

**WASTEWATER TREATMENT PLANT OPERATOR**

**The Wastewater Treatment Plant Operator efficiently manages wastewater, facilities, and programs in compliance with government regulations to protect human health and the environment.**

**General Categories Specific Tasks**

<b>A. Rules &amp; Regulations</b>	<b>A-1</b> Explain basics of CWA & appropriate state regs	<b>A-2</b> Define plant classifications & staffing requirements	<b>A-3</b> Explain operating permits (e.g., NPDES, federal, state, & local)	<b>A-4</b> List & explain state certification requirements, certification regs, & operator responsibilities	<b>A-5</b> Explain interaction of operator with state regulatory agencies & role of OSHA regs	<b>A-6</b> List & define receiving water categories or classifications	<b>A-7</b> Describe basic regs for waste minimization & industrial pretreatment
<b>B. Waste Streams &amp; Collection Systems</b>	<b>B-1</b> Identify major types of waste discharges to a WWTP (domestic & industrial)	<b>B-2</b> Define organic, inorganic, thermal, & radioactive wastes	<b>B-3</b> Explain the effects of waste discharges on receiving and ground waters	<b>B-4</b> Discuss effects of domestic & industrial waste discharges on human health	<b>B-5</b> Explain differences between sanitary, storm, & combined sewers	<b>B-6</b> Discuss problems associated with inflow & infiltration	<b>B-7</b> Diagram, list, & explain components of a collection system with gravity collection mains, manholes, pump stations, force mains, & service lines
	<b>B-8</b> Describe the types & handling of septage hauled into system (typically discharged at plant)	<b>B-9</b> Describe collection system preventive & regular maintenance activities (including jetting, rodding, bucket machine, flushing, vaccing, etc.)	<b>B-10</b> Discuss problems associated with odor control & corrosion				
<b>C. Treatment Processes</b>	<b>C-1</b> Identify, explain, & apply preliminary treatment	<b>C-2</b> Identify, explain, & apply primary treatment	<b>C-3</b> Identify, explain, & apply secondary treatment	<b>C-4</b> Identify & describe advanced treatments (including tertiary)	<b>C-5</b> Identify & describe effects of special wastes	<b>C-6</b> Identify & describe systems used for final effluent disinfection	<b>C-7</b> Identify & describe final effluent disposal options
	<b>C-8</b> Identify & describe biosolids/residuals disposal options (federal biosolids regs)	<b>C-9</b> Convert metric & U.S. standard measurements	<b>C-10</b> Identify WWT areas that require mathematical calculation (e.g., flows, loading, channels, sedimentation tanks & clarifiers, trickling filters & RBCs, hydraulics, disinfection, chemical dosages, pumps, activated sludge, sludge digestion, effluent disposal, maintenance, laboratory, data analysis)	<b>C-11</b> Identify & apply appropriate WWT formulas for calculation (e.g., velocity, flow, area, volume, detention time, feed rate, solids inventory (pounds formula), MCRT, F/M, % removal, arithmetic/geometric mean)			
<b>D. Facility Equipment &amp; Maintenance</b>	<b>D-1</b> Identify & describe function, operation, & troubleshooting of pumps (e.g., centrifugal, positive displacement, diaphragm, peristaltic, electronic)	<b>D-2</b> Identify & describe function, operation, & troubleshooting of blowers & compressors (e.g., centrifugal, positive displacement, compressors)	<b>D-3</b> Identify & describe function, operation, & troubleshooting of clarifiers	<b>D-4</b> Identify & describe function, operation, & troubleshooting of mixers	<b>D-5</b> Identify & describe function, operation, & troubleshooting of digesters	<b>D-6</b> Identify & describe function, operation, & troubleshooting of chemical feeders	<b>D-7</b> Identify & describe function, operation, & troubleshooting of dewatering equipment

	<b>D-8</b> Identify & describe function, operation, & troubleshooting of major equipment components (e.g., motors, basic electricity, gear boxes, belts, shafts, conveyors)	<b>D-9</b> Identify & describe function, operation, & troubleshooting of general equipment (e.g., valves, screens, comminutors, barminutors)	<b>D-10</b> Define components of and demonstrate ability to prepare written maintenance program for a WWTP's equipment, buildings, grounds, channels, & tanks (including preventive maintenance, lubrication, corrosion control, installation, vibration analysis, parts inventory/ordering, O&M manuals, & basic hand tools)	<b>D-11</b> Discuss equipment troubleshooting methods, diagnostic tools, & procedures	<b>D-12</b> Explain operation of sensors, transmitters, receivers, controllers, & SCADA systems	<b>D-13</b> Identify & describe function, operation, & troubleshooting of plant safety equipment (e.g., air gaps, backflow preventers/RPZs, fuses, circuit breakers, equipment & level alarms, vacuum breakers, flame arresters, gas monitors)	
<b>E. Field &amp; Lab Analysis</b>	<b>E-1</b> Explain relationship between sample collection & test results	<b>E-2</b> Identify & explain types of samples collected at a WWTP (wastewater, grab, composite, biosolids)	<b>E-3</b> Describe and compare sampling for process control & compliance	<b>E-4</b> Set up monitoring & sampling schedule	<b>E-5</b> Demonstrate proper sampling technique (e.g., uncontaminated sample for fecal coliform analysis)	<b>E-6</b> Demonstrate proper use of sampling equipment	<b>E-7</b> Describe sample preservation, storage, transportation, & holding time (including chain of custody)
	<b>E-8</b> Explain analysis needed for PC (a minimum of pH, DO, TSS, VSS, SVI, %TS, BOD, ammonia-nitrogen, TKN, NO3, metals, biomonitoring)	<b>E-9</b> Select, calibrate, & document calibration of proper analytical equipment for operator-collected & analyzed samples	<b>E-10</b> Collect, analyze, & document analysis of process control samples	<b>E-11</b> Describe proper QA/QC procedures			
<b>F. Plant Process Control</b>	<b>F-1</b> Perform operator plant checks (i.e., walk-throughs)	<b>F-2</b> Monitor plant equipment	<b>F-3</b> Adjust plant equipment as required	<b>F-4</b> Monitor flow rates	<b>F-5</b> Monitor treatment processes	<b>F-6</b> Interpret & document process control sample results	<b>F-7</b> Perform process control adjustments based on sample results
<b>G. Recordkeeping &amp; Documentation</b>	<b>G-1</b> Identify the different types of records	<b>G-2</b> Explain importance of and need for records (e.g., daily, monitoring, regulatory)	<b>G-3</b> Evaluate information collection & data analysis procedures	<b>G-4</b> Analyze and present data trends using numbers, tables, & graphs	<b>G-5</b> List the uses of computers in WWTPs	<b>G-6</b> Prepare a regulatory report	<b>G-7</b> Organize and write a report
<b>H. Safety</b>	<b>H-1</b> Explain & demonstrate good personal hygiene & housekeeping	<b>H-2</b> Explain & demonstrate the use of Personal Protective Equipment (PPE)	<b>H-3</b> List & describe basics of OSHA standards & mandated safety programs (e.g., HazCom, emergency response, lockout/tagout, confined space, etc.)	<b>H-4</b> Perform hazard assessments	<b>H-5</b> Organize & write an SOP for a safety procedure	<b>H-6</b> Describe basics of chemical handling safety (e.g., chlorine, sulfur dioxide, lime, gasoline, etc.)	<b>H-7</b> Conduct & participate in safety meetings
	<b>H-8</b> Discuss a model fire safety program	<b>H-9</b> List basic components of excavation safety program	<b>H-10</b> Discuss ways to safely work in traffic	<b>H-11</b> Prepare a laboratory safety checklist	<b>H-12</b> Discuss prevention of back injuries		
<b>I. Administration Overview</b>	<b>I-1</b> Organize general operation, maintenance, & administrative activities of a WWTP (including	<b>I-2</b> Develop & implement a public relations program	<b>I-3</b> Prepare a contingency plan for emergencies	<b>I-4</b> Develop a WWTP budget	<b>I-5</b> Prepare for & attend meetings	<b>I-6</b> Prepare a facility staffing schedule	<b>I-7</b> Develop an organizational chart & explain the principles of chain of

	personnel functions such as attendance reports, payroll, paperwork, & associated reports)						command
	<b>I-8</b> Research industry trends & regs (e.g., professional networking, Internet)	<b>I-9</b> Ensure resources (e.g., budget) available to maintain operator certification					
<b>J. Computer Applications for WWT</b>	<b>J-1</b> Select appropriate computer application for task	<b>J-2</b> Demonstrate basic computer functions (e.g., loading programs, saving & transferring files, backups, printing, email & Internet use)	<b>J-3</b> Demonstrate basic spreadsheet functions (e.g., formula development for sum, averages, graphical trending, report formatting)	<b>J-4</b> Demonstrate basic word processing functions (e.g., selecting & changing document format, merging lists, editing)	<b>J-5</b> Demonstrate basic database functions (e.g., program selection, data entry, data sort, search, analyze, report generation)	<b>J-6</b> Identify applicable computer support services	

**-Modified DACUM Chart-**

**Wastewater Treatment Plant Operator, March 9 thru March 16, 2000**

**Location:**

Online for Hazardous Materials Research Institute (HMTRI) at Kirkwood Community College in Cedar Rapids, IA

**Workshop Panel:**

Patrick Ball; Cedar Rapids Water Pollution Control; Cedar Rapids, IA

Larry Hazal; Southern Arkansas University Tech; Camden, AR

Edward Toby; Univ of FL; Gainesville, FL

Wayne Debrosky; Severn Trent Environmental Services, Inc.; Wappingers Falls, NY

Diane Monahan; Water Connection; Gillette, WY

Mark Vanden Heuvel; Green Bay Metropolitan Sewage District; Green Bay, WI

Dave Elias; City of Iowa City; IA

Gary Schellhorn; City of Clinton, IA

Larry Wacker; Rockwell Collins; Cedar Rapids, IA

**Coordinator:**

Doug Elam, HMTRI at Kirkwood Community College, Cedar Rapids, IA

**Facilitator:**

Melonee Docherty, Advanced Technology Environmental Education Center (ATEEC) and  
HMTRI, Bettendorf, IA

*Patent Pending 2000, ATEEC/HMTRI*