month. The PWS must submit the sampling plans required by §§ 141.142(c)(2)(ii) and 141.143(c)(3)(ii) of this subpart at the same time.

(3) *Disinfection Byproduct and Related Monitoring.* A PWS operating a treatment plant required to comply with § 141.142 of this subpart shall begin monitoring in the calendar month following approval of the DBP and related monitoring sampling plan submitted under the provisions of § 141.142(c)(2)(ii) of this subpart. Once a PWS has begun monitoring, it shall continue to monitor for 18 consecutive months.

(4) *Microbiological Monitoring.* A PWS operating a treatment plant identified in paragraph (d) of this section shall begin monitoring under the provisions of § 141.143 of this subpart in the calendar month following approval of the sampling plan submitted under the provisions of § 141.143(c)(3)(ii) of this subpart. Once a PWS has begun monitoring, it shall continue to monitor for 18 consecutive months.

(5) DBP precursor removal studies. (i) *TOC, UFCTOX, THM4, and HAA5 monitoring.* A PWS required to comply with § 141.144 of this subpart shall begin TOC, UFCTOX, THM4, and HAA5 monitoring specified in paragraph (e)(2) of this section not later than August 14, 1996 and continue this monitoring for 12 consecutive months for TOC and UFCTOX and four consecutive quarters for THM4 and HAA5.

(ii) A PWS required to conduct a disinfection byproduct precursor removal study (treatment study) under the provisions of paragraph (e)(1) of this section shall begin conducting such treatment studies not later than April 14, 1998 and submit the report(s) of the completed study to EPA not later than July 14, 1999.

§ 141.142 Disinfection byproduct and related monitoring.

(a) *Monitoring requirements.* Samples taken under the provisions of this section shall be taken according to the procedures described in the ''ICR Sampling Manual,'' EPA 814–B–96–001, April 1996. If a treatment plant configuration results in two required sampling points from any table in this section when in fact it is a single location, duplicate analyses are not required for the same location and time. A PWS that uses purchased finished water shall determine whether any monitoring of treatment plant influent is required under paragraphs (a) (2) through (5) of this section because of certain treatment (e.g., use of hypochlorite or chlorine dioxide) of the water provided by the selling PWS.

(1) A PWS shall obtain a complete set of samples at the frequency and location noted in tables 1a and 1b of this section for treatment plants required to test under § 141.141(b) of this subpart. Samples shall be taken according to the sampling plan approved under the provisions of paragraph (c)(2)(ii) of this section.

(i) Samples of finished water shall be collected at a point after which all treatment processes for a particular treatment plant are complete (including the clearwell and final point of chlorination) and before the distribution system begins. A PWS that purchases finished water shall collect a sample before additional disinfectant is added to the purchased finished water. A PWS shall collect a sample of purchased finished water only if the PWS redisinfects the purchased finished water. A sample of finished water is a sample representing the final product water from a particular treatment plant.

(ii) A sample of treatment plant influent for a PWS that treats untreated water shall be taken at a location at the upstream end of a treatment plant where waters from all intakes are blended prior to any treatment or chemical addition. For treatment plants that have multiple intakes and add chemicals at the intake, the sample of treatment plant influent shall be a flow proportional composite of intake samples collected before chemical addition and before pretreatment. If the intakes are expected to have the same source water quality, one representative intake sample may be taken. If a disinfectant is added at or before the intake (e.g., for zebra mussel control), the sample shall be taken in the vicinity of the intake so that the sample is not contaminated by the disinfectant. A sample of treatment plant

influent for a PWS that treats purchased finished water is taken at a location just before the purchased finished water is treated. An intake sample is collected after the intake but before blending with waters from other intakes and before addition of chemicals or any treatment.

TABLE 1A.—MONTHLY MONITORING REQUIREMENTS FOR TREATMENT PLANTS

Sampling point	Monthly analyses [1]
Treatment plant influent for non-finished water.	pH, Alkalinity, Turbidity, Temperature, Calcium and Total Hardness, TOC, UV_{254}, Bromide, Ammonia.
Treatment plant influent for purchased finished water [2].	pH, Alkalinity, Turbidity, Temperature, Calcium and Total Hardness, TOC, UV_{254}, Disinfectant residual [3].
Before first point of oxidant addition	Chlorine demand test.
Washwater return between washwater treatment plant and point of addition to process train [4].	pH, Alkalinity, Turbidity, Temperature, Calcium and Total hardness, TOC, UV_{254}, Bromide, Ammonia, Disinfectant residual [3] if disinfectant is used.
Additional water sources added to process train after treatment plant influent. The sample point is before additional water is blended with the process train.	pH, Alkalinity, Turbidity, Temperature, Calcium and Total hardness, TOC, UV_{254}, Bromide, Ammonia, Disinfectant residual [3] if disinfectant is used.
Before Filtration	pH, Alkalinity, Turbidity, Temperature, Calcium and Total Hardness, TOC, and UV_{254}.
After Filtration	pH, Alkalinity, Turbidity, Temperature, Calcium and Total Hardness, TOC, and UV_{254}.
Before each Point of Disinfection [5]	pH, Alkalinity, Turbidity, Temperature, Calcium and Total Hardness, TOC, and UV_{254}.
After every unit process that is downstream from the addition of chlorine or chloramines.	Disinfectant Residual [3].
Finished water sample point (Plant effluent).	pH, Alkalinity, Turbidity, Temperature, Calcium and Total Hardness, TOC, UV_{254}, Disinfectant Residual [3].
Entry point to distribution system [6]	pH, Alkalinity, Turbidity, Temperature, Calcium and Total Hardness, TOC, UV_{254}, Disinfectant Residual [3].

[1] TOC: total organic carbon. UV_{254}≤ absorbance of ultraviolet light at 254 nanometers.
[2] Samples of purchased finished water shall be taken prior to addition of any more disinfectant.
[3] Free chlorine residual and total chlorine residual shall be measured in treatment systems using free chlorine. Total chlorine residual, but not free chlorine residual, shall be measured in treatment systems using chloramines as the residual disinfectant.
[4] Washwater return shall be sampled prior to blending with the process train.
[5] For utilities using ozone or chlorine dioxide, Tables 4 and 5, respectively, of this section, show additional monitoring requirements at this sampling point. Addition of ammonia for the purpose of converting free chlorine to chloramines is considered a point of disinfectant addition. PWSs that disinfect just before filtration may use the ''before filtration'' sampling point analytical results to meet the monitoring requirement for this point.
[6] Entry point to distribution system only required for treatment plants that blend finished water with finished water from other treatment plant(s) prior to entry point of distribution system. For most treatment plants, the finished water sample point and the entry point to the distribution system are the same.

TABLE 1B.—QUARTERLY MONITORING REQUIREMENTS FOR TREATMENT PLANTS

Sampling point	Quarterly analyses [1]
Treatment plant influent for non-finished water.	TOX.
Treatment plant influent for purchased finished water.	THM4, HAA6[7], HAN, CP, HK, CH, TOX.
Washwater Return between washwater treatment plant and point of addition to process train.	TOX.
After filtration if disinfectant is applied at any point in the treatment plant prior to filtration.	THM4, HAA6[7], HAN, CP, HK, CH, TOX.
Finished water sample point (Plant Effluent).	THM4, HAA6[7], HAN, CP, HK, CH, TOX.
Entry point to distribution system [2]	THM4, HAA6[7], HAN, CP, HK, CH, TOX.
SDS [3]	THM4, HAA6[7], HAN, CP, HK, CH, TOX, pH, Alkalinity, Turbidity, Temperature, Calcium and Total Hardness, Disinfectant Residual[5].
Four monitoring points in distribution system [4,6].	THM4, HAA6[7], HAN, CP, HK, CH, TOX, pH, Alkalinity, Turbidity, Temperature, Calcium and Total Hardness, Disinfectant Residual[5].

[1] TOC: total organic carbon. THM4: trihalomethane (four). HAA6: haloacetic acids (six). HAN: Haloacetonitriles. CP: chloropicrin. HK: haloketones. CH: chloral hydrate. TOX: total organic halide. For THM4, HAA6, HAN, and HK, analytical results for individual analytes shall be reported.
[2] Entry point to distribution system only required for treatment plants that blend finished water with finished water from other treatment plant(s) prior to entry point of distribution system. For most treatment plants, the finished water sample point and the entry point to the distribution system are the same.

[3] Simulated Distribution System (SDS) sample shall be collected at the finished water sampling point (or entry point to distribution system if finished water from two or more plants are blended prior to entering the distribution system) and analyzed using the method specified in §141.142. PWSs using purchased finished water are not required to take an SDS sample at treatment plants that use only purchased finished water.

[4] For each treatment plant, one distribution system equivalent sample location (known as DSE) shall be chosen to correspond to the SDS sample, one sample location shall be chosen to be representative of maximum residence time for the treatment plant, and the remaining two sample locations shall be representative of the average residence time in the distribution system for the treatment plant. PWSs using purchased finished water shall take three samples representing the average residence time in the distribution system for the treatment plant and one representing the maximum residence time for the treatment plant (no DSE sample required).

[5] Free chlorine residual and total chlorine residual shall be measured in treatment systems using free chlorine. Total chlorine residual, but not free chlorine residual, shall be measured in treatment systems using chloramines as the residual disinfectant.

[6] A PWS may use TTHM compliance monitoring locations and analytical results under §141.30 of this part to the extent that such locations and analytical results are consistent with the requirements of this section.

[7] PWSs are encouraged to also analyze for the additional haloacetic acids bromodichloro-, chlorodibromo-, and tribromo-acetic acid, and report the results as part of the reports specified in paragraph (c)(1) of this section.

(2) *Additional requirements for PWSs using chloramines.* For each treatment plant that uses chloramines for treatment or disinfection residual maintenance, a PWS shall also conduct the additional sampling identified in table 2 of this section. A PWS shall send samples of cyanogen chloride taken under the provisions of this paragraph for analysis to EPA, following the procedures contained in the ''ICR Sampling Manual,'' EPA 814–B–96–001, April 1996.

TABLE 2.—ADDITIONAL QUARTERLY MONITORING FOR TREATMENT PLANTS USING CHLORAMINES

Sampling point	Quarterly analyses
Treatment plant influent for purchased finished water[1]	Cyanogen Chloride[2].
Finished water sample point (plant effluent)	Cyanogen Chloride[2].
Distribution system sample point representing a maximum residence time in distribution system relative to the treatment plant.	Cyanogen Chloride[2].

[1] Applicable only when wholesale water provider is using chloramines.
[2] EPA shall provide all analytical results to the PWS. The PWS shall report all results in its monthly report.

(3) *Additional requirements for PWSs using hypochlorite solutions.* For each treatment plant that uses hypochlorite solutions for treatment or disinfection residual maintenance, a PWS shall also conduct the additional sampling identified in table 3 of this section.

TABLE 3.—ADDITIONAL QUARTERLY MONITORING FOR TREATMENT PLANTS USING HYPOCHLORITE SOLUTIONS

Sampling point	Quarterly analyses
Treatment plant influent for non-finished water	Chlorate.
Treatment plant influent for purchased finished water[1]	Chlorate.
Hypochlorite Stock Solution	pH, Temperature, Free Residual Chlorine, Chlorate.
Finished Water Sample Point (Plant Effluent)	Chlorate.

[1] Applicable only when wholesale water provider is using hypochlorite solutions.

(4) *Additional requirements for PWSs using ozone.* For each treatment plant that uses ozone for treatment, a PWS shall also conduct the additional sampling identified in tables 4a and 4b of this section. A PWS shall collect samples for bromate taken under the provisions of this paragraph in duplicate, with the PWS analyzing one aliquot and submitting the other aliquot for analysis to EPA, following the procedures contained in the ''ICR Sampling Manual,'' EPA 814–B–96–001, April 1996. A PWS shall submit samples for aldehydes taken under the provisions of this paragraph for analysis to EPA, following the procedures contained in the ''ICR Sampling Manual,'' EPA 814–B–96–001, April 1996.

TABLE 4A.—ADDITIONAL MONTHLY MONITORING FOR TREATMENT PLANTS USING OZONE

Sampling point	Monthly analyses
Ozone Contactor Influent	Bromide, bromate [2,3], and ammonia.
Each Ozone Contact Chamber Effluent [1]	Ozone residual.
Ozone Contactor Effluent	Bromate[2].
Finished Water Sample Point (Plant Effluent)	Bromate[2].

[1] Each ozone contactor can be subdivided into its contact chambers. Measure ozone residual in effluent of all contact chambers until <0.05 mg/l is measured in two consecutive chambers.
[2] EPA shall provide all analytical results to the PWS. The PWS shall report all results in its monthly report.
[3] PWSs are not required to analyze a bromate sample at this location. However, PWSs are still required to submit a sample to EPA for analysis.

TABLE 4B.—ADDITIONAL QUARTERLY MONITORING FOR TREATMENT PLANTS USING OZONE

Sampling point	Quarterly analyses
Ozone Contactor Influent	Aldehydes [1] and AOC/BDOC [2].
Ozone Contactor Effluent	Aldehydes [1] and AOC/BDOC [2].
Finished Water Sample Point (Plant Effluent)	Aldehydes [1] and AOC/BDOC [2].

[1] EPA shall measure the following aldehydes: formaldehyde, acetaldehyde, propanal, butanal, pentanal, glyoxal, and methyl glyoxal. EPA may analyze for other aldehydes. EPA shall provide all analytical results to the PWS. The PWS shall report all results in its monthly report.
[2] Analysis and submission of data for both assimilable organic carbon (AOC) and biodegradable organic carbon (BDOC) are optional. Analytical methods for AOC and BDOC are listed in ''DBP/ICR Analytical Methods Manual,'' EPA 814–B–96–002, April 1996.

(5) *Additional sampling requirements for PWSs using chlorine dioxide.* For each treatment plant that uses chlorine dioxide for treatment or disinfection residual maintenance, a PWS shall also conduct the additional sampling identified in tables 5a and 5b of this section. A PWS shall collect samples for bromate taken under the provisions of this paragraph in duplicate, with the PWS analyzing one aliquot and submitting the other aliquot for analysis to EPA, following the procedures contained in the ''ICR Sampling Manual,'' EPA 814–B–96–001, April 1996. A PWS shall submit samples for aldehydes taken under the provisions of this paragraph for analysis to EPA, following the procedures contained in the ''ICR Sampling Manual,'' EPA 814–B–96–001, April 1996.

TABLE 5A.—ADDITIONAL MONTHLY MONITORING FOR TREATMENT PLANTS USING CHLORINE DIOXIDE

Sampling point	Monthly analyses
Treatment plant influent for purchased finished water [1]	Chlorine Dioxide Residual, Chlorite, Chlorate.
Before first chlorine dioxide application	Chlorate, bromate [2,3].
Before application of ferrous salts, sulfur reducing agents, or GAC.	Chlorine Dioxide Residual, Chlorite, Chlorate, pH.
Finished water sample point (plant effluent)	Chlorine Dioxide Residual, Chlorite, Chlorate, Bromate [2].
Three distribution system sampling points (1 near first customer, 1 in middle of distribution system, and 1 representative of maximum residence time in the distribution system).	Chlorine Dioxide Residual, Chlorite, Chlorate, pH, and Temperature.

[1] Applicable only when wholesale water provider is using chlorine dioxide.
[2] EPA shall provide all analytical results to the PWS. The PWS shall report all results in its monthly report.
[3] PWSs are not required to analyze a bromate sample at this location. However, PWSs are still required to submit a sample to EPA for analysis.

TABLE 5B.—ADDITIONAL QUARTERLY MONITORING FOR TREATMENT PLANTS USING CHLORINE DIOXIDE

Sampling point	Quarterly analyses
Before First Chlorine Dioxide Application	Aldehydes [1] and AOC/BDOC [2].
Before First Point of Downstream Chlorine/Chloramine Application After Chlorine Dioxide Addition.	Aldehydes [1] and AOC/BDOC [2].
Finished Water Sample Point (Plant Effluent)	Aldehydes [1] and AOC/BDOC [2].

[1] EPA shall measure the following aldehydes: formaldehyde, acetaldehyde, propanal, butanal, pentanal, glyoxal, and methyl glyoxal. EPA may analyze for other aldehydes. EPA shall provide all analytical results to the PWS. The PWS shall report all results in its monthly report.

[2] Analysis and submission of data for both assimilable organic carbon (AOC) and biodegradable organic carbon (BDOC) are optional. Analytical methods for AOC and BDOC are listed in ''DBP/ICR Analytical Methods Manual,'' EPA 814–B–96–002, April 1996.

(6) *Additional requirements.* A PWS shall also report the applicable information in tables 6a through 6e of this section. A PWS is required to provide the information in paragraphs (a)(6) (i) through (iii) of this section for each unit process listed in table 6c. The PWS may provide the information in paragraphs (a)(6) (iv) and (v) of this section for each unit process listed in table 6c. T_{10} and T_{50} tracer studies shall be conducted as specified in ''Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems using Surface Water Sources'', appendix C.

(i) Unit process flow (MGD) at time of sampling.

(ii) T_{10} (minutes). A PWS shall determine T_{10} based on a one-time tracer study in the clearwell of all treatment plants required to conduct microbiological monitoring under the provisions of §141.141(d) of this subpart. The PWS may use results of a tracer study conducted to meet the requirements of subpart H (Filtration and Disinfection) of this part to meet this requirement. For subsequent T_{10} determinations, the PWS shall use a flow-proportional interpolation of the clearwell tracer study. For unit processes other than a clearwell, a PWS shall either estimate T_{10} or use an interpolation of tracer study T_{10} using multiple flows for each unit process in which a disinfectant residual exists.

(iii) Chemicals in use at time of sampling. Report chemical name, chemical dose at time of sampling, and measurement formula. Measurement formulas (e.g., mg/l as Aluminum) shall be provided to determine the correct amount of the chemical compound being added.

(iv) Short circuiting factor (optional). The short circuiting factor is an assumed value for the ratio of T_{10} to nominal contact time (volume divided by flow).

(v) T_{50} (minutes) (optional). T_{50} should be reported only if based on a tracer study.

TABLE 6A.—PUBLIC WATER SYSTEM INFORMATION

Permanent data	Design data	Monthly data
Public Water System: Utility Name Public Water Supply Identification Number (PWSID) Water Industry Data Base (WIDB) Number [Optional] Official Contact Person: Name Mailing Address Phone Number [optional] FAX Number [optional] ICR Contact Person: Name Mailing Address Phone Number [optional] FAX Number [optional] E-Mail Address [optional] Treatment Plant: [1]		Sampling Dates: From (date) To (date). Retail population on day of sampling. Wholesale population on day of sampling. Monthly average Retail flow (MGD). Monthly average Wholesale flow (MGD).
Plant name ICR plant number assigned by EPA [2] PWSID number of treatment plant [3] State approved (permitted) plant capacity (MGD) Historical minimum water temperature (°C) Installed sludge handling capacity (lb/day) Process Train: Name	Plant type (e.g., Conventional Filtration, Direct Filtration, In-Line Filtration, Two Stage Softening, Disinfection Only/Groundwater, Other Groundwater treatment) Process Train Type (e.g., Conventional Filtration, Direct Filtration, In-Line Filtration, Two Stage Softening, Disinfection Only/Groundwater, Other Groundwater treatment)	Hours of operation (hours per day) Sludge solids production (lb/day) Percent solids in sludge (%)

[1] A PWS that operates more than one treatment plant shall report treatment plant information in this table for each treatment plant.
[2] EPA shall assign ICR plant number after the PWS submits sampling plan.

[3] PWSID of treatment plant if different from the PWSID reported in ''Public Water System''.

TABLE 6B.—PLANT INFLUENT INFORMATION

Permanent data	Monthly data
Water Resource [1]	
Name of resource: Type of resource (One of the following): 1 Flowing stream 2 Reservoir/Lake 3 Ground water classified as under the direct influence of surface water (GWUDI) 4 Ground water 5 Purchased finished water 6 Non-Fresh (such as salt water)	If Reservoir/Lake: Mean Residence Time (days).
Intake-Surface Water [2]	
Location of intake: [3] Latitude (deg/min/sec) Longitude (deg/min/sec) Hydrologic unit code (8 digit), if known [4] Stream Reach Code (3 digit) (if known) River mile number (mile) (if known) Is watershed control practiced? (yes/no)	Flow on day of sampling (MGD).
Intake-Ground Water [5 6]	
Location of intake: Latitude (deg/min/sec) Longitude (deg/min/sec) Hydrological unit code (8 digit), if known [4] Is wellhead protection practiced? (yes/no)	Flow on day of sampling (MGD).
Intake-Purchased Finished Water [7]	
Name of supplying utility ..... PWSID of supplying utility	Flow on day of sampling (MGD).
Plant Influent [8]	
	Monthly average flow (MGD). Flow at time of sampling (MGD).

[1] Each treatment plant shall have at least one water resource. Each water resource shall have at least one intake. A treatment plant that uses more than one water resource shall report water resource information in this table for each water resource.
[2] Intake-Surface Water describes the physical location of an intake structure located in a river, lake, or other surface water resource or, for ground water under the direct influence of surface water, the physical location of a well.
[3] The location of the intake will allow cross referencing into other data bases containing information on possible contamination threats to the intake.
[4] The hydrologic unit code will allow cross referencing into other data bases containing information on possible contamination threats to the intake.
[5] An Intake-Ground Water describes the physical location of a well or well field (if multiple wells draw from a common aquifer.
[6] A PWS is not required to report information for ground water that is not treated.
[7] A PWS is required to report information for purchased finished water only if that water is further treated.
[8] Multiple ''Intakes'' combine into one ''Plant Influent.'' Each treatment plant has only one treatment plant influent. The treatment plant influent shall mark the point in the treatment plant where the ''Plant Influent'' sample shall be collected as described in Tables 1, 2, 3 and 5 of this section.

TABLE 6C.—UNIT PROCESS INFORMATION

Design data	Monthly data
Presedimentation Basin [1]	
Tube Settler Brand Name Plate Settler Brand Name Baffling type[2]	Liquid volume (gallons). Surface area (ft^2). Projected Tube Settler Surface Area (ft^2). Projected Plate Settler Surface Area (ft^2).

TABLE 6C.—UNIT PROCESS INFORMATION—Continued

Design data	Monthly data
Ozone Contact Basin	
Information for the complete ozone contact basin: Type of Ozone Contactor (One of the following) 1 Bubble Diffusion 2 Turbine Number of Chambers Information for each ozone contact chamber: Chamber sequence number Liquid volume (ft^3) Surface area (ft^2) Water/Ozone flow regime (one of the following) 1 Counter-current 2 Co-current	Information for the complete ozone contact basin: Ozone CT (mg min/l).[10] Ozone Giardia Inactivation (logs). Ozone Virus Inactivation (logs). Ozone concentration in feed gas (% by weight). Total Ozone Gas Flow Rate to Contactor (SCFM).[3] Type of feed gas used to generate ozone (one of the following). 1 Air. 2 Oxygen. Total Ozone Applied Dose (mg/l). Information for each ozone contact chamber: Percent ozone gas flow split to this chamber (%). Hydrogen peroxide dose (mg/l).
Washwater Return Point[8]	
Indicate which washwater treatment processes are being used on day of sampling Is there treatment (yes/no): If yes: Plain sedimentation (yes/no) Coagulation/sedimentation (yes/no) Filtration (yes/no) Disinfection (yes/no) Other Treatment (Text)	Flow of returned washwater at time of sampling (MGD). 24 hr average flow prior to sampling (MGD).
Rapid Mix	
Type of mixer (one of the following): 1 Mechanical 2 Hydraulic 3 Static 4 Other Baffling type[2]	Mean velocity gradient ''G'' (sec^{-1}).[4] Liquid volume (gallons).
Flocculation Basin	
Type of mixer (one of the following): 1 Mechanical 2 Hydraulic Number of stages Baffling type[2]	Mean velocity gradient ''G'' (sec^{-1}) in each stage.[4] Liquid volume of each stage (gallons).
Sedimentation Basin	
Tube settler brand name Plate settler brand name Baffling type[2]	Liquid volume (gallons). Surface area (ft^2). Projected tube settler surface area (ft^2). Projected plate settler surface area (ft^2).
Solids Contact Clarifier	
Brand name: Type (check all that apply): Rectangular basin Upflow Reactor-clarifier Sludge blanket Tube settler brand name Plate settler brand name	Liquid volume (gallons). Surface area of settling zone (ft^2). Projected tube settler surface area (ft^2). Projected plate settler surface area (ft^2).

TABLE 6C.—UNIT PROCESS INFORMATION—Continued

Design data	Monthly data
Baffling type [2]	
Adsorption Clarifier	
Brand Name Baffling type [2]	Liquid volume (gallons). Surface area (ft^2).
Dissolved Air Flotation	
Baffling type [2]	Liquid volume (gallons). Surface area (ft^2). Percent recycle rate (%). Recycle stream pressure (psi).
Recarbonation Basin	
Baffling type [2]	Liquid volume (gallons). Surface area (ft^2).
Filtration	
Media Type (one of the following): 1 Dual media (Anthracite/Sand) 2 GAC over sand 3 Tri media (Anthracite/Sand/Garnet) 4 Sand 5 Deep bed monomedia anthracite 6 Deep bed monomedia GAC 7 Greensand 8 Other Design depth of GAC (inch) Type and manufacturer of activated carbon Design media depth (inch) Minimum water depth to top of media (ft) Depth from top of media to top of backwash trough (ft)	Liquid volume (gallons). Surface area (ft^2). Average filter run time (hr).
Slow Sand Filtration	
Media type Media depth Media size	Surface area (ft^2). Average filter run length. Cleaning method.
Diatomaceous Earth Filter	
	Effective DE filter surface (ft^2). Precoat (lb/ft^2). Bodyfeed (mg/l). Run length (hours).
Granular Activated Carbon—Post-Filter Adsorber	
Manufacturer of activated carbon Type of activated carbon	Liquid volume (gallons). Surface area (ft^2). Carbon volume (ft^3). Empty bed contact time (minutes). Operating reactivation frequency (days).

TABLE 6C.—UNIT PROCESS INFORMATION—Continued

Design data	Monthly data
Membranes	
Model name: Type (one of the following): 1 Reverse osmosis 2 Nanofiltration 3 Ultrafiltration 4 Microfiltration 5 Electrodialysis Number of stages Molecular weight cutoff (daltons) Design flux (gpd/ft²) Design pressure (psi)	Surface area (ft²). Percent recovery (%). Operating pressure (psi). Operating flux (gpd/ft²). Cleaning method (one of the following) Hydraulic. Chemical. Cleaning frequency (days).
Air Stripping	
Packing height (ft) Design air to water ratio (volume/volume) Type of packing (Name) Nominal size of packing (inch)	Horizontal cross-section area (ft²). Air flow (SCFM).[3]
Ion Exchange	
Resin (Name) Resin manufacturer Design exchange capacity (equ/ft³) [3] Bed depth (ft)	Liquid volume (gallons). Surface area (ft²).
Disinfection Contact Basin [5 6]	
Baffling type [2]	Liquid volume (gallons). Surface area (ft²).
Clearwell [7]	
Baffling type [2] Minimum liquid volume (gallons) Covered or Open	Liquid volume (gallons). Surface area (ft²).
Additional Water Sources [9]	
Type of water source: Purchased Finished water Untreated ground water Treated ground water Untreated surface water Treated surface water Other	Flow of additional source (MGD).[6]
Other Treatment	
Purpose	Surface area (ft²) [optional]. Liquid Volume (gallons) [optional].

[1] A reservoir to which oxidants, disinfectants, or coagulants are added is considered a presedimentation basin.
[2] Baffling type classified as one of the following: 1 (Unbaffled (mixed tank)), 2 (Poor (inlet/outlet only)), 3 (Average (Inlet/Outlet and intermediate)), 4 (Superior (Serpentine)), or 5 (Perfect (Plug flow)). Information on classifying baffling types can be found in ''Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems using Surface Water Sources'', Appendix C.
[3] ''SCFM'' is standard cubic feet per minute. ''Equ/ft³'' is equivalents per cubic foot.
[4] The mean velocity gradient is typically computed as G=square root of (P/uV) where P=power expended, u=viscosity, and V=liquid volume.
[5] The disinfection contact basin shall have a stable liquid level.
[6] Disinfection Contact Basin can be used to represent a pipe with a long contact time.
[7] A clear well may have a variable liquid level.
[8] The ''Washwater Return'' shall mark the point in the process train where washwater joins the main flow.
[9] Additional water sources includes water that is added to the process train after the influent.
[10] Ozone CT calculated using the procedure contained in ''Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems using Surface Water Sources'', Appendix O, 1991.

TABLE 6D.—ADDITIONAL PROCESS TRAIN INFORMATION

Design data	Monthly data
Disinfectant Addition	
	Disinfectants in use at time of sampling. Dose (mg/l). Chemical formula (e.g., mg/l as chlorine).
Finished Water Sample Point (Plant Effluent) [1, 2]	
	Monthly average flow (MGD). Flow at time of sampling (MGD).

[1] This shall mark the end of a treatment plant.
[2] Unless the finished water of this treatment plant is blended with finished water from another treatment plant, this point is also the entry point to the distribution system.

TABLE 6E.—FINISHED WATER DISTRIBUTION INFORMATION

Design data	Monthly data
Entry Point to Distribution System [1]	
	Monthly average flow (MGD). Flow at time of sampling (MGD).
Wholesale Information [2]	
Name of purchaser ..... PWSID of purchaser	Flow at time of sampling (MGD).
Distribution System	
Typical maximum residence time (days) Average residence time (days) Design volume of distribution system storage (million gallon) Total surface area of open reservoirs in distribution system storage (ft^2)	Maximum residence time (days). Average residence time (days). Number of disinfection booster stations in operation at time of sampling: Chlorine. Chloramine. Chlorine dioxide. Range of distribution system disinfectant dosages. Chlorine: High (mg/l) Low (mg/l). Chloramine: High (mg/l) Low (mg/l). Chlorine dioxide: High (mg/l) Low (mg/l).

[1] Multiple treatment plants can feed into one entry point to the distribution system. If there is only one treatment plant then ''Finished Water Sample Point (Plant Effluent)'' and ''Entry Point to Distribution System'' are the same.
[2] The supplying public water system shall report ''Wholesale Information'' for each public water system which purchases finished water.

(b) Analytical methods. (1) A PWS shall use the methods identified in table 7 of this section for conducting analyses required by this subpart.

TABLE 7.—ANALYTICAL METHODS APPROVED FOR SUBPART M

Analyte	Methodology [1]		
	40 CFR reference [2]	EPA method	Standard method [3]
pH, alkalinity, calcium hardness, temperature ...	§ 141.23(k)(1)		
Turbidity	§ 141.74(a)(1)		
Disinfectant residuals: free chlorine, total chlorine, chlorine dioxide, ozone.	§ 141.74(a)(2)		4500–Cl B [9]
Trihalomethanes: chloroform, bro	§ 141.24(e)	551.1 [4]	
modichloromethane, dibro			
mochloromethane, bromoform			
Haloacetic acids: mono-, di-, and trichloroacetic acids; mono- and dibromoacetic acid; bromochloroacetic acid.		552.1, [5] 552.2 [4]	6251 B
Chloral hydrate		551.1 [4]	

TABLE 7.—ANALYTICAL METHODS APPROVED FOR SUBPART M—Continued

Analyte	Methodology [1]		
	40 CFR reference [2]	EPA method	Standard method [3]
Haloacetonitriles: di- and trichloroacetonitrile; bromochloroacetonitrile; dibromoacetonitrile.		551.1 [4]	
Haloketones: 1,1-Dichloropropanone; 1,1,1-trichloropropanone.		551.1 [4]	
Chloropicrin		551.1 [4]	
Chlorite		300.0 [6]	
Chlorate		300.0 [6]	
Bromide		300.0 [6]	
Bromate		300.0 [6]	
Total Organic Halide (TOX)			5320 B
Total Organic Carbon			5310 B, 5310 C, 5310 D
UV absorbance at 254 nm			5910
Simulated Distribution System Test (SDS)			5710 C
Total Hardness			2340 B,[7] 2340 C
Ammonia	§ 136.3, Table 1b [8]	350.1 [6]	4500–NH_3 D, 4500–NH_3 G
Chlorine Demand Test			2350 B

[1] Analyses shall be conducted by using mandatory analytical and quality control procedures contained in ''DBP/ICR Analytical Methods Manual'', EPA 814–B–96–002.

[2] Currently approved methodology for drinking water compliance monitoring is listed in Title 40 of the Code of Federal Regulations in the sections referenced in this column. The 18th and 19th editions of *Standard Methods for the Examination of Water and Wastewater,* American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005, are equivalent for the methods cited in these sections. Therefore, either edition may be used.

[3] Except where noted, all methods refer to the 19th edition of *Standard Methods for the Examination of Water and Wastewater,* American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

[4] Analytical method reprinted in ''Reprints of EPA Methods for Chemical Analyses Under the Information Collection Rule'', EPA 814–B–96–006. Originally published in ''Methods for the Determination of Organic Compounds in Drinking Water—Supplement III,'' EPA/600/R–95/131, August 1995, PB95–261616.

[5] Analytical method reprinted in ''Reprints of EPA Methods for Chemical Analyses Under the Information Collection Rule'', EPA 814–B–96–006. Originally published in ''Methods for the Determination of Organic Compounds in Drinking Water—Supplement II,'' EPA/600/R–92/129, August 1992, PB92–207703.

[6] Analytical method reprinted in ''Reprints of EPA Methods for Chemical Analyses Under the Information Collection Rule'', EPA 814–B–96–006. Originally published in ''Methods for the Determination of Inorganic Substances in Environmental Samples,'' EPA/600/R–93/100, August 1993, PB94–121811.

[7] The following methods, cited at § 141.23(k)(1) of this part, can be used to determine calcium and magnesium concentrations for use in conjunction with Standard Method 2340 B: EPA Method 200.7, Standard Method 3111 B, Standard Method 3120 B, or ASTM Method D511–93 B.

[8] PWSs may use only the automated electrode method from § 136.3, Table 1b.

[9] Standard Method 4500–Cl B is approved only for determining free chlorine residual concentrations in hypochlorite stock solutions. This method may not be used for any other disinfectant residual analyses.

(2) Analyses under this section shall be conducted by laboratories that have received approval from EPA to perform sample analysis for compliance with this rule. Laboratories that wish to become approved shall contact EPA in writing at USEPA, Technical Support Division, ICR Laboratory Coordinator, 26 W. Martin Luther King Drive, Cincinnati, OH 45268 not later than November 14, 1996. Requirements for approval are included in ''DBP/ICR Analytical Methods Manual'', EPA 814–B–96–002.

(c) *Reporting.* (1) A PWS shall report required data and information collected under the provisions of paragraph (a) of this section to EPA, using an EPA-specified computer readable format. A PWS shall submit a monthly report that indicates the analytical results of all samples collected, including quarterly samples taken in that same month, and all process train data. These reports shall be submitted on a diskette no later than the fourth month following sampling. In addition to the information in tables 1 through 6 in paragraph (a) of this section, reports shall include PWSID, ICR plant identification, sample date, analysis date, laboratory identification numbers, analytical methods used, sample identification numbers, quality assurance code, internal standards, surrogate standards, and preserved sample pH, if appropriate.

(2) *Additional Requirements.* A PWS shall submit a DBP and related monitoring sampling plan for EPA approval, using software provided by EPA, for each treatment plant specified in § 141.141(b)(2) of this subpart that indicates sampling point locations and monitoring to be conducted at each point, and process treatment train information. This sampling plan shall be submitted to EPA at the same time

and on the same diskette as the microbiological sampling plan required by §141.143(c)(3) and no later than eight weeks after the PWS receives the Notice of ICR Final Applicability Determination from EPA, using the procedure specified in ''ICR Sampling Manual'', EPA 814–B–96–001, April 1996.

(3) All reports required by this section shall be submitted to USEPA (ICR4600), ICR Data Center, Room 1111 East Tower, 401 M Street SW., Washington, DC 20460.

(4) The PWS shall keep all data for at least three years following data submission to EPA.

(d) *Incorporation by reference.* The documents and methods listed in paragraphs (d) (1) and (2) of this section are incorporated by reference for purposes specified in this section. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at USEPA, Drinking Water Docket (4101), 401 M Street SW., Washington, DC 20460, or at Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC.

(1) ''Standard Methods for the Examination of Water and Wastewater,'' 19th edition, 1995. Available from the American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005.

(2) ''Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems using Surface Water Sources'', Appendices C and O, 1991. Available from American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.

§141.143 Microbial monitoring.

(a) Monitoring requirements. (1) *Parameters.* A PWS shall sample for the following parameters for the period specified in §141.141(d) of this subpart and at the location specified and using the analytical methods specified in paragraphs (a)(2) and (b), respectively, of this section. For each sample, a PWS shall determine the densities of total coliforms, fecal coliforms or *Escherichia coli, Giardia, Cryptosporidium,* and total culturable viruses for each treatment plant required to monitor under the provisions of §141.141(b) of this subpart.

(2) *Monitoring locations.* (i) A PWS shall collect one sample of the treatment plant influent at the frequency specified in §141.141(d) of this subpart.

(A) A sample of treatment plant influent shall be taken at a location at the upstream end of a treatment plant where waters from all intakes are blended prior to any treatment or chemical addition.

(B) For treatment plants that have multiple intakes and add chemicals at the intake, the PWS shall take an intake sample of the water resource with the poorest microbiological quality (or, if that cannot be determined, the water resource with the highest flow) collected before chemical addition and before pretreatment. If the intakes are expected to have the same source water quality, one representative intake sample may be taken. If a disinfectant is added at or before the intake (e.g., for zebra mussel control), the sample shall be taken in the vicinity of the intake in such manner that the sample is not contaminated by the disinfectant.

(ii) A PWS that, during any of the first twelve months of monitoring at the treatment plant influent, detects 10 or more *Giardia* cysts, or 10 or more *Cryptosporidium* oocysts, or one or more total culturable viruses, in one liter of water; or calculates a numerical value of the *Giardia* or *Cryptosporidium* concentration equal to or greater than 1000 per 100 liters or virus concentration equal to or greater than 100 per 100 liters; or detects no pathogens in the sample and calculates a numerical value of the detection limit for *Giardia* or *Cryptosporidium* concentration equal to or greater than 1000 per 100 liters or virus concentration equal to or greater than 100 per 100 liters; shall also collect one sample of finished water per month at each such treatment plant, beginning in the first calendar month after the PWS learns of such a result. The sample of finished water shall be collected at a point after which all treatment processes for a particular treatment plant are complete (including the clearwell and final point of disinfection) and before the distribution system begins. For each sample of finished