH (colorimetric and electrometric method); thirty minute settling test; test solids (TS) measurement, total volatile solids (TVS) measurement; total dissolved solids (TDS) measurement; total residual chlorine measurement; dissolved oxygen (DO) test; sampling mixed liquor for the DO test; determining biochemical oxygen demand; determining alkalinity; and volatile acids measurements.

307 - SLUDGE CONDITIONING, THICKENING AND DEWATERING SKILL TRAINING COURSE (ADVANCED) Educational Points: Three (3)

This training course is designed for the operators of wastewater treatment plants who are, or will become, involved in the processing of wastewater sludge. Volume A, Part I covers the quality and quantity of sludge produced. Topics include primary sludge, secondary biological sludge, chemical sludge, and miscellaneous wastewater sludge. Part 2 covers chemical conditioning of sludge. Topics include storage and handling, chemical feeders and processes control for chemical sludge conditioning. Volume B covers sludge dewatering. Topics include drying beds, centrifuges, vacuum filters, belt filter presses, and pressure filters. *Prerequisite: Completion of Course #210 or Volume I - Ken Kerri's course.*

308 - WASTEWATER STABILIZATION PONDS (ADVANCED) Educational Point: One (1)

The general objectives of this course are to increase the ability of the student to recognize and understand the function and operation of a facultative waste stabilization pond. Several points to be discussed include: locate and describe components and, where necessary, explain how they work; distinguish between the various types of ponds; distinguish between the responsibilities of the operator and those of the owner; describe how bacteria and algae cycle works; explain the advantages and disadvantages of parallel and series operation in terms of BOD, SS and fecal coliform removal. *Prerequisite: Completion of Course #209 or Volume I - Ken Kerri's course.*

310 – ACTIVATED SLUDGE MICROBIOLOGY Educational Point: One Half (0.5)

This course covers the basic functions of various microbes. Discusses the relationship between relative predominance of organisms and condition of activated sludge. Students are encouraged to bring sludge sample from their facilities for use during course case studies.
Prerequisite: Completion of Course #209 or Volume I - Ken Kerri's course.

312 - ADVANCED LABORATORY COURSE Educational Points: Two (2)

This course is designed to supplement Course #306 - Process Control Laboratory Course as well as to introduce advanced topics in wastewater chemistry, biomonitoring and toxicity testing, etc. Course objectives are: to learn and apply advanced analytical techniques and good laboratory practices; to apply knowledge and skills learned in previous laboratory course; to know how to properly collect and handle analytical samples; to know how to validate analytical data; to know how to write standard operating procedures; to understand quality assurance and quality control; and to recognize unsafe laboratory practices. *Prerequisite: Completion of Course #306.* NOTE: Course #312 replaces Courses #309 and #311. Anyone who has previously completed Courses #309 and #311 should not register for Course #312 as the instruction would duplicate training already received.

314 - LAB SKILLS TRAINING FOR SUPERVISORS AND MANAGERS **Educational Point: One (1)**

This two-day course for supervisory personnel in wastewater treatment operations focuses on the process control laboratory. The increasing emphasis on treatment upgrades, effluent re-use, and managing costs through treatment optimization are factors driving the need for reliable data from the laboratory. Students will receive classroom instruction in lab test methods and operations, then apply these skills in a laboratory setting. The training topics will stress quality control in sample collection and handling, analytical testing, data evaluation and reporting, and basic lab management. *Prerequisite: Completions of Course #312 (#309 & #311).*

315 – RCAC WATER SYSTEM UTILITY MANAGEMENT COURSE **Educational Point: One (1)**

315 - BIOLOGICAL NUTRIENT REMOVAL **Educational Point: One (1)**

LIST OF APPROVED TRAINING COURSES FOR REPEATS AFTER 6 YEARS @ ½ CREDIT (For Operator Certificate Renewal Purposes Only):			
	Basic Courses	**CEU**	**Allowed CEUs**
101	Basic Wastewater	1.00	0.00
102	Electricity Review and Reading Electrical Diagram	1.00	0.00
103	Plant Safety	1.00	0.00
104	Wastewater Collection System	1.00	0.00
105	Wastewater Mathematics	2.00	0.00
106	Hazard Communication Program	0.50	0.00
108	NPDES and UIC	0.50	0.25
109	Train-the-Trainers	1.00	0.00
110	Pumping Stations	1.00	0.00
111	Introduction to Personal Computers and Windows	0.50	0.00
112	State Regulations Affecting Wastewater Treatment Plants	0.50	0.25
114	Confined Space	0.50	0.00
115	Blueprint Reading	0.50	0.00
116	Ultraviolet Disinfection	1.00	0.00
117	Utility Management	0.50	0.00
118	First Aid and CPR	0.50	0.00
	Intermediate Courses		
201	Activated Sludge Process Control	1.00	0.50
202A	Certification Examination Refresher - Grades 1 & 2	1.00	0.00
202B	Certification Examination Refresher - Grades 3 & 4	1.00	0.00
204	Diesel Engines Operation and Maintenance	1.00	0.00
205	Equipment Operation: Heat Exchangers, Valves, and Lubrication	1.00	0.00
206	Instrumentation and Controls	1.00	0.50
207	Mechanical Maintenance Fundamentals for Operators: Measuring Instruments, Bolting & Fastening	1.00	0.00
208	Pumps: Operation and Maintenance	1.00	0.50
209	RBC, Trickling Filters and Stabilization Ponds	1.00	0.00
210	Sludge Handling, Sludge Thickening, Anaerobic and Aerobic Digestion, Dewatering	1.00	0.50
211	Troubleshooting Pumps	1.00	0.00
212A	Wastewater Facility Management Skill Training - Volume I	1.50	0.75
212B	Wastewater Facility Management Skill Training – Volume II	1.50	0.75
214	Waste Treatment Process: Community Wastewater Treatment, Pretreatment and Clarification	1.00	0.50
215	Plant Science	1.00	0.50
250	Air Compressors and Blowers	1.00	0.00
251	Bearings and Lubrication, Packing and Seals	1.00	0.00
252	Gear Boxes, Mechanical Drives	1.00	0.00
253	Valves	1.00	0.00
254	Motorized Valve Actuator and Relief Valves	1.00	0.00
255	Vibration Analysis	1.00	0.00

Intermediate Courses (continued)		CEU	Allowed CEUs
256	Boiler Fundamentals and Basic Boiler System	1.00	0.00
257	Hydraulic Equipment, Coal and Ash Handling Equipment	1.00	0.00
258	Piping	1.00	0.00
259	Advanced Pipe Fitting	1.00	0.00
260	Introduction to Hydraulic Systems and Pressure Controls	1.00	0.00
261	Fluids, Filters and Reservoirs, Pumps and Accumulators	1.00	0.50
262	Actuators, Troubleshooting Hydraulic System	1.00	0.50
263	Lifting and Rigging	1.00	0.00
264	Pneumatic Systems Course	1.00	0.50
265	Liquid Level Measurements, Pressure Gauge and Calibration	1.00	0.50
266	Recorders, Temperature and Temperature Measurements	1.00	0.00
267	Pneumatic Actuators, Positioners, and Pneumatic Control Equipment	1.00	0.50
268	Multi-Element Pneumatic Control Systems, Troubleshooting Pneumatic Instrument Systems	1.00	0.50
269	Reading Electrical Diagrams, Troubleshooting and Emergency Repair of AC Systems	1.00	0.00
270	Three-Phase AC Induction Motor Maintenance, AC Motor Controller Maintenance	1.00	0.00
271	Operational Amplifiers, Using Electronic Test Equipment	1.00	0.50
272	Transistor Principles, Transistor Amplifiers, Transistor Oscillators	1.00	0.00
275A	Mechanical Maintenance (Pumps and Gears)	1.00	0.00
275B	Mechanical Maintenance (Belts and Drives)	1.00	0.00
275c	Mechanical Maintenance (Bearing and Alignment)	1.00	0.00
276	Trickling Filters/Solids Contact	1.00	0.50
277	OSHA Process Safety Management	1.00	0.50
278	Industrial Hydraulic Technology (Topics 1 - 7)	1.00	0.00
278A	Industrial Hydraulic Technology (Topics 8 - 16)	1.00	0.00
	Advanced Courses		
301	Activated Sludge Skills Training Course	2.00	1.00
302	Anaerobic Digestion Skills Training Course	1.00	0.50
303	Chlorination Skills Training Course	1.00	0.00
304	Low and Medium Voltage Motor, Controls and Starters (Special Course)	1.00	0.00
306	Process Control Laboratory Course	2.00	1.00
307	Sludge Conditioning, Thickening, and Dewatering Skill Training Course	3.00	1.50
308	Wastewater Stabilization Ponds	1.00	0.00
310	Activated Sludge Microbiology Workshop	0.50	0.25
314	Laboratory for Manager and Supervisors	1.00	0.50
315	Biological Nutrient Removal	1.00	0.50
316	Clarifier Optimization	1.00	0.50
317	Fundamentals of Biology and Chemistry	1.00	0.50

REQUEST FOR PUBLIC RECORD

TO: STATEWIDE WASTEWATER OPERATOR
TRAINING CENTER
1350 SAND ISLAND PARKWAY, BLDG. 3A
HONOLULU, HI 96819

PHONE: (808) 832-5478
FAX: (808) 832-3496

The following record is hereby requested (Identify or describe character of record):

( ) Training Center Information (Payable to "**Department of Health, State of Hawaii**")
- [ ] Copy of Class Roster (two per year allowed)
- [ ] Additional copies of Class Roster = $5.00
- [ ] Certified copy of Course Completion Certificate = $5.00

( ) Board of Certification Information (Payable to "**State of Hawaii**")
- [ ] Replacement of Operator Certificate = $25.00
- [ ] Replacement of Operator I.D. card = $10.00

Effective October 15, 2008, the above fees will be imposed for additional copies/replacements.
Be sure to include your check or money order with your request.

Mail completed request & payment to:	OFFICIAL USE ONLY:
Statewide Wastewater Operator Training Center State of Hawaii, Department of Health 1350 Sand Island Parkway, Bldg. 3A Honolulu, HI 96819	Date Request Recd:_____ Date of Check:_____ Check #:_____ Amount Received: $_____

_____

_____

_____

Name of Requestor or Duly Authorized Agent

Company/Organization

Signature Date

Address

Phone No. Fax No.

City, State Zip Code

( ) No Information Found

( ) See Attached Information

Wastewater Branch Agent

Date

TRAINING SESSION REGISTRATION APPLICATION

STATEWIDE WASTEWATER OPERATOR TRAINING CENTER
DEPARTMENT OF HEALTH, STATE OF HAWAII
PHONE: (808) 832-5478 FAX: (808) 832-3496

NAME (Print) _____ Last _____ First _____ M.I.

MAILING ADDRESS _____
Street City Zip Code

TELEPHONE (BUSINESS) _____

EMPLOYER _____

POSITION TITLE _____ *CERTIFICATION GRADE _____

COURSE# & COURSE TITLE _____ ISLAND _____

DATE(S) OF COURSE _____

TUITION FEE $ _____ (IF APPLICABLE)

*IF ATTENDING ABC CERTIFICATION EXAMINATION REFRESHER COURSE, PLEASE **SPECIFY** WHICH CERTIFICATION GRADE EXAM YOU WILL BE SITTING FOR.

Please make check or money order payable to the "**Department of Health, State of Hawaii**".

INCOMPLETE FORMS WILL NOT BE PROCESSED! APPLICATIONS and TUITION ARE DUE AT LEAST two (2) WEEKS PRIOR TO THE FIRST DAY OF CLASS.

Mail completed application to:	OFFICIAL USE ONLY:
Statewide Wastewater Operator Training Center State of Hawaii, Department of Health 1350 Sand Island Parkway, Bldg. 3A Honolulu, HI 96819	Date Request Recd: _____ Date of Check: _____ Check #: _____ Amount Received: $ _____

I certify that I meet the prerequisites of the course.

APPLICANT'S SIGNATURE _____ Date _____

SUPERVISOR'S APPROVAL _____ Date _____

NOTES: STATE AND COUNTY WASTEWATER EMPLOYEES: Please submit applications to your supervisor for approval prior to submitting to the Statewide Wastewater Operator Training Center.

ALL OTHER NON-MUNICIPAL AND NON-WASTEWATER EMPLOYEES: Submit applications and tuition directly to the Statewide Wastewater Operator Training Center prior to class.

TAKE NOTE !

The **Statewide Wastewater Operator Training Center** and The **Board Of Certification** information, forms, training calendar and other links can be found on-line at the following website:

WEB SITE: http://hawaii.gov/wastewater