
6. Regulatory Compliance Issues

6.1. SDWA Regulations

The Safe Drinking Water Act (SDWA) and its amendments encompass the federal regulations governing drinking water systems. The SDWA was originally passed in 1974, and has been amended or reauthorized a number of times since then, with major amendments and/or reauthorizations in 1986 and 1996.

The 1986 Amendments were most notable for replacing the original National Interim Drinking Water Regulations with National Primary Drinking Water Regulations (NPDWRs), making provisions for filtration and disinfection requirements, requiring designation of Best Available Technologies (BATs) for regulated contaminants, banning the use of lead solder, flux, and pipe in plumbing, and requiring monitoring of contaminants that are not regulated. The amendments also prescribed a regulatory schedule with a requirement for 83 contaminants to be regulated within the following three years, and then an additional 25 contaminants to be regulated every three years thereafter. A number of key regulations which followed the 1986 Amendments were the Surface Water Treatment Rule, the Total Coliform Rule, the Lead and Copper Rule, the Phase I VOC Rule, the Phase II SOCs and IOCs Rule, and the Phase V SOCs and IOCs Rule. The initial rules related to disinfection by-products and *Cryptosporidium* oocysts were also proposed following the 1986 Amendments, as well as the Information Collection Rule.

The SDWA was reauthorized again in 1996 with major amendments included. The major elements of the reauthorization included:

- Revisions to the standard setting process – the process was required to be more focused on contaminants which are known to pose greater public health risks, and the previous requirement for adding 25 contaminants every three years was removed. Under the reauthorization, five new candidate contaminants are to be considered for regulation every five years, and risk/benefit assessments are to be part of the regulatory process.
- Endorsement of the Microbial/Disinfection By-Products (M/DBP) rule cluster, and provision of directions for the regulation of radon, sulfate, arsenic, and groundwater disinfection.

- The requirement for EPA to promulgate the requirement for Consumer Confidence Reports.
- The requirement for EPA to publish guidance for state source water protection programs and alternative monitoring requirements
- The establishment of a State Revolving Fund for loans to public water systems
- The requirement for EPA to publish operator certification guidelines

The following regulatory review provides details about relevant SDWA regulations affecting the proposed Lake Peckskill water treatment plant; regulations which are primarily focused on administrative/monitoring requirements, such as the Consumer Confidence Report, are not discussed below. Also, the Source Water Protection Rule, which could have impacts on the water source for the new plant, is a program that is currently the responsibility of the Primacy Agencies. Therefore, this rule is also not discussed herein.

Two sources of water quality information were used to evaluate compliance with current and future regulations. Data was obtained from the Montrose Improvement District from their connection to the Catskill Aqueduct. Data was also obtained from the NYCDEP Bureau of Water Quality Supply and Protection, in particular the *Technical Memorandum for Task 2.1.1 Water Quality and New York City Water Quality Data*. The above information is contained in Appendix A.

6.2. Disinfectants/Disinfection By-Products Rule

Disinfection of drinking water is one of the major health advances of the century. These disinfectants are major factors in the reduction of microbial diseases, including typhoid and cholera. However, the disinfectants can react with naturally occurring organic matter to form unintended by-products (trihalomethanes). Toxicological results have shown that several disinfection by-products (DBPs) can be carcinogenic in laboratory animals. In addition, in recent years it has been learned that some microbial pathogens, such as *Cryptosporidium*, are resistant to common disinfection practices. An attempt to curb the formation of DBPs was made in 1979, when the USEPA established an interim maximum contaminant level (MCL) for trihalomethanes of 0.10 mg/l as an annual average. Amendments to the SDWA in 1996 required EPA to develop rules to balance the risks between microbial pathogens and DBPs. The implementation schedule for these rules, titled the Microbial - Disinfectants and Disinfection Byproducts (M-DBP) Rules, is shown in Table 6-1. The Disinfectants/Disinfection Byproducts Rule is one of the Rules under the umbrella of the M-DBP Rules, and consists of two stages as described below.

Table 6-1 Schedule of M-DBP Rules

November 1998 - Final Rule	Interim Enhanced Surface Water Treatment Rule and Stage 1 Disinfection By-Product Rule
August 2000 - Final Rule	Filter Backwash Recycling Rule
November 2000 - Final Rule	Long Term 1 Enhanced Surface Water Treatment Rule and Groundwater Rule
May 2002 - Final Rule	Stage 2 Disinfection By-Product Rule and Long Term 2 Enhanced Surface Water Treatment Rule

6.2.1. Stage 1 Disinfectants/Disinfection By-Products Rule

The Stage 1 DBP Rule applies to all community and non-transient noncommunity water systems that treat their water with a chemical disinfectant for either primary or residual treatment. This rule updates and supercedes the 1979 regulation that governed formation of trihalomethanes.

Established under this rule are maximum residual disinfectant level goals (MRDLGs) and maximum residual disinfectant levels (MRDLs) for three chemical disinfectants ; chlorine, chloramine, and chlorine dioxide. The rule also sets out maximum contaminant level goals (MCLGs) and MCLs for total trihalomethanes, haloacetic acids, chlorite, and bromate. These levels are indicated in Table 6-2.

Water systems that use surface water or groundwater under the direct influence of surface water and use conventional filtration treatment are required to remove specified percentages of organic materials, measured as total organic carbon (TOC), that may react with disinfectants to form DBPs. Removal will be achieved through a treatment technique (enhanced coagulation or enhanced softening) unless a system meets alternative criteria. The required removal percentages are included in Table 6-3.

Small surface water systems are required to comply with Stage 1 DBP rule by December 2003. To aid water systems in the implementation of the Stage 1 DBP Rule, there are guidance manuals covering various aspects of the program. The M-DBP Simultaneous Compliance Manual is meant to assist utilities in complying with various drinking water regulations in addition to the Stage 1 DBP Rule (e.g., Interim Enhanced Surface Water Treatment Rule). This manual covers operational problems that may be encountered when implementing the rule. There is also the Alternative Disinfectants and Oxidants Guidance Manual, which provides technical data and engineering information on disinfectants and oxidants that are not as commonly used as chlorine.

Table 6-2. MRDLGs, MRDLs, MCLGs, and MCLs for Stage 1 DBP Rule

Disinfectant Residual		MRDLG (mg/l)	MRDL (mg/l)	Compliance Based On
Chlorine		4 (as Cl ₂)	4.0 (as Cl ₂)	Annual Average
Chloramine		4 (as Cl ₂)	4.0 (as Cl ₂)	Annual Average
Chlorine Dioxide		0.8 (as ClO ₂)	0.8 (as ClO ₂)	Daily Samples

Disinfection Byproducts		MCLG (mg/l)	MCL (mg/l)	Compliance Based On
Total	Trihalomethanes (TTHM) ¹	N/A	0.08	4-Quarter Running
-	Chloroform	0		Annual Average
-	Bromodichloromethane	0		Annual Average
-	Dibromochloromethane	0.06		Annual Average
-	Bromoform	0		Annual Average
Haloacetic	Acids (five) (HAA5) ²	N/A	0.06	4-Quarter Running
-	Chloroacetic Acid	0		Annual Average
-	Dichloroacetic Acid	0.3		Annual Average
-	Trichloroacetic Acid	N/A		
-	Bromoacetic Acid	N/A		
-	Dibromoacetic Acid	N/A		
Chlorite		0.8	1	Monthly Average
Bromate		0	0.01	Annual Average

Notes:

N/A - Not applicable because there are individual MCLGs for TTHMs and HAAs.

1 - Total trihalomethanes is the sum of the concentrations of chloroform, Bromodichloromethane, dibromochloromethane, and bromoform.

2 - Haloacetic acids (five) is the sum of the concentrations of mono-, di-, and trichloroacetic acids and mono- and dibromoacetic acids.

Table 6-3. Required Removal of TOC for Systems Using Conventional Treatment

Source Water TOC (mg/l)	Source Water Alkalinity (mg/l as CaCO ₃)		
	0 - 60	>60, <120	> 120 ²
>2.0 - 4.0	35.0%	25.0%	15.0%
>4.0 - 8.0	45.0%	35.0%	25.0%
>8.0	50.0%	40.0%	30.0%

Notes:

1. systems meeting at least one of the alternative compliance criteria in the rule are not required to meet the removals in this table. These criteria are:
 - i. source water TOC < 2.0 mg/l (annual average) OR
 - ii. treated water TOC < 2.0 mg/l (annual average) OR
 - iii. source water TOC < 4.0 mg/l, alkalinity > 60 mg/l (annual average), and
 - a. annual average TTHM < 0.040 mg/l and HAAS < 0.030 mg/l, or
 - b. system has made clear and irrevocable financial commitment to use technologies that limit TTHM and HAAS to < 0.040 mg/l and < 0.030 mg/l, respectively
 - financial commitment must be made by the applicable compliance dates
 - technologies must be operational no later than 78 months after publication of the rule

OR

- iv. TTHM < 0.040 mg/l and HAAS < 0.030 mg/l (annual average) and system uses only chlorine for primary and residual disinfection OR
 - v. source water SUVA < 2.0 L/mg-m (annual average) OR
 - vi. treated water SUVA < 2.0 L/mg-m (annual average)
2. Systems practicing softening must meet the TOC removal requirements in the last column to the right.

6.2.2. Stage 2 Disinfection By-Products Rule

The Stage 2 Final Rule is expected in May 2002, with an effective date of May 2005. This rule is expected to lower the MCLs for TTHMs and HAAs to 0.04 mg/l and 0.03 mg/l, respectively, although these levels may be changed if analysis of the Information Collection Rule (ICR) data warrants such change. Additionally, it is possible that MCLs may be set for other DBPs, individual THMs, and/or individual HAAs if health effects data warrant them.

6.2.3. Impacts on Lake Peekskill

It is anticipated that the Lake Peekskill facility can most likely meet the Stage 1 requirements. Given the historically low raw water total organic carbon (TOC), the facility will probably be exempt from the enhanced coagulation requirements. It is possible, however, that the facility may have difficulty meeting the Stage 2 requirements using free chlorination if the rule is applied to small systems at the proposed levels. Bench-scale testing would be required to confirm this. To facilitate compliance with the proposed

Stage 2 levels, provisions should also be made for the future practice of chloramination (chlorine and ammonia).

6.3. Surface Water Treatment Rule and Enhanced Surface Water Treatment Rule

6.3.1. Surface Water Treatment Rule

The Surface Water Treatment Rule (SWTR) was promulgated on June 29, 1989. States had 18 months (until December 29, 1990) to adopt any regulations necessary to implement the national primary drinking water regulations.

Under the SWTR, all public water systems using any surface water or using any groundwater under the direct influence (GWUDI) of surface water are required to disinfect. In addition, the state may require these systems to filter unless certain source-water quality requirements and site-specific conditions are met.

The rule includes the following:

1. Criteria under which filtration is required
2. Performance criteria (i.e., turbidity limits) for filtration
3. Disinfection requirements for filtered and unfiltered systems
4. Monitoring requirements for all surface water supplies
5. Exemption criteria from the filtration requirements, which are as follows:
 - a. source water quality (coliform limits prior to disinfection): fecal coliform less than or equal to 20/100 ml in at least 90 percent of samples taken, or total coliform less than or equal to 100/100 ml in at least 90 percent of the samples taken
 - b. minimum sampling frequency based on system size as follows:

Population Served	Coliforms Samples per Week
less than or equal to 500	1
501 - 3,300	2
3,301 - 10,000	3
10,001 - 25,000	4
greater than 25,000	5

- c. compliance is based on monitoring results during the previous six months.
6. Source water quality (turbidity limits prior to disinfection):
 - a. turbidity less than or equal to 5 ntu

- b. compliance is based on measurements every four hours
- 7. Level of disinfection:
 - a. Disinfection is required and must achieve 99.9 percent inactivation of *Giardia* cysts and 99.9 percent inactivation of viruses
 - b. Disinfection effectiveness must be demonstrated on each day that the unfiltered system delivers water to consumers by meeting CT values specified in the rule. Filtration is required if the system fails to meet this requirement on more than one day in one month during two or more months within a consecutive twelve-month period.
- 8. Point-of-entry disinfection:
 - a. the disinfectant residual in water entering the distribution system cannot be < 0.2 mg/l for more than four hours.
 - b. systems serving $> 3,300$ persons must monitor continuously. If the continuous monitoring system fails, grab-sampling every four hours is permitted for up to five working days.
 - c. if the disinfectant residual falls below 0.2 mg/l at any time in a system using grab-sample monitoring, the system must continue to take a grab sample every four hours until the residual is > 0.2 mg/l.
- 9. Distribution System Disinfection:
 - a. the disinfectant residual in the distribution system cannot be undetectable in > 5 percent of the samples in a month for any two consecutive months
 - b. a system may measure heterotrophic plate count (HPC) in lieu of disinfectant residual in the distribution system. A sampling site with an HPC level of < 500 colonies/ml is considered to have a "detectable" residual
 - c. disinfectant residual monitoring is required at the same interval as total coliform measurements under the Total Coliform Rule
 - d. the state may allow systems that use both surface water and groundwater sources to take disinfectant residual samples at points other than total coliform sampling points if it determines those sites are more representative of the distribution system water quality.
 - e. if the state determines a system that cannot meet the first item under this heading has no means for having a sample transported and analyzed for HPC by a certified lab under the required time and temperature conditions, but is providing adequate disinfection in the distribution system, the first item under the heading does not apply to the system.
- 10. Systems providing disinfection as the only treatment must provide redundant disinfection equipment, including an alarm or automatic water shutoff when the disinfectant residual drops below 0.2 mg/l
- 11. An effective watershed control program must be established and maintained
- 12. An annual on-site inspection by the state or approved third party is required to determine if an adequate watershed control program is in place and reliable disinfection treatment is being maintained

13. The system cannot have been identified as the source of an outbreak of waterborne disease, otherwise it must have been modified sufficiently to prevent another outbreak
14. The system must comply with the total coliform MCL, as well as the total trihalomethane MCL (if the system serves > 10,000 people)

The SWTR establishes treatment techniques instead of MCLs for the control of *Giardia* cysts, viruses, heterotrophic plate count (HPC) bacteria, and *Legionella*. Turbidity limits depend on the filtration method employed in its removal. For conventional filtration, the turbidity standard is 0.5 ntu in at least 95 percent of all measurements taken each month. At no time can the filtered water turbidity exceed 5 ntu. Treatment must achieve at least 99.9 percent (3-log) removal and/or inactivation of *Giardia lamblia* cysts and 99.99 percent (4-log) removal and/or inactivation of viruses. The MCLGs for *Giardia* cysts, viruses, and *Legionella* are zero. There are no MCLGs for HPC bacteria and turbidity.

A partial removal credit is given to systems that provide filtration. The remainder of the removal/inactivation requirement must be achieved through chemical disinfection. The actual amount of removal credit to be granted for filtration is based on the specific type of filtration process (for example, a 2.5-log *Giardia* cyst removal credit is recommended by EPA for conventional treatment or direct filtration, while a 2.0-log *Giardia* cyst removal credit is recommended for diatomaceous earth or slow sand filtration). Inactivation credit for chemical disinfectants is based on "CT", which equals the disinfectant residual concentration (C, in milligrams per liter) times the disinfectant contact time (T, in minutes). The State of New York has set the maximum filtration *Giardia* cyst removal credit to be 2 log units, thus requiring a full log unit of disinfection to meet the requirements of the rule. Virus removal credits are also granted depending upon the type of filtration process; the resulting virus inactivation requirements are typically easily achieved through providing adequate *Giardia* cyst inactivation, and therefore the virus requirements are usually not the driving consideration.

The disinfectant residual in the distribution system is also not allowed to drop below 0.2 mg/l for more than four hours. If this occurs, the system is considered to be in violation.

As discussed above, disinfection is an important process in drinking water treatment. However, new organisms are being discovered which are resistant to conventional forms of treatment, such as *Cryptosporidium* oocysts. In 1993, *Cryptosporidium* oocysts caused 400,000 people in Milwaukee to experience intestinal illness, hospitalizing over 4,000, and killing at least 50. Other *Cryptosporidiosis* outbreaks have been reported in Nevada, Oregon, and Georgia. In response, the Enhanced Surface Water Treatment Rule was proposed under the broader scope of the M-DBP Rule

Cluster. A future part of this rule which might apply to the proposed Lake Peekskill plant is the Long Term 1 Enhanced Surface Water Treatment Rule (LT1 ESWTR), which applies to systems serving less than 10,000 people and is described in the second of the following sections. The first section details the Interim Enhanced Surface Water Treatment Rule, which contains requirements that could be incorporated into the LT1 ESWTR.

6.4. Interim Enhanced Surface Water Treatment Rule

The IESWTR applies to all public water systems that use surface water or groundwater under the direct influence of surface water (GWUDI) and serve at least 10,000 people. In addition, States are required to conduct sanitary surveys for all surface water and GWUDI systems, including those that serve under 10,000 people. This rule amends the 1989 Surface Water Treatment Rule to further strengthen microbial protection. The final rule includes treatment requirements for waterborne pathogens, *e.g.* *Cryptosporidium* oocysts. In addition, systems must continue to meet existing requirements for *Giardia lamblia* cysts and viruses. Specifically, the rule includes:

1. MCLG of zero for *Cryptosporidium* oocyst
2. 2-log *Cryptosporidium* oocyst removal requirements for systems that filter
3. Strengthened combined filter effluent turbidity performance standards (for systems using conventional/direct filtration):
 - a. < 0.3 NTU in at least 95% of combined filter effluent samples (which are required every 4 hours)
 - b. combined filter effluent samples cannot exceed 1.0 NTU at any time
4. Individual filter turbidity monitoring provisions
5. Disinfection profiling and benchmarking provisions
6. Inclusion of *Cryptosporidium* oocyst in the watershed control requirements for unfiltered public water systems
7. Requirements for covers on new finished water reservoirs
8. Sanitary surveys, conducted by States, for all surface water systems regardless of size

Systems using surface water or GWUDI that serve a population of 10,000 or more have three years from promulgation to comply with the requirements of the rule, except for disinfection profiling and benchmarking, which requires sampling to begin after three months. In cases where substantial capital improvements are required, states may grant up to an additional two years to comply with the rule.

6.4.1. Long Term 1 ESWTR

While the Interim Enhanced Surface Water Treatment Rule applies to systems serving greater than 10,000 people, the LT1 ESWTR will be applied to smaller systems (those serving fewer than 10,000 people). Promulgation

of the LT1 ESWTR is scheduled for fall of 2000. The rule will strengthen microbial controls and prevent significant increase in microbial risk for those small systems implementing the Stage 1 DBP Rule. The USEPA believes the rule will follow the control approaches laid out in the IESWTR for improved turbidity control, including individual filter monitoring and reporting. The rule will also address disinfection profiling and benchmarking.

6.4.2. Impacts on Lake Peekskill

The Surface Water Treatment Rule will apply to the proposed Lake Peekskill water treatment plant until the Long Term 1 Enhanced Surface Water Treatment Rule is promulgated. The requirements for disinfection, 3-log removal/inactivation of *Giardia* cysts and 4-log removal/inactivation of viruses, will also need to be met. Additional or more stringent requirements may be imposed by the implementation of the LT1 ESWTR. If microfiltration is used to treat the water, it would be assumed that existing and future *Giardia* cysts and *Cryptosporidium* oocyst removal requirements would be met. However, enough disinfection will still need to be provided to inactivate viruses, which are not completely removed by microfiltration.

In addition, the New York State Department of Health is not allowing more than 2-log removal credit for microfiltration. Therefore a chlorine contact tank that provides at least one log inactivation is still required, as is a disinfectant residual in the distribution system.

6.5. Filter Backwash Recycling Rule

The 1996 SDWA Amendments require that USEPA set a standard on recycling filter backwash within the treatment process of public water systems by August 2000. The objective of this rule is to prevent the return of concentrated contaminants removed by the filters. The regulation will apply to all public water systems, regardless of size. USEPA is currently gathering data in support of this future regulation. Recycling of backwash water is not planned for the Lake Peekskill water treatment plant.

6.6. Total Coliform Rule

The Total Coliform Rule was enacted on June 29, 1989. Total coliforms include both fecal coliforms and *E. coli*. The Maximum Contaminant Level Goal (MCLG) for total coliforms has been set at zero. Compliance with the MCL is based on the presence or absence of total coliforms in a sample. The MCL for systems testing at least forty samples per month is a positive total coliform count in no more than five percent of the monthly samples. For systems testing fewer than forty samples per month, no more than one

sample per month may test positive for total coliforms. If a sample is found to have a positive result for total coliforms, a set of three or four repeat samples must be tested for total coliforms. At least one of the repeat samples must be from the original tap where the positive sample was taken.

Requirements for monthly monitoring are based on the population served. Table 6-4 gives the total coliform sampling requirements according to population served.

Table 6-4 Total coliform sampling requirements based upon population

Population Served	Minimum Number Routine Samples per Month	Population Served	Minimum Number Routine Samples per Month
25-1,000	1	59,001-70,000	70
1,001-2,500	2	70,001-83,000	80
2,501-3,300	3	83,001-96,000	90
3,301-4,100	4	96,001-130,000	100
4,101-4,900	5	130,001-220,000	120
4,901-5,800	6	220,001-320,000	150
5,801-6,700	7	320,001-450,000	180
6,701-7,600	8	450,001-600,000	210
7,601-8,500	9	600,001-780,000	240
8,501-12,900	10	780,001-970,000	270
12,901-17,200	15	970,001-1,230,000	300
17,201-21,500	20	1,230,001-1,520,000	330
21,501-25,000	25	1,520,001-1,850,000	360
25,001-33,000	30	1,850,001-2,270,000	390
33,001-41,000	40	2,270,001-3,020,000	420
41,001-50,000	50	3,020,001-3,960,000	450
50,001-59,000	60	3,960,001 or more	480

6.6.1. Impacts on Lake Peekskill

The MCL for total coliforms specified by the Total Coliform Rule can be met by meeting the Surface Water Treatment Rule requirements for a continuous disinfectant residual in the distribution system as discussed in Section 6.4.2. Therefore, it is anticipated that compliance with this rule will be achieved with proper disinfection practices.

6.7. Lead and Copper Rule

The Lead and Copper Rule was enacted on June 7, 1991. The National Primary Drinking Water Regulation (NPDWR) requires lead and copper be monitored at consumers' taps every 6 months. The tap sampling requirements for lead and copper based on population served are listed in

Table 6-5. One monitoring period is equivalent to 6 months, and two monitoring periods are required per calendar year.

Water samples at the customer's taps are required to be taken at high-risk locations, which are defined as homes with:

1. Lead solder installed after 1982
2. Lead service lines
3. Lead interior piping

In order for a water system to comply with the Lead and Copper Rule, the samples at the customer's tap must not exceed the following action levels:

1. Lead – a concentration of 0.015 mg/l detected in the 90th percentile of all samples
2. Copper – a concentration of 1.3 mg/l detected in the 90th percentile of all samples

Table 6-5 Tap sampling requirements for lead and copper

System Size <i>Population</i>	Number of Sampling Sites <i>Initial Base Monitoring</i>	Number of Sampling Sites <i>Reduced Monitoring</i>
>100,000	100	50
10,001-100,000	60	30
3,301-10,000	40	20
501-3,300	20	10
101-500	10	5
100	5	5

Small (those serving < 3,300 people) and medium (those serving > 3,300 and < 50,000 people) sized water systems that meet the lead and copper action levels during each of two consecutive six-month monitoring periods are deemed to have optimized corrosion control. Small and medium sized water systems that exceed the lead or copper action level are required to first submit a recommendation for optimal corrosion treatment to the state. The state will then either approve the recommended treatment, require installation of alternative treatment, or require corrosion-control treatment studies to be conducted. Corrosion control studies must compare the effectiveness of pH and alkalinity adjustment, calcium adjustment, and addition of a phosphate or silica-based corrosion inhibitor. Systems that comply with the action levels during initial monitoring must implement corrosion control treatment if either action level is exceeded in subsequent monitoring. In addition to lead and copper, small and medium sized systems that exceed the lead or copper action level are required to monitor other water quality parameters. The details are listed in Table 6-6.

If the action levels are exceeded for either lead or copper, the water system is also required to collect source water samples and submit the data with a

treatment recommendation to the state. In addition, if the lead action level is exceeded, the water system is required to present a public education program to its customers within 60 days of learning the results. The public education program must be continued as long as the water system exceeds the action levels.

Once the treatment plan is approved by the state, the purveyor will have twenty-four months to install the optimal corrosion control treatment and twelve months to collect follow-up samples. Once corrosion control is proven effective by monitoring, the regulatory agency will assign values for water quality parameters that will be used to ensure that corrosion treatment is being used. For example, utilities that choose to use orthophosphate for corrosion control would be required to monitor for phosphates.

All water systems that continue to exceed the lead action level after installing optimal corrosion control treatment and source water treatment must replace lead service lines that contribute more than 0.015 mg/l to total tap water lead levels. A system that exceeds the lead action level after installing optimal corrosion control treatment and source water treatment has 15 years to replace all lead service lines. A system must replace seven percent of its lead lines each year, or demonstrate that the lines not replaced contribute less than 0.015 mg/l of lead to drinking water.

6.7.1. Impacts on Lake Peekskill

Currently, other water systems in the area use caustic soda and orthophosphate for corrosion control due to the somewhat corrosive nature of the water. To comply with the requirements of the rule, it is likely that the Lake Peekskill facility would need to use the same chemicals for corrosion control as the other area systems. By using these chemicals, the facility would also need to monitor the water for these chemicals.

Table 6-6 Monitoring schedules for water quality parameter monitoring

Monitoring Period ^a	Parameters	Location	Frequency
Initial monitoring	pH, alkalinity, orthophosphate or silica ^b , calcium, conductivity, temperature	Taps and at entry point(s) to distribution system	Every 6 months
After Installation of Corrosion Control	pH, alkalinity, orthophosphate or silica ^b , calcium ^c	Taps	Every 6 months
	pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual ^e	Entry point(s) to distribution system	Every 2 weeks

Table 6-6 Monitoring schedules for water quality parameter monitoring

Monitoring Period ^a	Parameters	Location	Frequency
After State-Specified Parameter Values for Optimal Corrosion Control	pH, alkalinity, orthophosphate or silica ^b , calcium ^c	Taps	Every 6 months
	pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual ^c	Entry point(s) to distribution system	Every 6 months
Reduced monitoring	pH, alkalinity, orthophosphate or silica ^b , calcium ^d	Taps ^e	Every 6 months
	pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual ^c	Entry point(s) to distribution system	Every 6 months

^aMedium size systems have to monitor for water quality parameters only during monitoring periods in which system exceeds the lead or copper action level. Large systems must monitor water quality parameters during each monitoring period.

^bOrthophosphate must be measured only when an inhibitor containing a phosphate compound is used. Silica must be measured only when an inhibitor containing silicate compound is used.

^cInhibitor dosage rates and inhibitor residual concentrations (orthophosphate or silica) must be measured only when an inhibitor is used.

^dCalcium must be measured only when calcium carbonate stabilization is used as part of corrosion control.

^eSystems maintaining optimal corrosion control treatment specified by the State for three consecutive years may reduce tap water sampling of water parameters to once every three years and collect the reduced number of samples.

6.8. Volatile Organic Chemicals

The final MCLGs, MCLs, and monitoring requirements for several volatile organic chemicals (VOCs) were enacted on June 19, 1987. Several VOCs appear on the list of 83 contaminants for which the USEPA is required to establish MCLGs and MCLs. Systems are still required to monitor for those VOCs that appear on the list of 83 contaminants even if they are not currently regulated.

Table 6-7 gives the MCLGs and MCLs for the regulated VOCs. USEPA has determined that packed tower aeration (PTA) and granular activated carbon (GAC) are best available technologies (BATs) for VOCs. Initially, all systems must monitor each source at least once within four years. Repeat monitoring is at the state's discretion. Monitoring would be required only for systems judged to be vulnerable to VOC contamination by the states. The EPA issued guidelines for alternative monitoring (formerly Permanent Monitoring Relief) in August 1997. After completion of source water

assessments in 2003, primary agencies will be allowed to develop alternative monitoring requirements.

Table 6-7 Final MCLGs and MCLs for VOCs

Chemical	Final MCLG (mg/L)	Final MCL (mg/L)
Benzene	0	0.005
Carbon Tetrachloride	0	0.005
1,2-Dichloroethane	0	0.005
1,1-Dichloroethylene	0.007	0.007
para-Dichlorobenzene	0.075	0.075
1,1,1-Trichloroethane	0.2	0.2
Trichloroethylene	0	0.005
Vinyl Chloride	0	0.002

6.8.1. Impacts on Lake Peekskill

On the basis of historical data, it is not anticipated that VOCs will have an impact on the Lake Peekskill facility.

6.9. Synthetic Organic and Inorganic Chemicals

The initial list of 83 contaminants that the USEPA is required to regulate under the 1986 SDWA Amendments contains many synthetic organic chemicals (SOCs) and inorganic chemicals (IOCs). USEPA identifies the regulation of groups of SOCs and IOCs by phases. The Phase II Rule was enacted in two notices on January 30, 1991 and July 1, 1991. The Phase V Rule was enacted on July 17, 1992.

Table 6-8 and Table 6-9 provide final MCLGs and MCLs for the Phase II and Phase V Rules, respectively. The final and proposed rule making also includes monitoring, reporting, and public notification requirements for the SOCs. Monitoring requirements are quarterly for one year for VOCs and quarterly once every three years for pesticides. After one round of no detection, systems serving fewer than 3,300 people may reduce the sampling frequency to one sample per compliance period. As part of the Phase II Rule, USEPA established requirements for the monitoring of unregulated contaminants. Monitoring of thirty contaminants is required unless a vulnerability assessment determines the system is not vulnerable. The EPA issued guidelines for alternative monitoring (formerly Permanent Monitoring Relief) in August 1997. After completion of source water assessments in 2003, primary agencies will be allowed to develop alternative monitoring requirements.

Table 6-8 Final MCLGs and MCLs for Phase II compounds

Contaminant	MCLG (mg/L)	MCL (mg/L)
Volatile Organics		
o-Dichlorobenzene	0.6	0.6
cis-1,2-Dichloroethylene	0.07	0.07
trans-1,2-Dichloroethylene	0.1	0.1
1,2,-Dichloropropane	0	0.005
Ethylbenzene	0.7	0.7
Monochlorobenzene	0.1	0.1
Styrene	0.1	0.1
Tetrachloroethylene	0	0.005
Toluene	1	1
Xylenes (Total)	10	10

Table 6-8 Final MCLGs and MCLs for Phase II compounds

Contaminant	MCLG (mg/L)	MCL (mg/L)
Pesticides/PCBs		
Alachlor	0	0.002
Aldicarb	0.001	0.003
Aldicarb sulfone	0.001	0.002
Aldicarb sulfoxide	0.001	0.004
Atrazine	0.003	0.003
Carbofuran	0.04	0.04
Chlordane	0	0.002
2,4-D	0.07	0.07
Dibromochloropropane	0	0.0002
Ethylene dibromide	0	0.00005
Heptachlor	0	0.0004
Heptachlor epoxide	0	0.0002
Lindane	0.0002	0.0002
Methoxychlor	0.04	0.04
PCBs	0	0.0005
Pentachlorophenol	0	0.001
Toxaphene	0	0.003
2,4,5-TP (Silvex)	0.05	0.05
Treatment Techniques		
Acrylamide	0	0.005% dosed at 1 mg/L
Epichlorohydrin	0	0.01% dosed at 20 mg/L

Table 6-8 Final MCLGs and MCLs for Phase II compounds

Contaminant	MCLG (mg/L)	MCL (mg/L)
Inorganic Chemicals		
Asbestos	7 MFL*	7 MFL*
Barium	2	2
Cadmium	0.005	0.005
Chromium	0.1	0.1
Mercury	0.002	0.002
Nitrate (as Nitrogen)	10	10
Nitrite	1	1
Total Nitrate/Nitrite	10	10
Selenium	0.05	0.05

*-MFL = million fibers per liter longer than 10 µm

Table 6-9. Final MCLGs and MCLs for Phase V compounds

Contaminant	MCLG (mg/L)	MCL (mg/L)
Pesticides		
Dalapon	0.2	0.2
Dinoseb	0.007	0.007
Diquat	0.02	0.02
Endothal	0.1	0.1
Endrin	0.002	0.002
Glyphosate	0.7	0.7
Oxamyl (vydate)	0.2	0.2
Picloram	0.5	0.5
Simazine	0.004	0.004
Volatile Organic Chemicals		
Dichloromethane	0	0.005

Table 6-9. Final MCLGs and MCLs for Phase V compounds

Contaminant	MCLG (mg/L)	MCL (mg/L)
1,2,4-Trichlorobenzene	0.07	0.07
1,1,2-Trichloroethane	0.003	0.005
Other Organic Contaminants		
Benzo(a)pyrene	0	0.0002
Di(ethylhexyl)adipate	0.5	0.5
Di(ethylhexyl)phthalate	0	0.006
Hexachlorobenzene	0	0.001
Hexachlorocyclopentadiene	0.05	0.05
2,3,7,8-TCDD	0	3×10^{-8}
Inorganic Chemicals		
Antimony	0.006	0.006
Beryllium	0	0.004
Cyanide	0.2	0.2
Nickel	0.1	0.1
Thallium	0.0005	0.002

Table 6-9 Anticipated MCLGs for contaminants under Phase VIb

Contaminant	MCLG (mg/L)
acifluorfen	zero
acrylonitrile	zero
boron	1
bromomethane	0.01
cyanazine	0.001
2,4/2,6-dinitrotoluene	zero
ethylene thiourea	zero
hexachlorobutadiene	0.001
manganese	0.2

Table 6-9 Anticipated MCLGs for contaminants under Phase V/1b

Contaminant	MCLG (mg/L)
molybdenum	0.04
1,3 dichloropropane	zero
1,2,3-tetrachloroethylene	zero
zinc	2

6.9.1. Impacts on Lake Peekskill

It is not anticipated that the Phase II and Phase V synthetic organic and inorganic regulations will have an impact on the Lake Peekskill facility.

6.10. Arsenic

USEPA was under a court-ordered deadline to propose arsenic regulations by November 1992. The USEPA requested an extension of this deadline pending further studies of occurrence and health effects. The 1996 SDWA Amendments required USEPA to propose a NPDWR no later than January 1, 2000, and enact a final rule no later than January 1, 2001. While there is currently no MCLG, the MCL for arsenic has been set at 0.05 mg/l. This MCL will be revised pending USEPA's evaluation of BATs and the determination of an MCLG. The new MCL is expected to range between 2 and 20 µg/l.

Monitoring requirements for systems using surface water are a minimum of one sample at every entry point to the distribution system after treatment, or in the distribution system at a point representative of each source after treatment. Monitoring frequency is currently left up to the state, as the required frequency will not be specified until the new arsenic rule is enacted. If a sample is found to exceed the MCL, the system is in violation. The state may require an additional sample be taken within two weeks of the initial sampling at the same point as the original sample. The results of the original sample and the repeat sample are averaged to determine compliance.

6.10.1. Impacts on Lake Peekskill

It is not anticipated that the new arsenic regulations will have an impact on the Lake Peekskill facility.

6.11. Sulfate

The Sulfate Rule was originally enacted on December 20, 1994. The rule includes both an MCLG and an MCL equal to 500 mg/l. Sulfate's health effect (diarrhea) is acute, relatively short-term, and affects only a small portion of the population. Therefore, USEPA proposed two alternative approaches to regulation. The first option defines a combination of public

education, public notification, and provision of alternative water for targeted populations. The second option is central treatment using BAT (ion exchange, reverse osmosis, and electro dialysis). USEPA is currently planning to include sulfate among the five contaminants to be considered for regulation by August 2001.

6.11.1. Impacts on Lake Peekskill

It is anticipated that the sulfate regulations will not impact the Lake Peekskill Facility.

6.12. Fluoride

The current MCL for fluoride, 4 mg/l, became effective October 1987. Surface water systems are required to monitor for fluoride annually, with an allowance for states to reduce monitoring to once every ten years if the system is not likely to exceed the MCL. Monitoring consists of taking samples at points in the distribution system that are representative of household taps. Compliance with the MCL is determined based upon the average of four samples. USEPA commissioned the National Academy of Sciences (NAS) to review health effects and risk assessment for fluoride, which was completed in 1993. The NRC determined that the current MCL is adequate for the protection of public health. On December 29, 1993, the USEPA published a notice of intent to not revise the current fluoride standard. The New York State Department of Health has set a MCL of 2.2 mg/l for fluoride.

6.12.1. Impacts on Lake Peekskill

Since the water system currently does not fluoridate, the fluoride regulations are not anticipated to have an impact on the Lake Peekskill facility.

6.13. Radionuclides

The Radionuclide Rule was proposed on July 18, 1991. The proposed MCLs for radionuclides are given in Table 6-10. This rule proposed new regulations for radon and uranium and revised limits for radium 226 and 228 with no change to the existing limits for gross beta and gross alpha emitters.

The 1996 SDWA Amendments require a health risk assessment for radon by the National Academy of Sciences before a radon MCL can be set, and as a result, it was decided by the USEPA to regulate it separately with a proposed rule due by August 1999 and a final rule by August 2000. It is possible that the radon rule will allow for an alternate MCL to be employed in conjunction with a multimedia mitigation program. A December 1996 court order requires the USEPA to issue a final rule for the uranium and radium by December 2000. Because all of the radionuclides are classified as carcinogens, the MCLGs have been proposed as zero.

6.13.1. Impacts on Lake Peekskill

It is not anticipated that the radionuclide regulations will have an impact on the Lake Peekskill facility.

Table 6-10 Proposed MCLs for radionuclides

Contaminant	MCL (pCi/L)
Radon-222	300
Radium 226	20
Radium 228	20
Uranium	20 ug/L
Adjusted Gross Alpha	15
Beta Particle and Photon Emitters	4 mrem cdc/yr

6.14. Secondary MCLs

Secondary Maximum Contaminant Levels (SMCLs) have been enacted to provide guidelines for contaminants that may affect the appearance or taste/odor of water, but do not have adverse health effects. These SMCLs are non-enforceable federal guidelines. USEPA recommends that monitoring be performed at intervals no less frequent than those for inorganic chemicals applicable to community water systems. More frequent monitoring based on the specific adverse effect is left to the discretion of the State. Some of the principal aesthetic effects associated with the SMCLs are taste and odor or appearance problems. The parameters of primary concern with these problems include chloride, copper, foaming agents, iron, manganese, pH, sulfate, threshold odor number (TON), total dissolved solids (TDS), and zinc. Iron, which causes a rusty color, sediment, metallic taste, and reddish or orange staining, has an SMCL of 0.3 mg/l. Manganese, which causes a black to brown color, black staining, and a bitter metallic taste, has an SMCL of 0.05 mg/l. The MCLs put in place by the New York State Department of Health for iron and manganese are both 0.3 mg/l. The MCL for color is the same as that for the SDWA SMCL value, which is 15 Units.

6.14.1. Impacts on Lake Peekskill

Based on the experiences of nearby municipalities utilizing this source water, it is not anticipated that the SMCLs related to taste and odor will have an impact on the Lake Peekskill facility. Data has indicated that there may be occasional exceedances of the iron and manganese SMCLs, which would require either removal or sequestration. The relatively low levels of iron and manganese which normally appear to be in the water (typically less than

0.19mg/l and 0.18 mg/l, respectively) do not require treatment. The rare elevated levels of iron (1.2 mg/l) seem to be connected to unusual rainfall events also resulting in elevated turbidity. This historical elevated iron level can be treated through the use of sequestering agents including some phosphate blends which may be useful for corrosion control. Further study is required to confirm the appropriate selection of phosphate.

6.15. Operator Certification

The 1996 SDWA Amendments required the USEPA to set minimum national standards for operator certification and recertification. If a state does not establish a program meeting the USEPA's guidelines, the USEPA is required to withhold twenty percent of the state's State Revolving Loan Fund (SRF) Allotment. The USEPA is also required to provide reimbursement for training and certification for operators of systems serving a population of 3,300 or less. USEPA guidelines for certification and recertification were published February 5, 1999. There were nine baseline standards that each state needed to include at a minimum to meet the USEPA guidelines. These were:

1. The state must have the legal authority to implement the program requiring certification of operators and to require that the systems comply with the appropriate requirements.
2. The state's program must:
 - a. classify all community and nontransient noncommunity water systems based on indicators of potential health risk
 - b. require owners of all community and nontransient noncommunity systems to place direct supervision of their system under the charge of a certified operator
 - c. require that the operator in charge hold a valid certification equal to or greater than the classification of the system
 - d. require all operating personnel making process control decisions that affect public health be certified
 - e. require a designated certified operator be available for each shift
3. States must require the following for an operator to be certified:
 - a. take and pass an exam that demonstrates that the operator has the necessary skills, knowledge, ability, and judgement as appropriate for the classification. All exam questions must be validated
 - b. have a high school diploma or GED
 - c. have the defined amount of on-the-job experience for each appropriate level of certification
4. States may choose to implement a "grandparenting" clause in their program subject to certain conditions.
5. The state agency with primary enforcement responsibility for the Public Water System Supervision Program must have regulations that meet the requirements of these guidelines.

6. The state must implement a certification renewal program.
7. States must provide sufficient resources to adequately fund and sustain the operator certification program.
8. The states must have a process for recertification of individuals whose certification has expired for a period exceeding two years.
9. States must include ongoing stakeholder involvement in the revision and operations of state operator certification programs, and
10. States must perform reviews of their operator certification programs.

The deadline for states to submit their operator certification programs to the USEPA for approval is August 2000. States are required to submit existing programs to USEPA within eighteen months after the publication of the USEPA guidelines. The USEPA then has nine months to determine if the state's program is substantially equivalent to the USEPA's guidelines. An existing state program will be determined to be substantially equivalent to the USEPA guidelines if the state program meets the overall public health objectives of the USEPA guidelines.

6.15.1. Impacts on Lake Peekskill

Depending upon the State of New York's operator certification program, it is anticipated that the Lake Peekskill facility would need to have certified operators.