

DACUM Research Chart for Class I Water Operator

DACUM Panel

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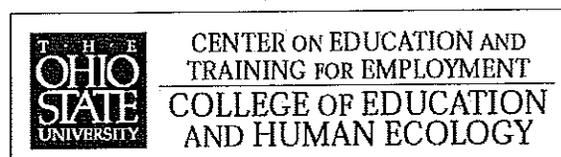
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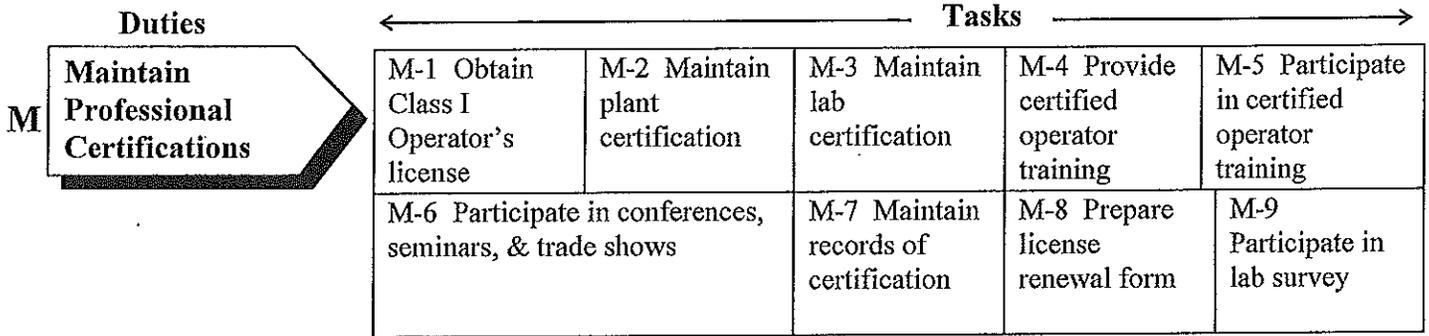
Duties		← Tasks →				
A	Manage Source Water	A-1 Identify source water area	A-2 Develop source water protection program	A-3 Identify source water contamination	A-4 Implement source water protection program	A-5 Develop source water sampling program
		B-1 Complete facility inspection checklist (e.g., visual, sound)		B-2 Record meter readings	B-3 Complete daily logs	B-4 Backwash filters
B	Operate Water Treatment Facility	B-11 Obtain alkalinity results	B-12 Obtain fluoride results	B-13 Obtain routine bacteria results	B-14 Calculate chemical dosages	B-15 Adjust chemical feeds
		B-23 Change flow charts	B-24 Check safety equipment (e.g., fire extinguishers, PPE, SCBA)		B-25 Receive deliveries (e.g., chemicals, operating supplies)	
		C-1 Obtain manganese results	C-2 Obtain dissolved oxygen results	C-3 Collect nitrate/nitrite samples	C-4 Collect iron samples	C-5 Collect special bacteria samples
C	Perform EPA Sampling Requirements	C-13 Collect radiological samples	C-14 Collect sodium samples	C-15 Collect cryptosporidium/giardia samples	C-16 Collect arsenic samples	C-17 Collect TTHM/HAA5 samples
		D-1 Search for unaccounted for water	D-2 Read water meters	D-3 Repair water leaks (e.g., water lines, meters, valves)	D-4 Repair/replace water meters	D-5 Perform service-oriented work orders (e.g., turn on/turnoff, reread, water quality)
D	Operate Distribution System	D-13 Repair hydrants	D-14 Inspect new water line installations	D-15 Replace water mains	D-16 Perform service line installation & taps	D-17 Locate water services (e.g., taps, mains, valves)
		D-25 Disinfect water mains (e.g., new lines, main breaks)	D-26 Thaw frozen meters	D-27 Thaw frozen service lines	D-28 Evaluate system temperatures	D-29 Dig out buried hydrants
		E-1 Develop preventive maintenance program	E-2 Grease pumps (e.g., well, high service, feed)	E-3 Calibrate flow meters	E-4 Evaluate pump efficiency (e.g., well, high service, feed)	E-5 Evaluate filter efficiency
E	Maintain Water Treatment Facility	E-13 Evaluate system supply & demand	E-14 Perform emergency repairs (e.g., pumps, feeders, motors)	E-15 Exercise standby generators	E-16 Perform generator maintenance	E-17 Repair pumps (e.g., well, service, feed)
		E-25 Exercise plant valves	E-26 Clean Venturi meters	E-27 Repair control valves	E-28 Replace control valves	E-29 Check pump motor alignment

A-6 Develop well maintenance program	A-7 Implement well head protection program	A-8 Identify future source waters				
B-5 Regenerate water softeners	B-6 Calibrate bench top meters (e.g., chlorine, hardness, pH)	B-7 Obtain chlorine test results (e.g., free, total, combined)		B-8 Obtain pH results	B-9 Obtain hardness results	B-10 Obtain iron results
B-16 Fill day tanks	B-17 Refill bulk chemical storage	B-18 Monitor water storage levels	B-19 Monitor system pressure	B-20 Balance high service pumps	B-21 Change chlorine cylinders	B-22 Interpret collective test data
C-6 Collect asbestos samples	C-7 Collect lead & copper samples	C-8 Collect inorganics samples	C-9 Collect organics samples	C-10 Collect VOC samples	C-11 Collect SOC samples	C-12 Collect metals samples
C-18 Collect unregulated contaminants samples						
D-6 Monitor chlorine residual levels	D-7 Exercise main line valves	D-8 Update distribution maps	D-9 Conduct flow & pressure analysis	D-10 Flush hydrants	D-11 Inspect hydrants (e.g., leaks, broken valves, drains)	D-12 Replace hydrants
D-18 Replace valve boxes	D-19 Repair main line valves	D-20 Lower/raise meter vaults/pits	D-21 Maintain booster stations	D-22 Collect main break bacteria samples	D-23 Perform grounds maintenance (e.g., mow, trim, plow)	D-24 Paint hydrants
E-6 Evaluate softener efficiency	E-7 Evaluate motor electrical efficiency	E-8 Evaluate aeration efficiency	E-9 Evaluate chemical feed efficiency	E-10 Calibrate chemical feeders	E-11 Calibrate pressure gauges	E-12 Calibrate water level sensors
E-18 Replace pumps (e.g., well, service, feed)	E-19 Adjust pump impellers	E-20 Troubleshoot electrical problems	E-21 Change oil in pump motors	E-22 Replace softener media	E-23 Maintain filters (e.g., iron & manganese, green sand, media)	E-24 Perform storage tank cleaning
E-30 Maintain water treatment plant security	E-31 Perform general house-keeping (e.g., empty trash, mop, sweep floors)		E-32 Provide inside/outside lighting	E-33 Perform facility groundskeeping (e.g., mow, trim, plow)		E-34 Paint facility (e.g., floors, walls, railings)

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Duties		Tasks				
E	Maintain Water Treatment Facility – cont.	E-35 Install new equipment (e.g., monitoring, feeders, pumps)		E-36 Perform vehicle maintenance		
F	Maintain Source Water	F-1 Monitor source water area	F-2 Monitor level of source water	F-3 Perform pump/flow test	F-4 Perform preventive maintenance on well pumps	F-5 Perform well cleaning
G	Perform Emergency Leak Repairs	G-1 Evaluate severity of water leaks	G-2 Notify customers (e.g., police, fire, schools)	G-3 Obtain repair parts	G-4 Coordinate traffic control	G-5 Issue boil alerts (e.g., radio, TV, EPA)
H	Provide Customer Service	H-1 Resolve customer complaints (e.g., quality, quantity, billing)	H-2 Respond to customer questions (e.g., water softeners, contractors, troubleshooting)		H-3 Provide public right-to-know information (e.g., CCR, test results, consumption)	
I	Manage Staff/ Contractors	I-1 Conduct hiring process	I-2 Provide employee training	I-3 Conduct employee evaluations	I-4 Provide policy information to employees	I-5 Schedule employees
		I-12 Coordinate replacement of water tower ground clearance lights		I-13 Coordinate future growth analysis	I-14 Oversee well abandonment	I-15 Coordinate well drilling
J	Administer Water Treatment Programs	J-1 Implement backflow prevention program	J-2 Implement disinfection by-products program	J-3 Implement distribution sampling plan	J-4 Develop flow model program	J-5 Implement hydrant flushing
K	Perform Administrative Activities	K-1 Prepare monthly operating reports	K-2 Prepare EPA source water report	K-3 Prepare total chlorine quarterly report	K-4 Prepare DNR well withdrawal report	K-5 Prepare lead & copper
		K-13 Update mapping program	K-14 Update preventative maintenance program	K-15 Update safety program	K-16 Update valve exercising program	K-17 Update consumer confidence
		K-25 Perform unaccounted-for water loss calculations	K-26 Approve invoices for payment	K-27 Prepare bid specifications	K-28 Deliver presentations (e.g., council, public, Ohio EPA)	K-29 Prepare operating budget
		K-36 Maintain documentation of service issues	K-37 Maintain O&M manual			
L	Maintain Contingency Plan	L-1 Develop plant operations contingency plan	L-2 Develop source water contingency plan	L-3 Develop distribution contingency plan	L-4 Update plant operations contingency plan	L-5 Update source water contingency plan

F-6 Disinfect well	F-7 Collect well scan samples	F-8 Repair well pumps (e.g., impeller, casing, screen)	F-9 Replace well pumps (e.g., impeller, casing, screen)	F-10 Rotate usage of wells		
G-6 Repair water main breaks	G-7 Coordinate leak repair restoration (e.g., road, landscaping, sidewalk)					
H-4 Provide information to contractors/developers (e.g., mapping, flow pressure, availability)		H-5 Perform final meter readings (e.g., moving, vacation, repairs)	H-6 Provide plant tours	H-7 Provide public relations (e.g., schools, service organizations, fairs)		H-8 Provide bulk water
I-6 Approve employee timesheets	I-7 Administer employee discipline	I-8 Coordinate leak repairs with contractor/service department		I-9 Coordinate water tower inspections	I-10 Coordinate water tower repairs	I-11 Coordinate water tower repainting
J-6 Implement lead & copper program		J-8 Implement mapping program	J-9 Implement preventive maintenance program (e.g., source water, plant, distribution)	J-10 Implement safety program (e.g., confined space, lockout/tagout, fall protection)		J-11 Implement valve exercising program
K-6 Update backflow prevention program	K-7 Update disinfection by-products program	K-8 Update distribution sampling plan	K-9 Update flow model program	K-10 Update hydrant flushing program	K-11 Update lead & copper program	
K-18 Participate in sanitary survey	K-19 Prepare sample submission report	K-20 Prepare purchase order requests	K-21 Review proposed construction prints	K-22 Prepare permits to install	K-23 Seek grant funding	K-24 Attend meetings (e.g., council, public, staff)
K-30 Maintain operating budget	K-31 Maintain records (e.g., mapping, test results, employee)	K-32 Establish water rates (e.g., tap fees, bulk water rate, customer consumption)		K-33 Maintain MSDS	K-34 Maintain inventory (e.g., parts, supplies, chemicals)	K-35 Review permits for line extensions
L-6 Update distribution contingency plan	L-7 Recommend succession plan for single operator system					



General Knowledge and Skills

Worker Behaviors

Problem solving skills
 Public speaking skills
 Troubleshooting skills
 Customer service skills
 Decision making skills
 Time management skills
 Selling skills
 Evaluation skills
 Basic chemical knowledge
 Basic mechanical knowledge
 Basic electrical knowledge
 Basic plumbing knowledge
 Intermediate math knowledge
 Communication skills (written listening, speaking)
 Basic first aid knowledge
 Teaching skills
 Driving skills
 Basic welding skills
 Knowledge of safety standards/requirements
 Mentoring skills
 Management skills
 Knowledge of state & federal EPA laws
 Basic computer knowledge
 Financial knowledge
 Schematic reading
 SCADA knowledge

Flexible	Resourceful
Self motivated	Communicator
Thick skinned	Knowledgeable
Team player	Physically fit
Reliable	Supportive
Dependable	Analytical
Responsible	Open minded
Dedicated	Patient
Customer service oriented	Tolerant
Sense of humor	Professional
Detail oriented	Goal oriented
Confident	Adaptable
Listener	Determined
Multi tasker	Common sense
High self esteem	

Tools, Equipment, Supplies and Materials

Curb wrench	Pneumatic tools
Hydrant wrench	Digital camera
Valve wrench	Basic office equipment
Quick saw	Utility truck
Pry bar	Mops/brooms/cleaning supplies]
Pipe wrench	TV/VCR
Shovels	Lab equipment
Locating instruments	Refrigerator
Backhoe	Thermometer
Dump truck	First aid kit
Pipe cleaner	Fire extinguisher
Scraper	Chains
Hand tools	Metering pumps
Calculator	Flow meters
Tape measure	Oil/grease
Pipe tape measure	Mower/weed eater
Pipe cutter	Hydrant markers
Welder	Gas meter
Cutting torch	Ladders
pH meters	Shoring
Chlorine meters	Water main repair clamps
Iron meter	Chlorine tablets
Trash pumps	Circular charts
Volt meter	Marking paint/flags
Fire hose	Pipe probe
Hydrant diffuser	Touch meter readers
Portable generator	Computer & Internet
Flashlights/work lights	AWWA standards
PPE	EPA small water system manual
Barricades	Fluoride meter
Auto dialer	Standard Methods
Air compressor	Operations/maintenance manual
Pressure gauge	Employee handbook
Cell phone/radio	Consumer confidence report

Future Trends and Concerns

- Increased regulation stretching budgets
- Use of automation to reduce labor costs
- Future shortage of licensed operators
- Outdated infrastructure
- Uncertainty of where to spend tight dollars
- Lack of successful planning in small systems
- Increased litigation and liabilities
- Rising fuel costs
- Increasing materials/chemical costs
- Rising health care/insurance costs
- Need for higher education to advance in field
- Lack of future source water
- Lack of property for well fields
- Lack of infrastructure funding
- Increased security concerns/threats

Acronyms

AWWA	American Water Works Association
CCR	Consumer Confidence Report
DNR	Department of Natural Resources
HAA5	Halo Acidic Acid
MSDS	Material Safety Data Sheets
O&M	Operations and Maintenance
PPE	Personal Protective Equipment
SCADA	Supervisory Control and Data Acquisition
SCBA	Self Contained Breathing Apparatus
SOC	Synthetic Organic Compound
TTHM	Total Trihalomethane
VOC	Volatile Organic Compound