

	<b>TOPIC</b>	<b>D</b>	<b>C</b>	<b>B</b>	<b>A</b>
1.	<b>THE SMALL WATER SYSTEM OPERATOR</b>				
1.0	NEED FOR SMALL WATER SYSTEM OPERATOR	X	X	X	X
1.10	Source Of Water	X	X	X	X
1.11	Storage Facilities	X	X	X	X
1.12	Treatment Facilities	X	X	X	X
1.13	Distribution System	X	X	X	X
1.20	Operation And Maintenance	X	X	X	X
1.21	Supervision And Administration	X	X	X	X
1.22	Public Relations	X	X	X	X
1.23	Safety	X	X	X	X
1.34	What Does It Take To Be A Small Water System Operator?	X	X	X	X
1.41	Your Personal Training Program		X	X	X
1.42	Certification	X	X	X	X
2.	<b>WORDS: WATER SOURCES AND TREATMENT</b>		X	X	X
2.0	IMPORTANCE OF WATER	X	X	X	X
2.140	Sources	X	X	X	X
2.141	Wells	X	X	X	X
2.20	Sanitary Survey	X	X	X	X
2.21	Precipitation	X	X	X	X
2.22	Physical Characteristics	X	X	X	X
2.23	Chemical Characteristics	X	X	X	X
2.24	Biological Factors	X	X	X	X
2.25	Radiological Factors		X	X	X
2.3	The Safe Drinking Water Act	X	X	X	X
2.4	Water Treatment	X	X	X	X
3.	<b>WORDS: WELLS</b>	X	X	X	X
3.00	Importance Of Groundwater	X	X	X	X
3.01	Water (Hydrological) Cycle	X	X	X	X
3.02	Aquifers	X	X	X	X
3.020	Porosity And Specific Yield		X	X	X
3.021	Overdraft		X	X	X
3.022	Salt Water Intrusion			X	X
3.030	Pollution Control	X	X	X	X
3.031	Geological And Hydrological Data		X	X	X
3.040	Statement Of The Problem	X	X	X	X
3.041	National Program		X	X	X
3.042	Community Involvement And Support			X	X
3.043	Step One- Community Participation			X	X
3.044	Step Two- Collecting Existing Data			X	X
3.045	Step Three- Filling In The Data Gap			X	X
3.046	Step Four- Which Land Uses Constitute A Threat To Groundwater Quality?			X	X

3.047	Step Five- Learning From What Has Been Collected			X	X
3.048	Step Six- Now What?			X	X
3.049	Step Seven- Establishing Wellhead Protection Area (WHPA)			X	X
3.0410	Step Eight- FINALLY			X	X
3.05	Groundwater Protection Tips			X	X
3.050	Agriculture			X	X
3.051	Gas Stations			X	X
3.052	Fuel Storage			X	X
3.053	Photo Labs/Printers, Dry Cleaners, Furniture Strippers/Painting, Medical Labs			X	X
3.054	Septic Systems, Subsurface Waste Disposal			X	X
3.055	What To Tell Homeowners			X	X
3.06	Summary	X	X	X	X
3.10	Purpose Of Surface Features	X	X	X	X
3.11	Well-Casing Vent	X	X	X	X
3.12	Gravel Tube			X	X
3.13	Sounding Tube		X	X	X
3.14	Pump Pedestal		X	X	X
3.15	Pump Motor Base Seal		X	X	X
3.16	Sampling Taps	X	X	X	X
3.17	Air Release-Vacuum Valves		X	X	X
3.18	Pump Blowoff	X	X	X	X
3.20	Typical Well Pump And Pressure Tank	X	X	X	X
3.210	Check Valves	X	X	X	X
3.211	Pump Control Valves		X	X	X
3.212	Foot Valves	X	X	X	X
3.22	Flowmeters	X	X	X	X
3.23	Sand Traps And Sand Separators			X	X
3.230	Sand Traps			X	X
3.231	Sand Separators			X	X
3.24	Tank Coatings	X	X	X	X
3.25	Surge Suppressors		X	X	X
3.26	Air And Vacuum Valves		X	X	X
3.27	Pressure Relief Valves	X	X	X	X
3.280	Methods Of Air Charging	X	X	X	X
3.281	Hydraulic Principle Air Chargers	X	X	X	X
3.282	Air Compressor Air Charger	X	X	X	X
3.290	Application	X	X	X	X
3.291	Tank Size	X	X	X	X
3.292	Operation	X	X	X	X
3.30	Importance Of Well Maintenance	X	X	X	X
3.310	Adverse Conditions	X	X	X	X
3.311	Overpumping	X	X	X	X

3.312	Clogging Or Collapse Of Screen		X	X	X
3.313	Corrosion Or Incrustation		X	X	X
3.32	Preventive Maintenance And Repair	X	X	X	X
3.33	Casing And Screen Maintenance	X	X	X	X
3.330	Surging			X	X
3.331	High-Velocity Jetting			X	X
3.332	Acid Treatment		X	X	X
3.333	Chlorine Treatment	X	X	X	X
3.334	Polyphosphates		X	X	X
3.335	Explosive Charges			X	X
3.336	Summary	X	X	X	X
3.34	Water Quality Monitoring	X	X	X	X
3.35	Downhole Video Inspection		X	X	X
3.360	Decline In Yield	X	X	X	X
3.361	Charges In Water Quality	X	X	X	X
3.37	Summary	X	X	X	X
3.400	Well Pumps	X	X	X	X
3.401	Shallow Well Pumps	X	X	X	X
3.402	Deep Well Pumps	X	X	X	X
3.410	Centrifugal Pumps	X	X	X	X
3.411	Volute-Type Pumps			X	X
3.412	Turbine-Type Pumps		X	X	X
3.413	Deep Well Turbine Pumps		X	X	X
3.414	Other Pumps	X	X	X	X
3.42	Column Pipe		X	X	X
3.43	Right-Angle Gear Drivers			X	X
3.44	Selecting A Pump	X	X	X	X
3.45	Service Guidelines		X	X	X
3.46	Motors	X	X	X	X
3.50	New Wells- During Construction				
3.51	New Wells- After Construction				
3.52	Existing Wells- After Well Or Pump Repairs	X	X	X	X
3.53	Contaminated Wells	X	X	X	X
3.54	Chlorine Requirement Calculation	X	X	X	X
3.60	Health And Safety	X	X	X	X
3.61	Operator Responsibility	X	X	X	X
3.62	Knowledge Of The Water Production Facilities		X	X	X
3.63	Routine Facility Servicing		X	X	X
3.64	What To Look For	X	X	X	X
3.65	Forms	X	X	X	X
3.66	Records	X	X	X	X
3.70	Source Of Sand		X	X	X
3.71	Problems Associated With Sand		X	X	X

3.72	Flushing Mains	X	X	X	X
3.73	Test For Sand, Volumetric Method			X	X
3.74	Acceptable Concentrations			X	X
3.75	Responding To Complaints	X	X	X	X
3.80	Purpose Of Electrical Supply And Controls		X	X	X
3.810	Electricity		X	X	X
3.811	Motor Starters		X	X	X
3.812	Auxiliary Power		X	X	X
3.820	Types Of Controls		X	X	X
3.821	Control Systems		X	X	X
3.822	Pressure	X	X	X	X
3.823	Water Level	X	X	X	X
3.83	Equipment		X	X	X
3.84	Common Electrical Control Definitions		X	X	X
3.85	Instrumentation			X	X
3.90	Need For Troubleshooting	X	X	X	X
3.91	Troubleshooting Guide	X	X	X	X
3.910	Pump Will Not Start		X	X	X
3.911	Pump Will Not Shut Off		X	X	X
3.912	Pump Starts Too Frequently		X	X	X
3.913	Fuses Blow, Circuit Breaker or Overload Relays Trip When Pump Is In Operation		X	X	X
3.914	Pump Will Not Deliver Normal Amount of Water		X	X	X
3.915	Pump Takes Too Much Power		X	X	X
3.916	Excessive Operating Noise		X	X	X
	APPENDIX (Chapter 3 Wells)				
3.12	WELL SITE SELECTION	X	X	X	X
3.120	Factors To Be Considered	X	X	X	X
3.121	Safe Horizontal Distance	X	X	X	X
3.123	Design Of Well Fields				X
3.126	Sanitary Control Of Future Construction	X	X	X	X
3.13	TYPES OF WELLS		X	X	X
3.130	Dug Wells		X	X	X
3.131	Bored Wells		X	X	X
3.132	Driven Wells		X	X	X
3.133	Drilled Wells	X	X	X	X
3.1330	Percussion Method			X	X
3.1331	Hydraulic Rotary Drilling Method			X	X
3.1322	Reverse Circulation Rotary Drilling Method			X	X
3.1333	Air Rotary Drilling Method			X	X
3.134	Shallow Collector Wells- Ranny Type			X	X
3.140	Rules And Regulations Regarding Well Construction	X	X	X	X
3.141	Subsurface Features Of A Well	X	X	X	X
3.142	Conductor Casing			X	X

3.143	Well Casing	X	X	X	X
3.1440	Purpose Of Intake Section		X	X	X
3.1441	Well Screens		X	X	X
3.1442	Mill-Cut Slots			X	X
3.1443	Formed Louvers			X	X
3.1444	Torch-Cut Slots			X	X
3.1445	Hydraulic Or Mechanical Slots			X	X
3.145	Annular Grout Seal	X	X	X	X
3.146	Sealing Material			X	X
3.147	Placement Of Sealing Material			X	X
3.148	Gravel Pack		X	X	X
3.15	DETERMINATION OF WORKING PRESSURE		X	X	X
3.160	Well Performance Testing	X	X	X	X
3.161	Types Of Pumping Tests			X	X
3.1610	Bailing Test Method			X	X
3.1611	Air Blow Test Method			X	X
3.1612	Variable Rate Method			X	X
3.1613	Constant Rate Method			X	X
3.1614	Step-Continuous Composite Method			X	X
3.170	Mechanical Wear Of Pumps			X	X
3.171	Guidelines For Testing			X	X
3.172	Operator Responsibility			X	X
3.173	Terminology			X	X
3.174	Calculations			X	X
3.175	Performance Values			X	X
3.176	Pump Electrical			X	X
4.	<b>WORDS: SMALL WATER TREATMENT PLANTS</b>		X	X	X
4.02	Groundwater	X	X	X	X
4.03	Operator Responsibility	X	X	X	X
4.3	SETTLING (SEDIMENTATION)			X	X
4.4	FILTRATION		X	X	X
4.6	CORROSION CONTROL		X	X	X
4.70	Process Description- SOLIDS-CONTACT CLARIFICATION				X
4.71	Fundamentals of Operation				X
4.72	Maintenance				X
4.9	IRON AND MANGANESE CONTROL		X	X	X
4.100	Lime-Soda Ash Softening			X	X
4.101	Ion Exchange Softening		X	X	X
4.11	OPERATION	X	X	X	X
4.120	MAINTENANCE - Program	X	X	X	X
4.121	Tools			X	X
4.13	SAFETY	X	X	X	X
5.	<b>WORDS: DISINFECTION</b>		X	X	X

5.00	Making Water Safe For Consumption	X	X	X	X
5.01	Safe Drinking Water Act (SDWA)	X	X	X	X
5.10	pH	X	X	X	X
5.11	Temperature	X	X	X	X
5.12	Turbidity	X	X	X	X
5.120	Organic Matter	X	X	X	X
5.121	Inorganic Matter	X	X	X	X
5.13	Reducing Agent	X	X	X	X
5.140	Number And Types Of Microorganisms	X	X	X	X
5.141	Removal Processes			X	X
5.20	Purpose Of Process	X	X	X	X
5.210	Physical Means Of Disinfection	X	X	X	X
5.211	Chemical Disinfectants			X	X
5.220	Properties Of Chlorine		X	X	X
5.221	Chlorine Disinfection Action	X	X	X	X
5.222	Reaction With Water		X	X	X
5.223	Reaction With Impurities In Water		X	X	X
5.230	Hypochlorite Reactions With Water	X	X	X	X
5.231	Differences Between Chlorine Gas And Hypochlorite Compound Reaction		X	X	X
5.240	Chlorine Dioxide Reaction With Water				X
5.241	Reaction With Impurities In Water				X
5.25	Breakpoint Chlorination	X	X	X	X
5.26	Critical Factors	X	X	X	X
5.27	Chlorine Residual Testing	X	X	X	X
5.290	Use Of Chloramination		X	X	X
5.291	Methods For Producing Chloramines		X	X	X
5.292	Chlorine To Ammonia-Nitrogen Ratios		X	X	X
5.293	Special Water Users		X	X	X
5.294	Blending Chlorinated Waters		X	X	X
5.295	Chloramine Residuals		X	X	X
5.295	Nitrification		X	X	X
5.297	Nitrification Prevention And Control		X	X	X
5.301	Sample Problems	X	X	X	X
5.302	Procedures	X	X	X	X
5.303	Continuous Disinfecting Of Wells	X	X	X	X
5.310	Mains- Procedures	X	X	X	X
5.311	Emergency Or Maintenance Disinfection	X	X	X	X
5.312	Disinfection Specifications	X	X	X	X
5.313	Areas Of Disinfection Problems	X	X	X	X
5.314	Sample Problems	X	X	X	X
5.321	Sample Problems	X	X	X	X
5.34	Sampling	X	X	X	X

5.400	Operation Of Chlorination Equipment- Description Of Various Units- Field Equipment	X (1)	X	X	X
5.401	Chlorine Containers	X (1)	X	X	X
5.41	Chlorine Handling		X	X	X
5.420	Hypochlorinators	X	X	X	X
5.421	Chlorinators		X	X	X
5.43	Laboratory Tests	X	X	X	X
5.44	Troubleshooting	X	X	X	X
5.45	Chlorination System Failure	X	X	X	X
5.50	Methods Of Measuring Chlorine Residual	X	X	X	X
5.51	Amperometric Titration For Free Chlorine Residual		X	X	X
5.52	DPD Colorimetric Method For Free Chlorine Residual	X	X	X	X
5.6	CHLORINE SAFETY PROGRAM		X	X	X
5.60	Chlorine Hazards		X	X	X
5.61	Why Chlorine Must Be Handled With Care		X	X	X
5.62	Protect Yourself From Chlorine		X	X	X
5.63	First Aid Measures		X	X	X
5.64	Hypochlorite Safety	X	X	X	X
5.65	Chlorine Dioxide Safety				X
5.66	Operators Safety Training	X	X	X	X
5.67	CHEMTREC (800) 424-9300	X	X	X	X
5.7	CHLORINATION ARITHMETIC	X	X	X	X
5.700	Disinfection Of Facilities- Wells And Pumps	X	X	X	X
5.701	Mains	X	X	X	X
5.702	Tanks	X	X	X	X
5.710	Disinfection Of Water From Wells- Chlorine Dose	X	X	X	X
5.711	Chlorinator		X	X	X
5.712	Hypochlorinator	X	X	X	X
6.	<b>WORDS: SAFETY</b>		X	X	X
6.00	Think Safety	X	X	X	X
6.01	What Is Safety?	X	X	X	X
6.10	Objective Of Safety Program	X	X	X	X
6.11	Unsafe Acts	X	X	X	X
6.12	Driving Safety	X	X	X	X
6.16	Corrosive Chemicals	X	X	X	X
6.17	Tailgate Safety Sessions	X	X	X	X
6.18	Employee "Right To Know" Laws	X	X	X	X
6.2	PERSONAL SAFETY	X	X	X	X
6.20	Monitoring Equipment	X	X	X	X
6.21	Protective Clothing	X	X	X	X
6.22	Slips And Falls	X	X	X	X
6.23	Handling And Lifting	X	X	X	X
6.24	Electrical Safety	X	X	X	X
6.30	Safety Around Wells- Importance Of Well Safety	X	X	X	X

6.31	Location Of Well Site	X	X	X	X
6.33	Sanitary Seals	X	X	X	X
6.35	Tank Coating	X	X	X	X
6.360	Well Chemicals- Acid Cleaning		X	X	X
6.361	Chlorine Treatment	X	X	X	X
6.362	Polyphosphate		X	X	X
6.37	Working Around Electrical Units	X	X	X	X
6.39	Safety Inspections	X	X	X	X
6.40	Uses Of A Pump	X	X	X	X
6.41	Guards Over Moving Parts	X	X	X	X
6.42	Maintenance And Repair	X	X	X	X
6.43	Lockout/Tagout Procedures	X	X	X	X
6.44	Storage Of Lubricants And Fuel	X	X	X	X
6.60	Safety Around Storage Facilities- Slips And Falls	X	X	X	X
6.610	Ladders- Fixed Ladders	X	X	X	X
6.611	Climbing Safety Devices	X	X	X	X
6.612	Training	X	X	X	X
6.613	Fixed Ladders Inspection	X	X	X	X
6.62	Application Of Coating			X	X
6.63	Confined Spaces	X	X	X	X
6.7	WORKING NEAR NOISE	X	X	X	X
6.8	SAFETY INSPECTIONS	X	X	X	X
7.	<b>WORDS: LABORATORY PROCEDURES</b>		X	X	X
7.00	Importance Of Laboratory Procedures	X	X	X	X
7.01	Metric System		X	X	X
7.02	Chemical Names And Formulas	X	X	X	X
7.03	Helpful References	X	X	X	X
7.10	Laboratory Equipment And Techniques- Water Laboratory Equipment			X	X
7.11	Use Of Laboratory Glassware			X	X
7.12	Chemical Solutions			X	X
7.13	Titrations		X	X	X
7.14	Data And Recording And Record Keeping	X	X	X	X
7.15	Laboratory Quality Control		X	X	X
7.16	Laboratory Safety			X	X
7.160	Laboratory Hazards			X	X
7.161	Personal Safety And Hygiene			X	X
7.162	Prevention Of Laboratory Accidents			X	X
7.1620	Chemical Storage			X	X
7.1621	Movement Of Chemicals			X	X
7.1622	Proper Laboratory Techniques			X	X
7.1623	Accident Prevention			X	X
7.20	Sampling- Importance Of Sampling	X	X	X	X
7.210	Importance Of Representative Sampling	X	X	X	X

7.211	Source Water Sampling	X	X	X	X
7.212	In-Plant Sampling		X	X	X
7.213	Distribution System Sampling	X	X	X	X
7.22	Types Of Sampling	X	X	X	X
7.220	Grab Sampling	X	X	X	X
7.221	Composite Samples	X	X	X	X
7.23	Sampling Devices			X	X
7.242	Water Tap Sampling	X	X	X	X
7.25	Sampling Containers And Preservation Of Sampling	X	X	X	X
7.3	1. Water Laboratory Tests- Alkalinity			X	X
	2. Chlorine Residual	A/B	X	X	X
	3. Chlorine Demand	A	A	X	X
	4. Coliform Bacteria	A	A/B	X	X
	5. Hardness		A	X	X
	6. Jar Test			X	X
	7. pH		A	X	X
	8. Temperature			X	X
	9. Turbidity			X	X
<b>APPENDIX: HOW TO SOLVE SMALL SYSTEM ARITHMETIC PROBLEMS</b>					
A.1	BASIC ARITHMETIC	X	X	X	X
A.10	Addition	X	X	X	X
A.11	Subtraction	X	X	X	X
A.12	Multiplication	X	X	X	X
A.13	Division	X	X	X	X
A.14	Rules For Solving Equations	X	X	X	X
A.15	Actual Problems		X	X	X
A.20	Area- Units		X	X	X
A.21	Rectangle		X	X	X
A.22	Triangle		X	X	X
A.23	Circle	X	X	X	X
A.24	Cylinder	X	X	X	X
A.25	Cone		X	X	X
A.26	Sphere		X	X	X
A.30	VOLUMES- Rectangle		X	X	X
A.31	Prism		X	X	X
A.32	Cylinder	X	X	X	X
A.33	Cone		X	X	X
A.34	Sphere		X	X	X
A.43	METRIC - Temperature			X	X
A.44	Milligrams Per Liter	X	X	X	X
A.5	WEIGHT- VOLUME RELATIONS		X	X	X
A.6	FORCE, PRESSURE AND HEAD		X	X	X
A.70	Velocity		X	X	X



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SECTION	TOPIC	C	B	A
12.	<b>WORDS: IRON AND MANGANESE CONTROL</b>	X	X	X
12.0	NEED TO CONTROL IRON AND MANGANESE	X	X	X
12.10	Occurrence Of Iron And Manganese	X	X	X
12.11	Collection Of Iron And Manganese Samples	X	X	X
12.12	Analysis For Iron And Manganese	X	X	X
12.2	REMEDIAL ACTION	X	X	X
12.20	Alternate Source	X	X	X
12.21	Phosphate Treatment	X	X	X
12.22	Removal By Ion Exchange	X	X	X
12.23	Oxidation By Aeration	X	X	X
12.24	Oxidation With Chlorine	X	X	X
12.25	Oxidation With Permanganate	X	X	X
12.26	Operation Of Filters	X	X	X
12.27	Proprietary Process	X	X	X
12.28	Monitoring Of Treated Water	X	X	X
12.29	Summary	X	X	X
12.30	Description Of Equipment And Process	X	X	X
12.31	Regeneration Of Manganese Greensand	X	X	X
12.32	Troubleshooting	X	X	X
12.4	MAINTENANCE OF A CHEMICAL FEEDER	X	X	X
12.5	TROUBLESHOOTING RED WATER PROBLEMS	X	X	X
13.	<b>WORDS: FLUORIDATION</b>		X	X
13.0	IMPORTANCE OF FLUORIDATION	X	X	X
13.1	FLUORIDATION PROGRAMS		X	X
13.2	COMPOUNDS USED TO FURNISH FLUORIDE ION		X	X
13.3	FLUORIDATION SYSTEMS		X	X
13.30	Chemical Feeders		X	X
13.31	Saturators		X	X
13.32	Downflow Saturators		X	X
13.33	Upflow Saturators		X	X
13.34	Large Hydrofluosilicic Acid Systems		X	X
13.40	Avoid Overfeeding		X	X
13.41	Review Of Designs And Specifications		X	X
13.5	CHEMICAL FEEDER START-UP		X	X
13.60	Fine Tuning		X	X
13.61	Preparation Of Fluoride Solution		X	X
13.62	Fluoridation Log Sheets		X	X
13.620	Hydrofluosilicic Acid		X	X
13.621	Sodium Silicofluoride		X	X
13.7	PREVENTION OF OVERFEEDING		X	X
13.8	UNDERFEEDING		X	X
13.9	SHUTTING DOWN CHEMICAL SYSTEMS		X	X
13.10	MAINTENANCE		X	X
13.11	SAFETY IN HANDLING FLUORIDE COMPOUNDS		X	X
13.110	Avoid Overexposure		X	X

13.111	Symptoms Of Fluoride Poisoning		X	X
13.112	Basic First Aid		X	X
13.113	Protecting Yourself And Your Family		X	X
13.114	Training		X	X
13.12	CALCULATING FLUORIDE DOSAGES		X	X
14.	<b>WORDS: SOFTENING</b>		X	X
14.0	WHAT MAKES WATER HARD?	X	X	X
14.1	WHY SOFTEN WATER?	X	X	X
14.2	CHEMISTRY OF SOFTENING		X	X
14.20	Hardness		X	X
14.21	pH		X	X
14.22	Alkalinity		X	X
14.30	Basic Methods of Softening		X	X
14.31	Chemical Reactions	X	X	X
14.310	Lime			X
14.311	Removal of Carbon Dioxide			X
14.312	Removal of Carbonate Hardness			X
14.313	Removal of Noncarbonate Hardness			X
14.314	Stability			X
14.315	Caustic Soda Softening			X
14.316	Calculation of Chemical Dosages			X
14.32	Lime Softening		X	X
14.33	Split Treatment		X	X
14.34	Lime-Soda Ash Softening		X	X
14.35	Caustic Soda Softening		X	X
14.36	Handling, Application, and Storage of Lime		X	X
14.4	INTERACTIONS WITH COAGULANTS		X	X
14.5	STABILITY		X	X
14.6	SAFETY		X	X
14.7	SLUDGE RECIRCULATION AND DISPOSAL		X	X
14.8	RECORDS		X	X
14.9	JAR TESTS			X
14.90	Typical Procedures			X
14.91	Examples			X
14.92	Calculation of Chemical Feeder Settings			X
14.10	DESCRIPTION OF ION EXCHANGE SOFTENING PROCESS	X	X	X
14.11	OPERATIONS	X	X	X
14.110	Service	X	X	X
14.111	Backwash	X	X	X
14.112	Brine	X	X	X
14.113	Rinse	X	X	X
14.12	CONTROL TESTING OF ION EXCHANGE SOFTENERS	X	X	X
14.13	LIMITATIONS CAUSED BY IRON AND MANGANESE	X	X	X
14.14	DISPOSAL OF SPENT BRINE	X	X	X
14.15	MAINTENANCE	X	X	X
14.160	Test Units	X	X	X
14.161	Service Stage	X	X	X
14.162	Backwash Stage	X	X	X

14.163	Brine Injection Stage	X	X	X
14.164	Rinse Stage	X	X	X
14.17	START-UP AND SHUTDOWN OF UNIT	X	X	X
14.18	ION EXCHANGE ARITHMETIC	X	X	X
14.19	BLENDING	X	X	X
14.20	RECORDKEEPING	X	X	X
15.	<b>WORDS: TRIHALOMETHANES</b>	X	X	X
15.0	THE TRIHALOMETHANES (THM) PROBLEM	X	X	X
15.1	FEASIBILITY ANALYSIS PROCESS	X	X	X
15.20	Sampling	X	X	X
15.21	THM Calculations	X	X	X
15.22	Chemistry of THM Formation	X	X	X
15.3	CONTROL STRATEGIES	X	X	X
15.4	EXISTING TREATMENT PROCESSES	X	X	X
15.50	Consider Options	X	X	X
15.51	Remove THM's After They Are Formed	X	X	X
15.52	Remove THM Precursors	X	X	X
15.53	Alternative Disinfectants	X	X	X
15.8	SUMMARY AND CONCLUSIONS	X	X	X
16.	<b>WORDS: DEMINERALIZATION</b>		X	X
16.0	SOURCES OF MINERALIZED WATER		X	X
16.1	DEMINERALIZING PROCESS		X	X
16.20	What is Reverse Osmosis?		X	X
16.21	Reverse Osmosis Membrane Structure and Composition		X	X
16.22	Membrane Performance and Properties		X	X
16.23	Definition of Flux		X	X
16.24	Mineral Rejection		X	X
16.25	Effects of Feedwater Temperature and pH on Membrane Performance		X	X
16.26	Recovery		X	X
16.30	Pressurization Pump			X
16.31	Piping			X
16.32	Pressure Vessel Housings			X
16.33	Concentrate Control Valve			X
16.34	Sample Valves			X
16.35	Flush Connections			X
16.36	Cleaning Connections			X
16.37	Permeate Rinse			X
16.38	Permeate Drawback Tank			X
16.39	Energy Recovery Devices			X
16.310	Membranes			X
16.40	Pretreatment		X	X
16.41	Removal of Turbidity and Suspended Solids		X	X
16.42	pH and Temperature Control		X	X
16.43	Other Potential Scalants		X	X
16.44	Microbiological Organisms		X	X
16.45	RO Plant Operation		X	X
16.46	Typical RO Plant Operations Checklist		X	X
16.47	Membrane Cleaning		X	X

16.480	Use of Proper Procedures		X	X
16.481	Chemical Safety		X	X
16.482	Hydraulic Safety		X	X
16.483	Electrical Safety		X	X
16.5	ELECTRODIALYSIS			X
16.60	Anions and Cations in Water			X
16.61	Effect of Direct Current (D.C.) Potential on Ions			X
16.62	Anion and Cation Membranes and Three Cell Unit			X
16.63	Multi-Compartment Unit			X
16.70	Flow Diagram			X
16.71	Pretreatment			X
16.72	Pumping Equipment and Piping			X
16.73	D.C. Power Supply			X
16.74	Membrane Stack			X
16.75	Chemical Flush System			X
16.8	ROUTINE OPERATING PROCEDURES			X
16.80	Design Specifications for Feedwater			X
16.81	Detailed Operating Procedures			X
16.9	SAFETY PRECAUTIONS			X
17.	<b>WORDS: HANDLING AND DISPOSAL OF PROCESS WASTES</b>		X	X
17.0	NEED FOR HANDLING AND DISPOSAL OF PROCESS WASTES	X	X	X
17.1	SOURCES OF TREATMENT PROCESS WASTES		X	X
17.2	PROCESS SLUDGE VOLUMES		X	X
17.3	METHODS OF HANDLING AND DISPOSING OF PROCESS WASTES		X	X
17.4	DRAINING AND CLEANING TANKS		X	X
17.5	BACKWASH RECOVERY PONDS (SOLAR LAGOONS)		X	X
17.60	SLUDGE DEWATERING PROCESS - Solar Drying Lagoons		X	X
17.61	Sand Drying Beds		X	X
17.62	Belt Filter Presses		X	X
17.63	Centrifuges		X	X
17.64	Filter Presses		X	X
17.65	Vacuum Filters		X	X
17.7	DISCHARGE INTO COLLECTION SYSTEMS (SEWERS)		X	X
17.8	DISPOSAL OF SLUDGE		X	X
17.90	Vacuum Trucks		X	X
17.91	Sludge Pumps		X	X
17.10	PLANT DRAINAGE WATERS		X	X
17.11	MONITORING AND REPORTING		X	X
18.	<b>WORDS: MAINTENANCE</b>		X	X
18.0	TREATMENT PLANT MAINTENANCE - GENERAL PROGRAM		X	X
18.00	Preventive Maintenance Records		X	X
18.01	Library of Manufacturers' Operation and Parts Manuals		X	X
18.02	Emergencies		X	X
18.03	Lockout/Tagout Procedures		X	X
18.100	ELECTRICAL EQUIPMENT - Attention		X	X
18.101	Recognize Your Limitations		X	X
18.110	Introduction to Electric Fundamentals		X	X

18.111	Volts		X	X
18.112	Direct Current (D.C.)		X	X
18.113	Alternating Current (A.C.)		X	X
18.114	Amps		X	X
18.115	Watts		X	X
18.116	Power Requirements		X	X
18.117	Conductors and Insulators		X	X
18.120	Voltage Testing		X	X
18.121	Ammeter		X	X
18.122	Megger		X	X
18.123	Ohmmeters		X	X
18.130	Equipment Protective Devices		X	X
18.131	Fuses		X	X
18.132	Circuit Breakers		X	X
18.133	Overload Relays		X	X
18.134	Motor Starters		X	X
18.140	Classifications		X	X
18.141	Troubleshooting		X	X
18.142	Recordkeeping		X	X
18.150	Safety First		X	X
18.151	Standby Power Generation		X	X
18.152	Emergency Lighting		X	X
18.153	Batteries		X	X
18.160	Transmission		X	X
18.161	Switch Gear		X	X
18.162	Power Distribution Transformers		X	X
18.17	Electrical Safety Checklist		X	X
18.20	Repair Shop		X	X
18.21	Pumps		X	X
18.210	Centrifugal Pumps		X	X
18.211	Let's Build a Pump		X	X
18.212	Vertical Centrifugal Pumps		X	X
18.213	Horizontal Centrifugal Pumps		X	X
18.214	Reciprocating or Piston Pumps		X	X
18.215	Progressive Cavity (Screw-Flow) Pumps		X	X
18.216	Chemical Metering Pumps		X	X
18.220	Purpose of Lubrication	X	X	X
18.221	Properties of Lubrication		X	X
18.222	Lubrication Schedule		X	X
18.223	Precautions		X	X
18.224	Pump Lubrication		X	X
18.225	Equipment Lubrication		X	X
18.230	Section Format		X	X
18.231	Preventative Maintenance		X	X
1.	Pumps, General		X	X
2.	Reciprocating Pumps, General		X	X
3.	Propeller Pumps, General		X	X
4.	Progressive Cavity Pumps, General		X	X

5.	Pump Controls		X	X
6.	Electric Motors		X	X
7.	Belt Drives		X	X
8.	Chain Drives		X	X
9.	Variable Speed Belt Drives		X	X
10.	Couplings		X	X
11.	Shear Pins		X	X
18.240	Starting a New Pump		X	X
18.241	Pump Shutdown		X	X
18.242	Pump-Driving Equipment		X	X
18.243	Electrical Controls		X	X
18.244	Operating Troubles		X	X
18.245	Starting and Stopping Pumps		X	X
18.2450	Centrifugal Pumps		X	X
18.2451	Positive Displacement Pumps		X	X
18.25	Compressors		X	X
18.260	Uses of Valves		X	X
18.261	Gate Valves		X	X
18.262	Maintenance of Gate Valves		X	X
12.	Gate Valves		X	X
18.263	Globe Valves		X	X
18.264	Eccentric Valves		X	X
18.265	Butterfly Valves		X	X
18.266	Check Valves		X	X
18.267	Maintenance of Check Valves		X	X
13.	Check Valves		X	X
18.268	Automatic Valves		X	X
18.30	Gasoline Engines		X	X
18.300	Need to Maintain Gasoline Engines		X	X
18.301	Maintenance		X	X
18.310	How Diesel Engines Work		X	X
18.311	Operation		X	X
18.312	Fuel System		X	X
18.313	Water-Cooled Diesel Engines		X	X
18.314	Air-Cooled Diesel Engines		X	X
18.315	How to Start Diesel Engines		X	X
18.316	Maintenance and Troubleshooting		X	X
18.32	Cooling Systems		X	X
18.330	Code Requirements		X	X
18.331	Diesel		X	X
18.332	Gasoline		X	X
18.333	Liquid Petroleum Gas (LPG)		X	X
18.334	Natural Gas		X	X
18.34	Standby Engines		X	X
18.40	Chemical Storage		X	X
18.41	Drainage from Chemical Storage and Feeders		X	X
18.42	Use of Feeder Manufacturer's Manual		X	X
18.43	Solid Feeders		X	X

18.44	Liquid Feeders	X	X	X
18.45	Gas Feeders		X	X
18.46	Calibration of Chemical Feeders		X	X
18.460	Large-Volume Metering Pumps		X	X
18.461	Small-Volume Metering Pumps		X	X
18.462	Dry Chemical Systems		X	X
18.47	Chlorinators		X	X
18.50	Scheduling Inspections		X	X
18.51	Steel Tanks		X	X
18.52	Cathodic Protection		X	X
18.53	Concrete Tanks		X	X
18.6	BUILDING MAINTENANCE		X	X
19.	<b>WORDS: INSTRUMENTATION</b>		X	X
19.00	Need for Understanding Measurement and Control Systems		X	X
19.01	Importance to Waterworks Operator		X	X
19.02	Purpose and Nature of the Measurement Process		X	X
19.03	Explanation of Control Systems		X	X
19.10	Be Careful		X	X
19.11	Electrical Hazards		X	X
19.12	Mechanical Hazards		X	X
19.13	Vaults and Other Confined Spaces		X	X
19.14	Falls		X	X
19.20	How Variables are Measured		X	X
19.21	Pressure		X	X
19.22	Level		X	X
19.23	Flow (Rate of Flow and Total Flow)		X	X
19.24	Chemical Feed Rate		X	X
19.25	Process Instrumentation		X	X
19.26	Signal Transmitters/Transducers		X	X
19.30	Measuring Elements		X	X
19.310	Panel Instruments - Indicators		X	X
19.311	Indicators/Recorders		X	X
19.312	Recorders		X	X
19.313	Totalizers		X	X
19.314	Alarms		X	X
19.32	Automatic Controller		X	X
19.33	Pump Controllers		X	X
19.34	Telemetry Links (Phone Lines)		X	X
19.35	Air Supply Systems		X	X
19.36	Laboratory Instruments		X	X
19.37	Test and Calibration Equipment		X	X
19.40	Proper Care of Instruments		X	X
19.41	Indications of Proper Function		X	X
19.42	Start-up/Shutdown Considerations		X	X
19.43	Maintenance Procedures and Records		X	X
19.44	Operational Checks		X	X
19.45	Preventive Maintenance		X	X
20.	<b>WORDS: SAFETY</b>		X	X

20.00	What is Safety?		X	X
20.01	Causes of Accidents		X	X
20.02	Steps to Avoid Accidents		X	X
20.10	Safe Handling of Chemicals		X	X
20.11	Acids		X	X
20.110	Acetic Acid (Glacial)			X
20.111	Hydrofluosilic Acid		X	X
20.112	Hydrogen Fluoride			X
20.113	Hydrochloric Acid			X
20.114	Nitric Acid			X
20.115	Sulfuric Acid			X
20.12	Bases		X	X
20.120	Ammonia	X	X	X
20.121	Calcium Hydroxide			X
20.122	Sodium Hydroxide (Caustic Soda)	X	X	X
20.123	Sodium Silicate			X
20.124	Hypochlorite	X	X	X
20.125	Sodium Carbonate			X
20.13	Gases		X	X
20.130	Chlorine	X	X	X
20.131	Carbon Dioxide			X
20.132	Sulfur Dioxide			X
20.150	Potassium Permanganate	X	X	X
20.151	Powdered Activated Carbon		X	X
20.152	Other Powders		X	X
20.17	Chemical Storage Drains		X	X
20.20	Fire Prevention	X	X	X
20.21	Classification of Fires and Extinguishers	X	X	X
20.22	Fire Extinguisher Operation and Maintenance	X	X	X
20.23	Fire Hoses	X	X	X
20.24	Storage of Flammables	X	X	X
20.25	Exits	X	X	X
20.30	Maintenance Hazards	X	X	X
20.31	Cleaning	X	X	X
20.32	Painting	X	X	X
20.33	Cranes	X	X	X
20.34	Confined Spaces	X	X	X
20.35	Manholes	X	X	X
20.36	Power Tools	X	X	X
20.37	Welding	X	X	X
20.38	Safety Valves	X	X	X
20.40	Types of Vehicles	X	X	X
20.41	Maintenance	X	X	X
20.42	Seat Belts	X	X	X
20.43	Accident Prevention	X	X	X
20.44	Forklifts	X	X	X
20.50	Electrical Safety	X	X	X
20.51	Current - Voltage	X	X	X

20.52	Transformers	X	X	X
20.53	Electric Starters	X	X	X
20.54	Electric Motors	X	X	X
20.55	Instrumentation	X	X	X
20.56	Control Panels	X	X	X
20.57	Lockout/Tagout Procedure	X	X	X
20.60	Laboratory Hazards		X	X
20.61	Glassware		X	X
20.62	Chemicals		X	X
20.63	Biological Considerations		X	X
20.64	Radioactivity		X	X
20.65	Laboratory Equipment		X	X
20.650	Hot Plates		X	X
20.651	Water Stills		X	X
20.652	Sterilizers		X	X
20.653	Pipet Washers		X	X
20.71	Respiratory Protection		X	X
20.72	Safety Equipment		X	X
20.73	Eye Protection		X	X
20.74	Foot Protection		X	X
20.75	Hand Protection		X	X
20.76	Head Protection		X	X
20.77	Water Safety		X	X
20.8	PREPARATION FOR EMERGENCIES	X	X	X
21	<b>ADVANCED LABORATORY PROCEDURES</b>			
21.0	USE OF A SPECTROPHOTOMETER		X	X
21.1	TEST PROCEDURES		X	X
2.	Calcium		X	X
3.	Chloride		X	X
4.	Color			X
5.	Dissolved Oxygen			X
6.	Fluoride		X	X
7.	Iron (Total)		X	X
8.	Manganese		X	X
9.	Marble Test (Calcium Carbonate Saturation Test)			X
10.	Metals		X	X
11.	Nitrate		X	X
12.	pH	X	X	X
13.	Specific Conductance (Conductivity)		X	X
14.	Sulfate			X
15.	Taste and Odor		X	X
16.	Trihalomethanes	X	X	X
17.	Total Dissolved Solids		X	X
22.	<b>WORDS: DRINKING WATER REGULATIONS</b>		X	X
22.0	HISTORY OF DRINKING WATER LAWS AND STANDARDS	X	X	X
22.1	HOW EPA DEVELOPS DRINKING WATER STANDARDS	X	X	X
22.10	Types of Contaminants	X	X	X
22.11	Identifying Contaminants To Be Regulated	X	X	X

22.12	Unregulated Contaminants	X	X	X
22.13	Schedule (2000 Forward)	X	X	X
22.14	Setting Standards	X	X	X
22.15	Types of Water Systems	X	X	X
22.2	PRIMARY DRINKING WATER STANDARDS	X	X	X
22.20	Inorganic Chemical Standards		X	X
22.200	Antimony		X	X
22.201	Arsenic		X	X
22.202	Asbestos		X	X
22.203	Barium		X	X
22.204	Beryllium		X	X
22.205	Bromate in new edition		X	X
22.206	Cadmium		X	X
22.207	Chlorite in new edition		X	X
22.208	Chromium		X	X
22.209	Copper		X	X
22.2010	Cyanide		X	X
22.2011	Fluoride		X	X
22.2012	Lead and Copper		X	X
22.2012	Lead and Copper		X	X
22.2013	Mercury		X	X
22.2014	Nitrate and Nitrite		X	X
22.2015	Selenium		X	X
22.2016	Thallium		X	X
22.21	Organic Chemical Standards		X	X
22.210	Trichloroethylene		X	X
22.211	1,1-Dichloroethylene		X	X
22.212	Vinyl Chloride		X	X
22.213	1,1,1-Trichloroethane		X	X
22.214	1,2-Dichloroethane		X	X
22.215	Carbon Tetrachloride		X	X
22.216	Benzene		X	X
22.217	Para-Dichlorobenzene (p-Dichlorobenzene)		X	X
22.22	Microbial Standards		X	X
22.220	Total Coliform Rule		X	X
22.2200	Sanitary Survey		X	X
22.2201	Sampling Plan		X	X
22.2202	Laboratory Procedures		X	X
22.2203	Monitoring Frequency		X	X
22.2204	Determining Compliance		X	X
22.221	Surface Water Treatment Rule		X	X
22.2210	Criteria for Avoiding Filtration		X	X
22.2212	Chlorine Residual Substitutions		X	X
22.2213	Turbidity Requirements		X	X
22.2214	Monitoring Requirements		X	X
22.2215	CT Values		X	X
22.2216	Interim Enhanced Surface Water Treatment Rule (IESWTR)		X	X
22.2217				

22.23	Disinfectants and Disinfection By-Products (D/DBPs)		X	X
22.24	Radiological Standards		X	X
22.3	SECONDARY DRINKING WATER STANDARDS	X		
22.30	Enforcement of Regulations	X	X	X
22.31	Secondary Maximum Contaminant Levels	X	X	X
22.32	Monitoring	X	X	X
22.33	Secondary Contaminants		X	X
22.331	Chloride		X	X
22.332	Color		X	X
22.333	Copper		X	X
22.334	Corrosivity		X	X
22.335	Fluoride		X	X
22.336	Foaming Agents		X	X
22.337	Iron and Manganese		X	X
22.338	Iron		X	X
22.339	Manganese		X	X
22.3310	Odor		X	X
22.3311	pH		X	X
22.3312	Silver		X	X
22.3313	Sulfate		X	X
22.3314	Total Dissolved Solids (TDS)		X	X
22.3315	Zinc		X	X
22.4	SAMPLING PROCEDURES		X	X
22.40	Safe Drinking Water Regulations		X	X
22.41	Initial Sampling		X	X
22.42	Routine Sampling		X	X
22.43	Check & Repeat Sampling		X	X
22.44	Sampling Points		X	X
22.46	Sampling Schedule		X	X
22.47	Sampling Routine		X	X
22.48	Sample Collection		X	X
22.5	REPORTING PROCEDURES		X	X
22.6	NOTIFICATION REQUIREMENTS		X	X
22.7	RECORDKEEPING		X	X
22.8	CONSUMER CONFIDENCE REPORT (CCRs)		X	X
23	<b>WORDS: ADMINISTRATION</b>			X
23.0	NEED FOR UTILITY MANAGEMENT			X
23.2	PLANNING			X
23.3	ORGANIZING			X
23.40	STAFFING - The Utility Manager's Responsibilities			X
23.41	How Many Employees Are Needed			X
23.42	Qualifications Profile			X
22.430	Advertising the Position			X
23.431	Paper Screening			X
23.432	Interviewing Applicants			X
23.433	Selecting the Most Qualified Candidate			X
23.44	New Employee Orientation			X
23.450	Probationary Period			X

23.451	Compensation			X
23.452	Training and Certification			X
23.453	Performance Evaluation			X
23.454	Dealing with Disciplinary Problems			X
23.455	Example Policy: Harassment			X
23.456	Labor Laws Governing Employer/Employee Relations			X
23.457	Personnel Records			X
23.46	Unions			X
23.5	COMMUNICATION			x
23.50	Oral Communication			X
23.51	Written Communication			X
23.6	CONDUCTING MEETINGS			X
23.70	Establish Objectives			X
23.71	Utility Operations			X
23.72	The Mass Media			X
23.73	Being Interviewed			X
23.74	Public Speaking			X
23.75	Telephone Contacts			X
23.76	Consumer Inquiries			X
23.77	Plant Tours			X
23.8	FINANCIAL MANAGEMENT			X
23.80	Financial Stability			X
23.81	Budgeting			X
23.82	Equipment Repair/Replacement Funds			X
23.83	Water Rates			X
23.84	Capital Improvements and Funding in the Future			X
23.85	Financial Assistance			X
23.90	The Manager's Responsibilities			X
23.91	Purpose of O & M Programs			X
23.92	Types of Maintenance			X
23.93	Benefits of Managing Maintenance			X
23.94	SCADA Systems			
23.940	Description of SCADA Systems			X
23.941	Typical Water Treatment and Distribution SCADA Systems			X
23.95	Cross Connection Control Program			
23.950	Importance of Cross Connection Control			X
23.951	Program Responsibilities			X
23.952	Water Supplier Program			X
23.953	Types of Backflow Prevention Devices			X
23.954	Devices Required for Various Types of Situations			X
23.100	Planning for Emergency Response			X
23.1010	Handling the Threat of Contaminated Water Supplies - Importance			X
23.1011	Toxicity			X
23.1012	Effective Dosages			X
23.1013	Protective Measures			X
23.1014	Emergency Countermeasures			X
23.1015	In Case of Contamination			X
23.1016	Cryptosporidium			X

23.110	Safety Program Responsibilities			X
23.1100	SAFETY PROGRAM - Everyone is Responsible for Safety			X
23.1101	Regulatory Agencies			X
23.1102	Managers			X
23.1103	Supervisors			X
23.1104	Operators			X
23.111	First Aid			X
23.112	Hazard Communication Program and Worker Right-To-Know (RTK) Laws			X
23.113	Confined Spaces Entry Procedures			X
23.114	Reporting			X
23.115	Training			X
23.116	Measuring			X
23.117	Human Factors			X
23.120	Purpose of Records			X
23.121	Types of Records			X
23.122	Types of Plant Operations Data			X
23.123	Maintenance Records			X
23.124	Procurement Records			X
23.125	Inventory Records			X
23.126	Equipment Records			X
23.127	Disposition of Plant Records			X
	<b>APPENDIX</b>			
A.2	BASIC FORMULAS		X	X
A.30	Iron and Manganese Control		X	X
A.31	Fluoridation		X	X
A.32	Softening		X	X
A.33	Trihalomethanes		X	X
A.34	Demineralization		X	X
A.35	Maintenance		X	X
A.36	Advanced Laboratory Procedures		X	X
A.37	Administration, Safety		X	X
A.51	Fluoridation			X
A.52	Softening			X
A.54	Demineralization			X

Rules Governing Public Water Systems NCAC Title 15A

SECTION	TOPIC	D	C	B	A
.0102	DEFINITIONS	X	X	X	X
	G.S. 130A-2. Definitions	X	X	X	X
	G.S. 130A-313. Definitions	X	X	X	X
	141.2 Definitions	X	X	X	X
.0203	PUBLIC WELL WATER SUPPLIES	X	X	X	X
.0301	APPLICABILITY: PRIOR NOTICE	X	X	X	X
.0303	SUBMISSIONS REQUIRED BY ENGINEER AND APPLICANT	X	X	X	X
.0304	APPLICATION FOR APPROVAL: BY WHOM MADE	X	X	X	X

.0305	APPROVALS NECESSARY BEFORE CONTRACTING OR CONSTRUCTING	X	X	X	X
.0306	CHANGES IN ENGINEERING PLANS OR SPECIFICATIONS AFTER APPROVAL	X	X	X	X
.0307	ENGINEER'S REPORT, WATER SYSTEM MANAGEMENT PLAN AND OTHER PLANS	X	X	X	X
.0309	FINAL APPROVAL	X	X	X	X
.0402	WATER SUPPLY WELLS	X	X	X	X
.0404	WATER TREATMENT FACILITIES	X	X	X	X
.0405	STORAGE OF FINISHED WATER	X	X	X	X
.0406	DISTRIBUTION SYSTEMS	X	X	X	X
.0407	ELECTRICAL SYSTEMS	X	X	X	X
.0408	LEAD FREE CONSTRUCTION	X	X	X	X
.0409	SERVICE CONNECTIONS	X	X	X	X
.0708	GRAVITY FILTERS			X	X
.0709	PREVENTION OF BACKFLOW AND BACK SIPHONAGE			X	X
.0801	CAPACITIES: DETERMINING MINIMUM EFFECTIVE VOLUME			X	X
.0802	CAPACITIES: DETERMINING PEAK DEMAND			X	X
.0803	CAPACITIES: DETERMINING TOTAL VOLUME			X	X
.0804	CAPACITIES: GROUND STORAGE PLUS HYDROPNEUMATIC TANKS			X	X
.0805	CAPACITIES: ELEVATED STORAGE		X	X	X
.0901	SIZE OF WATER MAINS	X	X	X	X
.0902	NUMBER OF RESIDENCES ON A WATER MAIN	X	X	X	X
.0903	DEAD END WATER MAINS	X	X	X	X
.0904	PIPE LAYING	X	X	X	X
.0905	TESTING NEW WATER MAINS	X	X	X	X
.0906	RELATION OF WATER MAINS TO SEWERS	X	X	X	X
.0907	VALVES	X	X	X	X
.1001	DISINFECTION OF NEW SYSTEM	X	X	X	X
.1002	DISINFECTION OF WELLS	X	X	X	X
.1003	DISINFECTION OF STORAGE TANKS & DISTRIBUTION SYSTEM	X	X	X	X
.1004	DISINFECTION OF FILTERS		X	X	X
.1303	OPERATION OF PUBLIC WATER SYSTEM WELLS	X	X	X	X
.1304	WATER SYSTEM OPERATION AND MAINTENANCE	X	X	X	X
.1400	FLUORIDATION OF PUBLIC WATER SUPPLIES			X	X
.1401	POLICY			X	X
.1402	FORMAL APPLICATION			X	X
.1404	FEEDING EQUIPMENT			X	X
.1405	PROTECTION OF OPERATORS			X	X
.1406	CONTROL OF TREATMENT PROCESS			X	X
.1407	APPROVAL MAY BE RESCINDED			X	X
.1502	MONITORING OF CONSECUTIVE PUBLIC WATER SYSTEMS		X	X	X
.1503	MICROBIOLOGICAL CONTAINMENT SAMPLING AND ANALYSIS	X	X	X	X
.1504	MAXIMUM MICROBIOLOGICAL CONTAINMENT LEVELS	X	X	X	X
.1505	TURBIDITY SAMPLING AND ANALYSIS	X	X	X	X

.1506	MAXIMUM CONTAINMENT LEVELS FOR TURBIDITY	X	X	X	X
.1507	CORROSION CONTROL AND LEAD AND COPPER MONITORING	X	X	X	X
.1508	INORGANIC CHEMICAL SAMPLING AND ANALYSIS	X	X	X	X
.1509	SPECIAL MONITORING FOR SODIUM	X	X	X	X
.1510	MAXIMUM CONTAMINANT LEVEL FOR INORGANIC CHEMICALS	X	X	X	X
.1511	CONCENTRATION OF IRON	X	X	X	X
.1512	CONCENTRATION OF MANGANESE	X	X	X	X
.1513	TOTAL TRIHALOMETHANES SAMPLING & ANALYSIS: 10,000 OR MORE		X	X	X
.1514	TREATMENT TECHNIQUES FOR TOTAL TRIHALOMETHANES			X	X
.1515	ORGANIC CHEMICALS OTHER THAN TTHM, SAMPLING AND ANALYSIS	X	X	X	X
.1516	SPECIAL MONITORING FOR ORGANIC CHEMICALS	X	X	X	X
.1517	MAXIMUM CONTAMINANT LEVEL FOR ORGANIC CHEMICALS			X	X
.1518	MAXIMUM CONTAMINANT LEVEL FOR ORGANIC CONTAMINANTS	X	X	X	X
.1519	MONITORING FREQUENCY FOR RADIOACTIVITY		X	X	X
.1520	MAXIMUM CONTAMINANT LEVELS FOR RADIUM		X	X	X
.1523	PUBLIC NOTIFICATION REQUIREMENTS	X	X	X	X
.1524	REPORTING FOR ORGANIC CHEMICALS	X	X	X	X
.1525	REPORTING FOR REQUIREMENTS	X	X	X	X
.1526	RECORD MAINTENANCE	X	X	X	X
.1527	CERTIFIED LABORATORIES	X	X	X	X
.1529	POINT-OF-ENTRY AND OTHER TREATMENT DEVICES				X
.1532	VARIANCES AND EXEMPTIONS				X
.1533	TOTAL TRIHALOMETHANES SAMPLING/ANALYSIS:LESS THAN 10,000	X	X	X	X
.1534	COLIFORM SAMPLING	X	X	X	X
.1535	MAXIMUM CONTAMINANT LEVELS FOR COLIFORM BACTERIA	X	X	X	X
.1536	TREATMENT TECHNIQUES			X	X
.1537	DRINKING WATER ADDITIVES	X	X	X	X
.1538	CONSUMER CONFIDENCE REPORT		X	X	X
.1601	REQUIREMENTS FOR VARIANCE				X
.1602	VARIANCE REQUEST				X
.1603	CONSIDERATION OF VARIANCE REQUEST				X
.1605	PUBLIC HEARINGS ON VARIANCES AND SCHEDULES				X
.1606	VARIANCES FOR FLUORIDE				X
.1607	VARIANCES & EXEMPTIONS FOR CHEMICALS, LEAD & COPPER , & RADIO-NUCLIDES				X
.1608	REQUIREMENTS FOR AN EXEMPTION				X
.1610	CONSIDERATION OF AN EXEMPTION REQUEST				X
.1611	DISPOSITION OF AN EXEMPTION REQUEST				X
.1612	PUBLIC HEARINGS ON EXEMPTION SCHEDULES				X
.1613	FINAL SCHEDULE				X
.1614	BOTTLED WATER AND POINT-OF-USE DEVICES				X
.1904	WHEN PENALTIES MAY BE ASSESSED	X	X	X	X

.1905	AMOUNT OF PENALTY ASSESSMENT	X	X	X	X
.1913	RIGHT OF ENTRY AND INSPECTION	X	X	X	X
.2001	GENERAL REQUIREMENTS (FILTRATION AND DISINFECTION)		X	X	X
.2008	DISINFECTANTS AND DISINFECTION BYPRODUCTS	X	X	X	X
.2100	OPERATING PERMITS		X	X	X
.2101	PERMITS		X	X	X
.2102	APPLICATION FOR PERMITS		X	X	X
.2103	INITIAL PERMIT PERIOD		X	X	X
.2104	RENEWAL FEES		X	X	X
.2105	REVOCAION		X	X	X
	APPENDIX A	X	X	X	X
	APPENDIX B - FIGURE 2 - NORTH CAROLINA GUIDELINES CROSS CONNECTION CONTROL IN WATER	X	X	X	X

Well Construction Standards NCAC

SECTION	TOPIC	D	C	B	A
.0101	GENERAL PROVISIONS	X	X	X	X
.0102	DEFINITIONS	X	X	X	X
.0105	PERMITS	X	X	X	X
.0107 (d)	CASING	X	X	X	X
.0107 (e)	GROUTING	X	X	X	X
.0107 (f)	WELL SCREENS		X	X	X
.0107 (g)	GRAVEL-AND SAND-PACKED WELLS		X	X	X
.0107 (h)	WELL DEVELOPMENT	X	X	X	X
.0107 (i)	WELL HEAD COMPLETION	X	X	X	X
.0109	PUMP AND PUMPING EQUIPMENT		X	X	X
.0110	WELL TESTS FOR YIELD		X	X	X
.0111	DISINFECTION OF WATER SUPPLY WELLS	X	X	X	X
.0112	WELL MAINTENANCE: REPAIR: GROUNDWATER RESOURCES	X	X	X	X
.0113	ABANDONMENT OF WELLS	X	X	X	X
.0114	DATA AND RECORDS REQUIRED	(b)	(b)	(b)	(b)

Rules Governing Water Treatment Facility Operators

SECTION	TOPIC	D	C	B	A
.0105	Definitions	X	X	X	X
.0201	Grades of Certification	X	X	X	X
.0202	Examinations	X	X	X	X
.0205	Classification of Water Treatment Facility	X	X	X	X
.0206	Certified Operator Required	X	X	X	X

.0301	Application for Exam	X	X	X	X
.0302	Application for Reciprocity	X	X	X	X
.0303	Application for Temporary Certificate	X	X	X	X
.0307	Revocation of Certificate	X	X	X	X
.0309	Certification Reinstatement	X	X	X	X
.0401	Notification of Classification	X	X	X	X
.0404	Temporary Certificate	X	X	X	X
.0501	Petitions	X	X	X	X
.0701	Operator in Responsible Charge	X	X	X	X