

**NEW YORK CITY**  
**FILTRATION AVOIDANCE**  
**DETERMINATION**

**USEPA - May 1997**

SURFACE WATER TREATMENT RULE DETERMINATION  
NEW YORK CITY'S CATSKILL AND DELAWARE PUBLIC WATER SYSTEMS

INTRODUCTION:

This document sets forth the background and the basis and purpose for the United States Environmental Protection Agency's (EPA) determination on whether New York City is required to provide filtration of a portion of its drinking water supply, the Catskill and Delaware public water systems. New York City shall comply with all conditions of this determination. The determination is applicable until a further determination, scheduled for April 15, 2002, is made by EPA, in consultation with the New York State Department of Health (NYSDOH), or earlier, should EPA in consultation with NYSDOH determine that New York City (NYC) has significantly failed to meet the conditions of the determination and/or the avoidance criteria of the Surface Water Treatment Rule (SWTR).

REGULATORY BACKGROUND:

As required under the Safe Drinking Water Act (SDWA) Amendments of 1986, EPA promulgated the SWTR on June 29, 1989, specifying the criteria under which filtration is required as a treatment technique for public water systems supplied by a surface water source. The SWTR is codified in Subpart H of 40 CFR, Part 141 - National Primary Drinking Water Regulations. Its purpose is to reduce the contamination of drinking water by microbial pathogens, including *Giardia lamblia* cysts and viruses.

The SWTR requires all public water systems supplied by unfiltered surface water sources to meet a series of water quality, operational, and watershed control criteria. These criteria, referred to as the filtration avoidance criteria, are detailed in 40 CFR §141.71. If, at any time, a system fails to meet the avoidance criteria, it may be required to provide filtration within 18 months of such failure.

FEDERAL AND STATE ROLES IN DETERMINING WHETHER FILTRATION IS REQUIRED:

In New York State, EPA delegated primary enforcement responsibility (primacy) of the Safe Drinking Water Act to the New York State Department of Health (NYSDOH) on September 9, 1977. Under this delegation, NYSDOH has primacy for implementation and enforcement of the drinking water regulations. EPA is responsible for overseeing NYSDOH's implementation and enforcement of the drinking water program. However, when EPA promulgates a new rule, such as the SWTR, EPA retains primary

enforcement responsibility for the new rule until it has approved a State's primacy package. On July 30, 1993, EPA announced its determination that it approved NYSDOH's primacy package and intended to delegate primacy of the SWTR to NYSDOH. A public hearing on that determination was requested and a hearing was held on December 7, 1993. EPA received public comments at the hearing and thereafter. Based on those comments, the primacy revision package, and other applicable information, EPA anticipates delegating primacy to NYSDOH for the SWTR for all public water systems in New York State, except NYC's Catskill and Delaware Public Water Systems. Primacy for the SWTR for the Catskill and Delaware Public Water Systems will be delegated to NYSDOH May 15, 2007.

APPLICABILITY OF THE SURFACE WATER TREATMENT RULE TO NEW YORK CITY'S  
CATSKILL AND DELAWARE SYSTEMS:

The source of New York City's water supply consists of unfiltered surface water sources that comprise three public water systems: the Croton, the Catskill and the Delaware. NYCDEP intends to filter its Croton system and entered into an enforceable Stipulation Agreement with NYSDOH which establishes the schedule for completion of construction of the Croton filtration plant by December 31, 2000. More recently, on April 24, 1997, the United States filed a complaint in Federal District Court for the Eastern District of New York against the City to enforce the SWTR for the Croton System. NYCDEP seeks to avoid filtration for its Catskill and Delaware systems.

EPA'S FIRST DETERMINATION:

Following NYCDEP's submission of an application not to filter its Catskill and Delaware water systems, in July 1992, EPA began an in-depth review of New York City's water supply in order to determine whether the Catskill and Delaware systems could fully meet the avoidance criteria. EPA concluded that the Catskill and Delaware systems met each of the objective criteria for filtration avoidance, including meeting raw water coliform and turbidity requirements, demonstrating that the systems are not the source of waterborne disease outbreaks, and controlling of *Giardia lamblia* and viruses through disinfection inactivation. EPA also concluded that the City's existing watershed protection programs were currently adequate and met the SWTR goal for a watershed control

program, but that the program's ability to meet the criteria in the future was uncertain. Accordingly, on January 19, 1993, EPA issued its conditional Determination granting filtration avoidance until a further determination was made, on or before December 31, 1993, or earlier if the City failed to meet the Determination's conditions for avoidance (January 19, 1993 Determination). The Determination required compliance with sixty-six conditions for avoidance, the purposes of which were to undertake studies and programs to identify sources of pollution, to develop programs to assure the long-term protection of the watershed, and to address actual and potential sources of contamination of the water supplies. The January 19, 1993 Determination also imposed substantial reporting requirements to monitor NYCDEP's progress in its programs and to evaluate whether NYC continued to meet the conditions for avoidance during the term of the determination.

EPA'S SECOND DETERMINATION :

In September 1993, in support of its request that the Catskill and Delaware public water systems be allowed to remain unfiltered after December 31, 1993, NYCDEP submitted "New York City's 1993 Long-Term Watershed Protection and Filtration Avoidance Program" to demonstrate that the Catskill and Delaware systems could and would continue to meet the filtration avoidance criteria in the future.

EPA reviewed historic and 1993 water quality data, "New York City's 1993 Long-Term Watershed Protection and Filtration Avoidance Program", NYC's achievements meeting the sixty-six conditions contained in EPA's January 19, 1993 conditional Determination, the EPA March 23, 1993 Expert Panel Report, public comments received, including those received on EPA's

January 19, 1993 conditional Determination and at the public hearing held on the conditional Determination, and additional documentation submitted by the NYCDEP and interested parties on the watershed.

EPA concluded that the Catskill and Delaware systems met each of the SWTR objective criteria for filtration avoidance, including meeting raw water coliform levels and turbidity criteria and achieving control of *Giardia lamblia* cysts through disinfection inactivation. EPA also concluded that the NYCDEP's existing watershed protection programs continued to be adequate and met the SWTR's criteria for a watershed control program, but that the program's ability to meet the criteria in the future remained uncertain. EPA determined that progress was made toward enhanced watershed protection programs. At the same time, NYCDEP had undertaken the required preliminary steps toward design of a filtration facility or facilities for the Catskill and Delaware systems should filtration have been required. However, EPA sought more refined characterization of the watershed and more specific data concerning the identification and location of the activities within the watershed. EPA also wanted the watershed protection programs to operate for a longer period in order to evaluate the effectiveness of the programs' long-term abilities to monitor and control activities in the watershed with the potential to pollute the water system, thereby assuring that the overall watershed control program would be adequate to minimize potential contamination of the source water by *Giardia lamblia* cysts and viruses.

On December 30, 1993, EPA issued a second conditional determination that New York City's Catskill and Delaware public water systems would be

allowed to remain unfiltered (December 30, 1993 conditional Determination). This second Determination was intended to be effective until December 15, 1996 and contained over one hundred-fifty (150) conditions related primarily to enhanced watershed protection and monitoring programs, pathogen studies, reservoir modeling and other efforts to characterize the watershed and its activities. The conditions also included continued design of filtration facilities should EPA deem filtration necessary in the future.

A major concern of the December 30, 1993 Determination was preventing pollution of the Kensico Reservoir, the terminal reservoir for the Catskill and Delaware systems. NYCDEP conducted the Kensico Water Pollution Control Study to identify actual and potential sources of pollution and to identify measures to remediate those sources. The Kensico Reservoir Water Quality Control Program (KRWQCP) resulting from that study consists of implementation of a waterfowl management program, maintenance dredging of the reservoir and undertaking stormwater best management practices, including installation of detention basins and streambank stabilization projects. A water quality model was also developed and calibrated for the Kensico Reservoir. Activities which are part of the KRWQCP are detailed in the Final Environmental Impact Statement for that program, dated December 1995.

The study identified Malcolm Brook as a tributary which periodically contributed high levels of turbidity to the Kensico Reservoir. Short term remediation efforts such as sediment barriers, erosion control blankets and turbidity curtains were installed until permanent controls could be implemented.

The study also examined the possibility of relocating the effluent chambers from the Kensico Reservoir and the installation of aeration or mixing equipment as coliform and turbidity controls. The review of existing information did not indicate that either option would significantly improve water quality.

Concern over pathogenic, bacterial and viral contamination resulted in an extensive study of the sewers and septic systems within the Kensico watershed. Results indicated that septic systems and sewer lines are not major contributors of fecal coliform to the reservoir. However, NYCDEP will continue a ground water monitoring program and sewer inspections will be continued to assure that these potential sources do not become a source of contamination. NYCDEP also evaluated the feasibility and benefits of having local governments install additional sewer lines within their sewer districts. NYCDEP determined that sewer extensions provided no net benefit toward pollution reduction. Also, NYCDEP continues to monitor septic systems in the Kensico Reservoir watershed. If failures occur in a particular area, NYCDEP will evaluate the need for sewer service extensions in the vicinity.

In addition to addressing microbial contamination and turbidity, the study addressed hazardous materials. In order to prevent hazardous materials from entering the Kensico Reservoir, a spill response strategy was developed. This strategy includes a notification process, formalized response procedures and staff training programs. Additionally, NYCDEP has undertaken discussions with facilities' owners and operators to minimize the risk of hazardous materials reaching the reservoir. As a further protection measure, NYCDEP is beginning the

design of eleven spill containment structures that will be located between Interstate 684 and the Kensico Reservoir. In the event of a spill these structures will capture and contain the material for clean up.

As another means of reducing the risk of contamination, NYCDEP fully implemented measures to control access to the Kensico Reservoir. These control measures consist of installation of guardrails along roads adjacent to the reservoir, installation of natural vegetative barriers along steep slopes to identify accessways for fishing and boating activities, increasing security around reservoir intake chambers, increasing police patrols along and in the vicinity of the reservoir, stricter enforcement and development and implementation of a comprehensive public awareness program.

EPA'S CURRENT DETERMINATION:

Beginning in late November, 1995, EPA undertook a comprehensive review of NYCDEP's accomplishments toward fulfilling the conditions of the December 1993 FAD at the two year mark: the preliminary results of water quality data collected as required by several monitoring programs established or implemented as part of the December 1993 FAD; "New York City's Long-Term Watershed Protection and Filtration Avoidance Program"; NYCDEP's 1994 and 1995 annual reports on NYC's achievements toward meeting the over one hundred-fifty conditions contained in the December 1993 FAD; public comments received, including those received on the December 1993 FAD and the comments given in conjunction with the public

hearings held; and additional documentation submitted by the NYCDEP and interested parties on the watershed.

Based on this review, EPA finds that New York City's Delaware and Catskill public water systems continue to meet the following SWTR conditions for unfiltered surface water supply systems: source water quality conditions found at 40 CFR §141.71(a); the disinfection requirements of 40 CFR §141.72(a); and the site specific conditions found at 40 CFR §141.71(b) (1), (3), (4), (5) and (6). The data on raw water turbidity and coliform levels, measured at the Catskill and Delaware aqueduct intakes at Kensico, demonstrate that the Catskill and Delaware systems comply with 40 CFR §141.71(a) (1) and (2). Until 1994, NYCDEP bypassed Kensico Reservoir during fall and winter months in order to assure compliance with the source water quality criteria. Beginning in Fall, 1994, NYCDEP has not bypassed the Kensico Reservoir. Since January 1996, the Catskill water system has been in limited use due to high turbidity levels, and was put back into full use as of June, 1996. Other water quality and watershed program data submitted in accordance with the December 30, 1993 Determination confirm that the Catskill and Delaware systems continue to meet the following site-specific SWTR criteria:

§141.71 (b) (1) (i): CT<sup>1</sup> requirements.

§141.71 (b) (1) (ii): Redundant disinfection and auxiliary power.

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1. "CT" is the product of the residual disinfectant concentration (C) in mg/l determined at or before the first customer, and the corresponding disinfectant time "T" in minutes.

§141.71 (b) (1) (iii): Entry point disinfectant residual requirements.

§141.71 (b) (1) (iv): Disinfectant residual in distribution system.

§141.71 (b) (3): Annual on-site inspection.

§141.71 (b) (4): System is not a source of a waterborne disease outbreak.

§141.71 (b) (5): System meets coliform maximum contaminant level (MCL) eleven months of the year.

§141.71 (b) (6): System complies with trihalomethane requirements.

NYCDEP currently meets the SWTR requirement to comply with the total coliform MCL for at least 11 months of the year, §141.71 (b) (5). Since the effective date of the SWTR, June 29, 1989, NYCDEP has never violated the monthly coliform MCL (i.e., positive total coliform samples in five percent of the monthly compliance samples). From May 1993 through October 1994, NYC has had eight *Escherichia coli* (*E. coli*) violations of the Total Coliform Rule. EPA and NYSDOH have agreed with NYCDEP's conclusions in its 1993 and 1994 coliform events reports and in its Hillview Reservoir studies prepared as part of the December 30, 1993 Determination that the preponderance of data indicated that the contamination that resulted in these violations was not representative of source water quality. Yet the reports did not conclusively determine the source of contamination.

In its reports and studies, NYCDEP suspected that *E. coli* bacteria contamination in the distribution system may have resulted from waterfowl located at Hillview Reservoir, and scouring of sediment containing fecal coliform from the bottom of Hillview Reservoir. As a result, in order to reduce the potential for future coliform incidents attributable to sediment and the bottom of the Reservoir and to protect treated water from the effects of open storage, NYCDEP entered into a stipulation with NYSDOH which requires NYCDEP to remove sediment from the Hillview Reservoir and to cover the Reservoir as a treated water storage reservoir. In February 1996, NYCDEP submitted its Phase I preliminary report prepared in conjunction with these tasks. The report stated that NYCDEP determined that sediment is likely a primary source of coliform at Hillview Reservoir. As a result of NYCDEP and NYSDOH entering into the enforceable stipulation, EPA is not including these conditions in the current Determination. Delays in the implementation of these tasks is an item of concern for EPA. EPA expects that a modified stipulation will be executed in the near future and that the time frame for sediment removal and covering of the Reservoir set forth in the modified stipulation will be enforced under the terms of that order.

The SWTR also requires the Catskill and Delaware systems to meet the site-specific condition of maintaining a watershed control program which minimizes the potential for contamination by *Giardia lamblia* cysts and viruses, 40 CFR §141.72(b)(2). In the December 30, 1993 Determination, the main area of concern to EPA remained the degree of NYCDEP's control over activities in the watershed which may have an adverse impact on the

microbiological quality of the source water as required under §141.71(b)(2). During the term of the December 30, 1993 Determination, NYCDEP undertook numerous tasks that were intended to identify and address actual and potential sources of microbiological contamination of watershed source waters. Many of these tasks have been completed, while others are ongoing programs that become more refined with more data and staff experience.

As part of its program to assure that NYCDEP meets the SWTR objective criteria, NYCDEP has undertaken an aggressive cross-connection control program. Accordingly, EPA will allow NYCDEP to submit semi-annual program reports of inspection results.

Additional requirements of §141.71(b)(2) are the following:

- (i) Characterization of the watershed hydrology and land ownership.
- (ii) Identify watershed characteristics and activities which may have an adverse effect on source water quality.
- (iii) Monitor the occurrence of activities which may have an adverse effect on source water quality.

The watersheds of the Catskill and Delaware systems cover an area of approximately 1600 square miles (approximately one million acres). New York City owns approximately six percent. New York State owns approximately twenty percent. Generally, NYCDEP's land ownership is

limited to a buffer zone of a few hundred feet around the City's reservoirs (approximately 36,400 acres) and the land beneath the reservoirs themselves (approximately 25,900 acres). The Catskill and Delaware systems' watershed includes reservoir basins east of the Hudson River (Kensico, Boyds Corner, and West Branch Reservoirs) ("EOH"). Residential and commercial development exist around the reservoirs and along the tributaries. The Catskill and Delaware systems' watershed also includes reservoir basins west of the Hudson River (Schoharie, Cannonsville, Pepacton, Ashokan, Neversink and Rondout Reservoirs) ("WOH"). The total population of the Catskill and Delaware watershed is approximately 77,000 persons.

EPA has concerns about potential contamination by *Giardia lamblia* and viruses that results from activities associated with residential and commercial development. In addition, EPA has concerns about the potential for significant threats to water quality from other human activities, including runoff from dairy farming operations and discharges from wastewater treatment plants (WWTPs) that are violating their State Pollutant Discharge Elimination System (SPDES) permits. EPA also has a concern about the recurring high turbidity in the Catskill system that threatens long-term compliance with the raw water turbidity requirements of the SWTR.

Based on results from its *Giardia lamblia* cyst and virus monitoring program, NYCDEP determined that pathogen contamination is not often detected in the watershed. When cysts were detected in the source water, their concentrations were low. NYCDEP's watershed pathogen monitoring

program has indicated that the three most significant sources of these pathogens are WWTPs, urban activities and agricultural land uses. NYCDEP has three mechanisms to respond to these potential sources of pathogens: the installation of microfiltration or its equivalent at WWTPs located in the Catskill and Delaware systems' watershed, new Watershed Rules and Regulations and the Watershed Agricultural Program.

In order to reduce actual and potential contamination from point sources of pollution, EPA finds that many WWTPs with current SPDES permits must be upgraded. The WWTPs will require significant increases in SPDES permit requirements, and will require compliance, inspections, monitoring and enforcement oversight by the regulatory agencies, including NYSDEC and NYCDEP. Prior to the December 30, 1993 Determination, NYCDEP developed and, since then, further refined and implemented WWTP inspections and compliance program protocols. NYCDEP also developed with NYSDEC joint agency procedures for enforcement of SPDES permits and NYC Watershed Rules and Regulations. NYCDEP has been and will continue to submit to EPA quarterly reports on NYCDEP/NYSDEC enforcement activities, including inspection and follow-up summaries on WWTPs of concern to NYCDEP located West of the Hudson.

NYCDEP has doubled the number of its inspectors since 1990 and increased the number of regular and compliance inspections at non-City owned watershed WWTPs, resulting in the facilities being upgraded and in improved operation and maintenance at the plants. In addition, NYCDEP has agreed to provide funds necessary to existing non-City owned watershed WWTPs to meet specific requirements of the new NYC watershed rules and regulations. At its City-owned WWTPs construction is underway

to upgrade the treatment processes pursuant to deliverable 312b-1 of this Determination. Further reductions in potential contamination from point and non-point discharges will be achieved through the enforcement of New York City's new watershed regulations which will require more stringent treatment controls on wastewater discharges.

NYCDEP has made progress during the past two years to address non-point source pollution in the Catskill and Delaware watershed. It began implementation of non-traditional non-point source control approaches, such as the Watershed Agricultural Program.

The Watershed Agricultural Program, jointly developed between NYCDEP and the watershed farm community, has been promoting pollution prevention through Whole Farm Planning (WFP) since 1994. Phase I resulted in the successful development and implementation of WFP on ten demonstration farms and a publication of a Whole Farm Planning guide. As of April 11, 1997, 250 farmers have signed up to participate in Phase II, with 118 plans approved and several plans in development. Voluntary implementation of plans reduces the potential of pathogenic, nutrient, chemical and other contamination by agricultural activities.

Additionally, the Watershed Agricultural Program resulted in completion of a digital soil survey and a listing of agricultural best management practices for the watershed. An investigation of the significance of wildlife as an important nonpoint source of pathogens in the watershed determined that little published information was available.

Accordingly, a Wildlife Research Workplan was developed.

In order to assure continued development and implementation of the Watershed Agricultural Program, NYC provided funding to the Watershed Agricultural Council of over thirty-five (35) million dollars to fund this program through 1999.

Further reductions in potential contamination from non-point sources of pollution will be achieved through implementation and enforcement of NYC's new watershed regulations, which require stormwater pollution prevention plans to be reviewed and approved.

Since the December 30, 1993 Determination, NYCDEP completed development of a Geographic Information System (GIS) and gathered additional data on the hydrology and land uses in the watershed. NYCDEP completed mapping of all watershed wetlands of one-acre or more in size. The GIS is updated regularly with new watershed data, such as location of wetlands and new land uses, and the GIS program is modified regularly with updated software and equipment, all of which includes training of NYCDEP staff on the use of the GIS.

NYCDEP has completed development and calibration of a three-dimensional water quality model of the Kensico Reservoir and has developed the Cannonsville Reservoir and terrestrial models upon which models of the remaining Catskill and Delaware Reservoirs shall be based. NYCDEP has progressed in its development of a multi-tiered model of the entire watershed that will allow NYCDEP to evaluate the impact of sources of contamination on downstream water quality and optimize reservoir withdrawal operations based on water level and water quality.

NYCDEP investigated the feasibility of including pathogen transport in the Cannonsville Reservoir and terrestrial modeling efforts. NYCDEP concluded and EPA agrees that incorporation of pathogen loadings into the models was not feasible because the current state of knowledge on pathogen source occurrence, fate and transport is insufficient for predictive modeling. NYCDEP has identified basic research needs and plans to support research efforts directed toward filling the data gaps.

NYCDEP has been and will continue to be required to perform studies on filtration of the Catskill and Delaware systems, leading up to completion of conceptual and draft preliminary design of a filtration plant or plants. The Determination maintains a "time-neutral" concept, whereby NYC must proceed with the draft preliminary design of filtration facilities so that no time will be lost if filtration is later determined to be necessary. The NYCDEP will have an opportunity, prior to the end of this determination, to request relief from the requirements to continue its design efforts through final preliminary design and full detail design based on its substantial compliance with the terms of this Determination.

NEW YORK CITY WATERSHED MEMORANDUM OF AGREEMENT:

In 1995, when NYCDEP's implementation of certain conditions of the 1993 Determination was delayed, EPA and other interested parties, urged the Governor of New York State to intercede. The Governor agreed to bring the parties together, and EPA participated in full partnership with the State and the City, in a consensus-building approach to negotiate

reasonable, effective and scientifically-defensible watershed protection programs that culminated in an historic Agreement-in-Principle.

The Agreement-In-Principle, announced on November 2, 1995 between the State of New York, City of New York, watershed communities including, the Coalition of Watershed Towns, Putnam and Westchester Counties, the environmental parties and EPA, was reached with the expectation of NYCDEP receiving a land acquisition permit from the New York State Department of Environmental Conservation so that land acquisition goals could begin to be met and on the approval and promulgation of new NYCDEP Watershed Rules and Regulations that will protect New York City's drinking water supply into the next century.

The Agreement-in-Principle calls for new Watershed Rules & Regulations, the establishment of economic partnerships between the City and Watershed Communities to assist parties in their efforts to protect the watershed, and the implementation of an extensive land acquisition program through which the City will solicit a minimum of 355,050 acres of eligible watershed land in the most sensitive areas over the next 10 years.

In addition, the agreement mandates wastewater treatment plant upgrades, nonpoint source pollution controls, and the review of the current monitoring program. By April, 2002, EPA will fully evaluate the effectiveness of the existing protection programs, including the Rules & Regulations, in an attempt to determine if the City's efforts at protecting its water supply meet the requirements of the SWTR.

A formal document signed by the above parties, titled the New York City Watershed Memorandum of Agreement or "MOA", details the above agreements. In addition to the above agreements, the MOA establishes water quality protection programs in both the East of Hudson and West of Hudson watersheds, to further aid the City's efforts to protect the water supply. The MOA provides that because certain conditions were met, EPA issued a four-month Interim Filtration Avoidance Determination ("Interim FAD") on January 21, 1997 and this new 1997 Filtration Avoidance Determination ("1997 FAD"), granting New York City respective third and fourth conditional avoidance determinations from filtering its Catskill and Delaware water systems until April 15, 2002.

The MOA further outlines that this 1997 FAD would be issued only if the Watershed Rules and Regulations became effective on or about April 15, 1997, and all of the pre-conditions of the Interim FAD, listed below, remained operative. The pre-conditions of the Interim FAD are: NYSDEC has issued a final land acquisition permit as set forth in the MOA, NYSDOH has approved New York City's Watershed Rules and Regulations with conditions agreed to by the Parties to the MOA, the MOA has been fully executed, and New York City has submitted for registration all the contracts identified in the MOA as requiring immediate execution pursuant to the City Charter.

This 1997 FAD will supersede the January 21, 1997 Interim FAD and will be applicable until a further determination is made in consultation with NYSDOH. Such further determination is scheduled for April 15, 2002, but may occur earlier. Prior to the April 15, 2002 determination, the EPA, in consultation with the City and NYSDOH, will formally review and

evaluate the City's compliance with the terms and conditions of the 1997 FAD by April 15, 2000.

In addition, during negotiations of the MOA, EPA and the City jointly reviewed the provisions of the December 1993 FAD and modified several requirements, tasks and programs based on the results of studies and current program requirements of the December 1993 FAD. EPA and NYSDOH agreed to issue a new filtration avoidance determination that reflected their evaluation of the City's achievements to date as well as the agreements and requirements of the MOA.

EPA expects that the MOA and its partnership programs will assist New York City in meeting the conditions of both the Interim FAD and the 1997 FAD.

EPA has determined that NYC's existing watershed protection programs are currently adequate and meet the goal for a watershed control program found at 40 CFR §141.71(b)(2). However, EPA finds that NYCDEP must immediately implement its Watershed Rules and Regulations and must immediately commence acquisition of watershed lands, consistent with the MOA, in order to assure NYCDEP's ability to meet the avoidance criteria in the long-term. NYCDEP has not yet completed certain tasks associated with these watershed protection programs as set forth in the December 30, 1993 Determination. Accordingly, at this time, EPA finds that the documentation submitted by NYCDEP to date does not conclusively demonstrate that the Catskill and Delaware systems will continue, in the long term, to meet the avoidance criteria for a watershed control program as required by 40 CFR § 141.71(b)(2). Therefore, EPA is issuing

this 1997 Determination that requires NYCDEP: 1) begin, continue or complete certain programs, not inconsistent with programs set forth in the MOA and the December 1993 FAD; 2) to implement and administer the Watershed Rules and Regulations; 3) to immediately and continuously implement the land acquisition program set forth in the MOA; and 4) to continue the dual-track progress of filtration avoidance and filtration planning towards completion of the conceptual design, preliminary design, and final design of filtration facilities for the Delaware and Catskill public water systems should events occur that require a filtration determination in the future. With these conditions, EPA issues this Determination until April 15, 2002.

The provisions of this Determination, if complied with, will achieve the objectives of the Safe Drinking Water Act, and the regulations promulgated thereunder, in particular the Surface Water Treatment Rule (SWTR). The SWTR was promulgated to reduce the risk of water borne disease outbreaks from microbial contaminants at public water systems with surface water sources, either through filtration or meeting the stringent water quality, disinfection and site-specific avoidance criteria which make filtration unnecessary. Compliance by the City with the conditions of this Determination is necessary to continue to meet the objective criteria of the SWTR and the site specific criteria to protect the source waters of the Catskill/Delaware system from microbiological contamination.

In summary, EPA has determined that until a further determination is made, or until April 15, 2002, whichever is earlier, New York City will not be required to filter its Catskill and Delaware public water

systems. This Determination is conditional upon NYCDEP complying, in a manner acceptable to EPA and NYSDOH, with the filtration avoidance criteria and all conditions set forth below:

Italicized deliverables were included as part of the December 1993 Determination. Completion of the italicized items is not required in order for NYCDEP to comply with the current Determination.

TASK #	OBJECTIVE CRITERIA COMPLIANCE	DUE DATE/ FREQUENCY
101	All requirements described in Section §141.71(a)(1) must continue to be met. Specifically, raw water fecal coliform concentration sampling results must be submitted along with a certificate of compliance.	monthly (10 days)
102	All requirements described in Section §141.71(a)(2) must continue to be met. Specifically, raw water turbidity sampling results must be submitted along with a certificate of compliance.	monthly (10 days)
103	All requirements described in Section §141.71(b)(1)(i) must continue to be met. Specifically, raw water disinfection CT value reports must be submitted along with a certificate of compliance.	monthly (10 days)
104	All requirements described in Section §141.71(b)(1)(ii) must continue to be met. Specifically, operational status reports for the Kensico and Hillview disinfection facilities including the status of the generators and alarm systems must be submitted, as a part of the monthly operational status reports (Deliverable 403).	monthly (10 days)
105a	Submit entry point chlorine residual levels report (every four hours and the lowest value for the day).	monthly (10 days)
105b	Notify EPA and NYSDOH within twenty four hours, if at any time the chlorine residual falls below 0.2 mg/l in the water entering the distribution system.	continuous
105c	Notify EPA and NYSDOH by the close of the next business day, whether or not the chlorine residual was restored within 4 hours.	continuous

TASK #	OBJECTIVE CRITERIA COMPLIANCE	DUE DATE/ FREQUENCY
106	All requirements described in Section §141.72(a)(4) must continue to be met. Specifically, submit distribution system disinfection residual reports.	monthly (10 days)
107	All requirements described in Section §141.71(b)(6) must continue to be met. Specifically, submit the results of the trihalomethane monitoring.	quarterly (30 days)
108	All requirements described in Section §141.71(b)(4) must continue to be met. Specifically, notify EPA and NYSDOH within twenty four hours of any suspected waterborne disease outbreak.	continuous
109a	All requirements described in Section §141.71(b)(5) must continue to be met. Specifically, submit the results of the monthly coliform monitoring in the distribution system, including a summary of the number of samples taken, how many tested positive for total coliform, whether the required number of repeat samples were taken for each total coliform positive sample at the required locations, and which, if any, total coliform positive samples were also E. coli positive. For each E. coli positive sample, include the investigation of potential causes, problems identified and what has or will be done to remediate problems. Submittal must also include copies of any public notifications issued as a result of coliform violations including identification of dates and frequency issued.	monthly (10 days)
109b	Notify EPA and NYSDOH by the end of the day when a sample tested positive for E. coli.	continuous
109c	<i>Combined with 109a. Whenever a water sample from the distribution system tests positive for E. coli, within 30 days of the incident submit to EPA and NYSDOH a report on the incident. including the investigation of potential causes, problems identified and what has or will be done to remediate any problems.</i>	continuous

TASK #	OBJECTIVE CRITERIA COMPLIANCE	DUE DATE/ FREQUENCY
109d	Submit a report providing the status of the ongoing system wide efforts to maintain sufficient levels of chlorine throughout the distribution system to prevent low chlorine residual/total coliform positive areas.	semi - annually
109e	Submit a report summarizing cross connection activities including the number of cross connection contamination complaints investigated, what actions were taken to address identified cross connections, the number of plans reviewed for cross connection prevention devices, the number of devices installed and the number of devices inspected.	semi- annually

TASK #	CONCEPTUAL DESIGN AND PRELIMINARY DESIGN OF FILTRATION FACILITIES	DUE DATE/FREQUENCY
200	Submit progress reports.	quarterly (30 days)
201a	Revised, see 201a-1. Complete prioritization of potential treatment sites.	3/94
201 a-1	Revised. Submit prioritization of potential sites, including engineering/cost benefit analysis and explanation of rationale used by City.	12/31/96
201 a-2	New. Select optimum scheme/site(s) to be used in preliminary design and EIS work.	7/31/98
201b	Complete. Outline of pilot filtration study.	N/A
201c	Complete. Scope of work for operation pilot filtration plant.	N/A
201d	Complete. Select consultant for operation of pilot filtration plant.	N/A
201e	Complete. Design of pilot filtration plant.	N/A
201f	Complete. Execute contract for operation of pilot filtration plant.	N/A
202a	Complete. Start equipment shake down of pilot filtration plant.	N/A
202b	Complete. Start Phase I of operation of pilot filtration plant.	N/A
202c	Modified date, see 202c-1. Complete Phase I (first year) operation of filtration pilot plant(s).	3/96
202 c-1	Complete. Complete Phase I operation of filtration pilot plant(s) for Catskill and Delaware water supplies.	07/31/96
202d	Modified date, see 202d-1. Complete conceptual design.	6/96
202 d-1	Complete conceptual design of a filtration facility for the Catskill and Delaware water supplies. The conceptual design will utilize data obtained from the Phase I pilot plant operation in the design. (The 1993 Determination due date of 6/96 was extended to 9/30/96.)	09/30/96

TASK #	CONCEPTUAL DESIGN AND PRELIMINARY DESIGN OF FILTRATION FACILITIES	DUE DATE/FREQUENCY
202e	New. (Interim FAD deliverable) Begin study to analyze benefits of ozonation in rendering cryptosporidia cysts inactive.	12/16/96
203a	Revised, see 203a-1, 203a-2. Complete Phase II operation of filtration pilot plant.	3/97
203 a-1	203a revised. Start Phase II operation of filtration pilot plant.	1/31/97
203 a-2	203a revised. Complete Phase II operation of filtration pilot plant.	7/31/98
203b	Revised, see 203b-1, 203b-2, 203b-3, 203b-4. Start preliminary design based on Phase II pilot results.	6/97
203 b-1	203b revised. Complete update of conceptual design for filtration facility for the Catskill and Delaware water supplies based on data obtained from the Phase II pilot plant operation and early ozone study data.	10/31/98
203 b-2	203b revised. Complete study to analyze benefits of ozonation in rendering cryptosporidia cysts inactive.	10/31/98
203 b-3	203b revised. Commence preliminary design of full scale filtration plant consistent with preferred site(s) as determined in 201a-2. The preliminary design will be based on the results of the conceptual design and will define the general appearances and spatial allowances for architectural, structural, mechanical, heating, ventilation and air conditioning, plumbing, electrical and other appurtenances. The preliminary design will include approximately 225 preliminary design drawings and outline specifications for the major components of the treatment scheme. It will also provide a estimate $\pm 15\%$ for the capital, as well as, operating and maintenance costs.	12/31/98
203 b-4	203b revised. Complete draft preliminary design of full scale filtration plant.	12/31/00
203c	Revised, see 203c-1. Complete draft EIS if one is required.	12/98

TASK #	CONCEPTUAL DESIGN AND PRELIMINARY DESIGN OF FILTRATION FACILITIES	DUE DATE/FREQUENCY
203 c-1	<p>203c revised. Complete draft EIS for the full scale filtration plant.</p> <p>The City shall have the right and shall be given a reasonable opportunity, prior to this due date, to make a presentation to EPA demonstrating that (i) the City is in substantial compliance with the terms of this Determination, and, (ii) the City is providing adequate protection of its Catskill and Delaware watersheds so as to render unnecessary the initiation of final design work for a full scale filtration Plant. EPA agrees to give due consideration to any such presentation and, if EPA concurs with the City's conclusions, the City shall not be required to perform Tasks 203d-1, 203e-1, 203f and 203g.</p>	12/31/00
203d	<i>Revised, see 203d-1. Complete final EIS if one is required.</i>	12/98
203 d-1	203d revised. Complete final EIS for the full scale filtration plant, including final site selection.	6/30/01
203e	<i>Revised, see 203e-1. Complete preliminary design including submittal of basis of design report and site selections.</i>	6/99
203 e-1	203e revised. Complete preliminary design of full scale filtration plant based on final EIS.	9/30/01
203f	New. Commence preparation of final design for full scale filtration plant.	12/31/01
203g	New. Complete final design for full scale filtration plant.	12/31/05

TASK #	LAND ACQUISITION	DUE DATE/ FREQUENCY
301a	Program has been revised. Submit report assessing overall effectiveness of NYC's 1993 Land Acquisition Program.	3/94
301b	Program has been revised. Submit revised phase I Land Acquisition Plan.	3/94
301c	Program has been revised. Establish escrow account for land acquisition purposes only	3/94
301d	Program has been revised. Establish a procedure whereby missed semi-annual milestones in addition to funds remaining from the initial \$44 million account are placed in the land acquisition escrow account with 10% added for shortfalls	3/94
301e	Program has been revised. Submit phase II Long Term Land Acquisition Plan	6/96
301f	Program has been revised. Submit quarterly reports within 30 days of the end of each quarter	quarterly
301g	New. (Interim FAD deliverable) Complete, and submit to NYSDEC, a permit application to conduct the 10-year land acquisition program.	12/16/96
301h	New. (Interim FAD deliverable) Establish a separate land acquisition account and fund it initially with a balance of \$88 million.	12/16/96
301i	New. Establish an aggregate total of \$250 million for land acquisition in the segregated land acquisition account to be used only for direct costs of the land acquisition program (site assessment, survey, appraisal and title search costs and purchase price of the land or easement).	12/2000
301j	New. Complete bi-annual reviews with EPA/DOH to determine the sum of deposits to be made into the account for the upcoming two-year period. Promptly deposit the amount EPA/DOH determines to be necessary to fund projected acquisitions.	every two years starting 4/98
301k	New. If EPA/DOH determines it to be necessary, establish an additional \$50 million for land acquisition in the segregated account, bringing the aggregate total to \$300 million.	6/2001

TASK #	LAND ACQUISITION	DUE DATE/ FREQUENCY
301l	New. Begin solicitation of eligible land in the Catskill/Delaware Watershed by seeking to acquire parcels in priority area 1 and parcels in priority areas 2, 3, and 4 that satisfy 1 or more natural features criteria, in fee or through conservation easements.	permit issuance + one month
301m	New. Upon receipt of a positive response from a landowner to a solicitation from the City, begin, except under certain limited situations, to proceed through a specified series of steps to acquire an interest in such parcel in perpetuity. (City may petition EPA for relief from the requirement that it purchase a parcel of property where the cost of the property is disproportionate to the water quality benefits obtained by the acquisition of that parcel.)	as occurs
301n	New. Solicit individual landowners of 37,264 acres in Priority Area 1, and 19,345 acres in Priority Area 2 for a total of 56,609 acres in the first year.	permit issuance + one year
301o	New. Solicit individual landowners of an additional 24,486 acres in Priority Area 1, an additional 22,955 acres in Priority Area 2, and 3,825 acres in Priority Area 4 for a total of 51,266 acres in the second year.	permit issuance + two years
301p	New. Solicit individual landowners of 14,198 acres in Priority Area 3, and an additional 28,535 acres in Priority Area 4 for a total of 42,733 acres in the third year.	permit issuance + three years
301q	New. Solicit individual landowners of an additional 24,769 acres in Priority Area 3, and an additional 28,078 acres in Priority Area 4 for a total of 52,846 acres in the fourth year.	permit issuance + four years
301r	New. Solicit individual landowners of an additional 22,395 acres in Priority Area 3, and an additional 32,870 acres in Priority Area 4 for a total of 55,265 acres in the fifth year.	permit issuance + five years

TASK #	LAND ACQUISITION	DUE DATE/ FREQUENCY
301s	New. Solicit individual landowners of an additional 20,081 acres in Priority Area 3, and an additional 28,450 acres in Priority Area 4 for a total of 48,531 acres in the sixth year.	permit issuance + six years
301t	New. Solicit individual landowners of an additional 14,558 acres in Priority Area 3, and an additional 33,243 acres in Priority Area 4 for a total of 47,800 acres in the eighth year.	permit issuance + eight years
301u	New. Solicit 950 acres of eligible land in the Kensico Basin, 14,250 acres of eligible land in the West Branch/Boyd's Corner Basin, 45,530 acres of eligible land in the Ashokan Basin, and 28,975 acres of eligible land in the Rondout Basin.	permit issuance + two years
301v	New. Solicit 12,988 acres of eligible land in the Neversink Basin.	permit issuance + three years
301w	New. Solicit 68,700 acres of eligible land in the Schoharie Basin, 78,630 acres of eligible land in the Pepacton Basin, and 105,028 acres of eligible land in the Cannonsville Basin.	permit issuance + eight years
301x	New. Solicit a minimum of 61,750 acres in Priority Area 1; a minimum of 42,300 acres in Priority Area 2; a minimum of 96,000 acres in Priority Area 3; and a minimum of 155,000 acres in Priority Area 4, for a minimum of 355,050 total acres of eligible land.	permit issuance + ten years
301y	New. If determined to be necessary by EPA/DOH and NYCDEP, the City shall request NYSDEC to renew the water supply permit to conduct the land acquisition program for an additional 5 years.	permit issuance + nine years
301z	New. (Interim FAD deliverable) Develop an Agricultural Easement Program. Submit program plan for informational purposes.	3/97

TASK #	LAND ACQUISITION	DUE DATE/FREQUENCY
301 z-1	New. The City may, at its option, spend up to \$10 million of the funds budgeted for the Land Acquisition Program to acquire agricultural easements on working agricultural properties. Farms must have a Whole Farm Plan implementation agreement in place. These acquisitions will not count in total acreage solicited for the land acquisition program.	as occurs
301aa	New. Submit progress reports on the number of solicitations made and amount of land acquired in each basin and priority area.	quarterly

TASK #	GIS/DATA GATHERING	DUE DATE/FREQUENCY
302a	<i>Complete. Wetlands Protection Program moved to NPS. Wetland mapping.</i>	1/95
302b	<i>Revised, see 302b-1. Submit quarterly status reports on data acquisition and management.</i>	quarterly
302 b-1	<i>Revised. Submit report on the status of GIS development for the NYC Watershed including equipment upgrades, training, database development and GIS project status.</i>	semi-annually
302c	<i>Combined with 302b. Report on GIS development.</i>	semi-annually

TASK #	MULTI-TIERED WATER QUALITY MODELING - CANNONSVILLE, PEPACTON, RONDOUT, NEVERSINK, WEST BRANCH, ASHOKAN AND SCHOHARIE 303, 304 & 305 COMBINED AND REVISED	DUE DATE/FREQUENCY
303a	<i>See new schedule below. Submit a plan and schedule for development of a watershed wide hydrologic/water quality model that will assess the potential impact of a full range of pollution sources in a complete array of land use categories, be compatible with modeling efforts in individual reservoirs, and be useable for making reservoir/water system management decisions.</i>	6/94
303b	<i>Revised, see 303b-1. Submit quarterly reports.</i>	quarterly
303 b-1	Submit status reports on model development and application. Reports are to be submitted for quarters where no water quality modeling milestone is due.	4/97 10/97 4/98 10/98 4/99 7/99 10/99
303c	New. (Interim FAD deliverable) Calibrate and verify the reservoir model (includes hydrothermal, water quality, eutrophication and generalized watershed loading function) for Cannonsville Reservoir. Submit report. (Activity related to Phase II TMDL development.)	12/16/96
303d	New. (Interim FAD deliverable) Set-up hydrothermal models for remaining Catskill/Delaware Reservoirs. Submit report.	1/97
303e	New. Assess hydrothermal models for remaining Catskill/Delaware Reservoirs. Submit report.	6/97
303f	New. Calibrate and verify hydrothermal models for remaining Catskill/Delaware Reservoirs. If model assessment indicates further model development or data collection is required, identify needs and time frame for completion. Submit report.	1/98
303g	New. Set-up eutrophication models for remaining Catskill/Delaware Reservoirs. Submit report.	1/98

TASK #	MULTI-TIERED WATER QUALITY MODELING - CANNONVILLE, PEPACTON, RONDOUT, NEVERSINK, WEST BRANCH, ASHOKAN AND SCHOHARIE 303, 304 & 305 COMBINED AND REVISED	DUE DATE/FREQUENCY
303h	New. Assess eutrophication models for remaining Catskill/Delaware Reservoirs. Submit report.	6/98
303i	New. Calibrate and verify eutrophication models for remaining Catskill/Delaware Reservoirs. If model assessment indicates further model development or data collection is required, identify needs and time frame for completion. Submit report.	1/99
303j	New. (Interim FAD deliverable) Set-up Generalized Watershed Loading Function (GWLf) models for remaining Catskill/Delaware Reservoirs. Submit report. (Activity related to Phase II TMDL development.)	3/97
303k	New. Assess GWLF models for remaining Catskill/Delaware Reservoirs. Submit report. (Activity related to Phase II TMDL development.)	6/97
303l	New. Calibrate and verify GWLF models for remaining Catskill/Delaware Reservoirs. If model assessment indicates further model development or data collection is required, identify needs and time frame for completion. Submit report.	1/98
303m	New. Continue research necessary to develop predictive models of pathogen loading, as outlined in the 6/30/95 report on pathogen loading feasibility.	ongoing
303n	New. Submit final report on the relationship between phosphorus and THM precursors. The report shall include a discussion on the adequacy of the 20 ug/l phosphorus standard in the NYC Watershed Rules and Regulations.	12/97

TASK #	MULTI-TIERED WATER QUALITY MODELING - CANNONVILLE, PEPACTON, RONDOUT, NEVERSINK, WEST BRANCH, ASHOKAN AND SCHOHARIE 303, 304 & 305 COMBINED AND REVISED	DUE DATE/FREQUENCY
<b>TMDL DEVELOPMENT</b>		
303 o-1	<p>New. NYSDEC to review the proposed Phase I TMDLs developed by NYCDEP. Phased I TMDLs will be considered complete and acceptable if they are calibrated consistent with the NYCDEP "Methodology For Calculating TMDLs." If the Phase I TMDLs are not determined to be calibrated, in accordance with the "Methodology", indicating an inadequacy in the ambient data, wasteload data or model application, the establishment of wasteload allocations and load allocations will defer to completion of Phase II TMDLs.</p> <p>NYSDEC will notify NYCDEP and EPA of its determination. NYSDEC will provide public notice and submit Phase I TMDLs and ensuing WLAs/LAs to EPA for its approval. NYSDECs submittal of TMDLs to EPA will include a statement that upon EPA approval, the TMDLs will be incorporated into the current water quality management plan.</p> <p>If the Phase I TMDLs are determined to be calibrated, NYSDEC using the proposed Phase I TMDLs, in cooperation with NYCDEP and EPA, will recommend modified point source SPDES permit limits based on wasteload allocations; and management practices based on nonpoint source load allocations in accordance with the schedule outlined in the following deliverables.</p>	<p>no later than 1/10/97</p> <p>as scheduled</p>
303 o-2	<p>New. EPA reviews and issues determination on Phase I TMDLs within one month of NYSDEC submittal.</p>	<p>by the later of 2/10/97 or one month from NYSDEC submittal</p>

TASK #	MULTI-TIERED WATER QUALITY MODELING - CANNONVILLE, PEPACTON, RONDOUT, NEVERSINK, WEST BRANCH, ASHOKAN AND SCHOHARIE 303, 304 & 305 COMBINED AND REVISED	DUE DATE/FREQUENCY
303 o-3	New. NYSDEC proposes modified point source SPDES permits based on Phase I TMDLs.	by the later of 4/1/97 or 90 days after EPA approval of Phase I TMDLs
303 o-4	New. NYSDEC completes and issues appropriate final SPDES permit modifications in accordance with the Watershed Rules & Regulations and consistent with the New York SAPA (Articles 3 & 4) and ECL procedures for SPDES permit issuance.	ASAP
303 o-5	New. NYCDEP and NYSDEC will jointly evaluate and identify potential management practices for controlling non-point source pollution. Submit report.	by the later of 7/1/97 or six months after EPA approval of Phase I TMDLs
303 o-6	New. NYSDEC shall work jointly with NYCDEP and shall identify potential nonpoint source management practices it will implement and recommend potential nonpoint source management practices to be implemented by other parties. NYSDEC shall provide EPA/NYCDEP a description and a schedule of the implementation mechanisms.	by the later of 1/1/98 or twelve months after EPA approval of Phase I TMDLs
303 o-7	New. NYCDEP to submit a report on the nonpoint source controls implemented and WLAs established as a result of NYSDEC Phase I TMDL adoption.	6/98, 6/99
303 o-8	New. (Interim FAD deliverable) NYCDEP to develop draft Phase II Methodology and submit to the Technical Advisory Committee for review.	12/96

TASK #	MULTI-TIERED WATER QUALITY MODELING - CANNONVILLE, PEPACTON, RONDOUT, NEVERSINK, WEST BRANCH, ASHOKAN AND SCHOHARIE 303, 304 & 305 COMBINED AND REVISED	DUE DATE/FREQUENCY
303 o-9	New. NYCDEP to develop Phase II TMDLs, as well as suggested WLAs, estimated IAs and potential management practices, and submit to NYSDEC for action.	the later of 6/30/98 or 9 months from agreement on Phase II methodology
303 o-10	<p>New. NYSDEC to review the proposed Phase II TMDLs developed by NYCDEP.</p> <p>NYSDEC will notify NYCDEP and EPA of its determination. NYSDEC will provide public notice and submit Phase II TMDLs and ensuing WLAs/LAs to EPA for its approval. NYSDEC's submittal of TMDLs to EPA will include a statement that upon EPA approval, the TMDLs will be incorporated into the current water quality management plan.</p> <p>If the Phase II TMDLs are determined to be technically defensible, NYSDEC using the proposed Phase II TMDLs, in cooperation with NYCDEP and EPA, will recommend modified point source SPDES permit limits based on wasteload allocations; and management practices based on nonpoint source load allocations in accordance with the schedule outlined in the following deliverables.</p>	<p>the later of 12/98 or six months from NYCDEP submittal</p> <p>as scheduled</p>
303 o-11	New. EPA reviews and issues determination on Phase II TMDLs within one month of NYSDEC submittal.	the later of 1/99 or one month from NYSDEC submittal
303 o-12	New. NYSDEC proposes modified point source SPDES permits based on Phase II TMDLs.	4/99

TASK #	MULTI-TIERED WATER QUALITY MODELING - CANNONSVILLE, PEPACTON, RONDOUT, NEVERSINK, WEST BRANCH, ASHOKAN AND SCHOHARIE 303, 304 & 305 COMBINED AND REVISED	DUE DATE/FREQUENCY
303 o-13	New. NYSDEC completes and issues appropriate final SPDES permit modifications in accordance with the Watershed Rules & Regulations and consistent with the New York SAPA (Articles 3 & 4) and ECL procedures for SPDES permit issuance.	ASAP
303 o-14	New. NYSDEC shall work jointly with NYCDEP to continue to identify potential nonpoint source management practices based on the types of land use in the relevant basin and any other basin specific conditions. Submit report.	the later of 1/1/99 or six months after submittal of Phase II TMDL reports to NYSDEC
303 o-15	New. NYCDEP to submit a report on the nonpoint source controls implemented and WLAs established as a result of NYSDEC Phase II TMDL adoption.	6/2000, 6/2001
901a	New. Report progress on pathogen loading research.	annually

TASK #	CANNONSVILLE MODELING 303, 304 & 305 COMBINED AND REVISED	DUE DATE/FREQUENCY
304a	Combined with 303b. Status reports.	quarterly
304b	Complete. Cannonsville Scope of Work.	6/94
304c	Complete. Report on feasibility of inclusion of pathogen and chemical transport.	10/96
304d	Complete. Award contract.	12/94
304e	Complete. Complete data collection to run, calibrate and verify model.	12/95
304f	Revised schedule, see 303 deliverables. Complete model, including programming and interface to make operational.	10/96

TASK #	CANNONSVILLE MODELING 303, 304 & 305 COMBINED AND REVISED	DUE DATE/ FREQUENCY
304g	304c identified this activity as not feasible without further information. Incorporate pathogen loading into terrestrial model.	10/95
304h	Revised schedule, see 303 deliverables. Complete data collection for terrestrial model.	10/95
304i	Revised schedule, see 303 deliverables. Complete terrestrial model.	10/96

TASK #	PEPACTON, RONDOUT, NEVERSINK, WEST BRANCH, KENSICO, ASHOKAN AND SCHOHARIE MODELING 303, 304 & 305 COMBINED AND REVISED	DUE DATE/ FREQUENCY
305a	Revised schedule, see 303 deliverables. Watershed wide plan and schedule.	6/94
305b	Revised schedule, see 303 deliverables. Complete data collection to run and calibrate terrestrial models for each.	9/95
305c	Revised schedule, see 303 deliverables. Complete data collection to run and calibrate reservoir/routing models for each.	3/96
305d	Revised schedule, see 303 deliverables. Complete each model in line with Cannonsville.	1/97

TASK #	WATERSHED AGRICULTURAL PROGRAM	DUE DATE/ FREQUENCY
306a	Revised, see 306a-1. Submit quarterly reports on whole farm planning beginning by 1/94. Included must be detailed progress of each of the 10 pilot farms, Phase I progress, Phase II progress starting with its implementation in 9/94, and progress against the <u>Watershed Agricultural Program Five Year Plan for Whole Farm Planning timeline.</u>	quarterly

TASK #	WATERSHED AGRICULTURAL PROGRAM	DUE DATE/ FREQUENCY
306 a-1	306a revised. Status reports on the Watershed Agricultural Program. Agricultural easement acquisitions should also be reported in this status report.	quarterly
306b	Complete. Interim Phase I evaluation.	1/94
306c	Complete. Signed Phase II implementation agreement.	7/94
306d	Complete. Demonstration farm implementation.	9/94
306e	Complete. Formal agreements for continued implementation with demonstration farms.	9/94
306f	Complete. Phase I achievement report.	10/94
306g	Complete. List of BMPs considered.	3/94
306h	Complete, workplan submitted and reported on in 308e quarterly report. Report on NPS sources and wildlife impact on pathogens.	6/94
306i	Revised, see 306i-1. Develop draft watershed regs to control agricultural contamination based on revision of NYCs agriculture regs distributed previously under discussion draft, upon failure to complete deliverables 306j through 306q.	within 3 months
306 i-1	306i revised. Publish draft agricultural regulations, if based on a review of the 12/97 or 12/99 reports EPA determines that the current Watershed Agricultural Program activities do not adequately control agricultural non-point source pollution, or if NYCDEP fails to meet the requirements of the Watershed Agricultural Program.	within 9 months of EPAs determination
306j	Complete. Phase I BMP effectiveness assessment.	1/95
306k	Complete. Begin WFPs in 50 new farms.	12/94
306l	Complete. Begin WFPs in 100 new farms.	10/95
306m	Revised, see 306m-1. Begin WFPs in 265 new farms.	10/96
306 m-1	Revised. Obtain agreement from 90 new farms to participate in the Watershed Agricultural Program. For the purposes of the Watershed Agricultural Program, a farm is defined as having \$10,000 or more gross income attributable to farming activities.	10/96

TASK #	WATERSHED AGRICULTURAL PROGRAM	DUE DATE/FREQUENCY
306 m-2	New. Obtain agreement from 67 new farms to participate in the Watershed Agricultural Program.	10/97
306n	Complete. Secure WFPs and implementation agreements with 50 new farms.	10/95
306o	Revised, see 306o-1. Secure WFPs and implementation agreements with 100 new farms.	10/96
306 o-1	Revised. Execute agreements with 53 new farms to implement Whole Farm Plans.	10/96
306 p-1	New. Execute agreements with 83 new farms to implement Whole Farm Plans.	10/97
306 p-2	New. Execute agreements with 111 new farms to implement Whole Farm Plans.	10/98
306q	Revised, see 306q-1, 306q-2, 306q-3. Submit an evaluation report of the Watershed Agricultural Program.	12/97
306 q-1	306q revised. (Interim FAD determination) Submit criteria for use in 1997 evaluation.	12/16/96
306 q-2	306q revised. Submit preliminary evaluation of Watershed Agricultural Program based on evaluation criteria, including an assessment of the evaluation criteria used.	12/97
306 q-3	306q revised. Submit evaluation of the Watershed Agricultural Program based on evaluation criteria.	12/99
306r	New. Continue funding of the Watershed Agricultural Program for a total of \$35.2 million through FY 1999.	ongoing

TASK #	KENSICO MODELING AND REMEDIATION ACTIVITIES	DUE DATE/FREQUENCY
307a	Complete. Initiate within 3 months implementation of recommendations which are attainable within 6 months made in contractor report scheduled for 6/94.	9/94
307b	Complete. Contractor report which will include recommendations for remediation of the causes of elevated coliform in Kensico Reservoir.	12/94

TASK #	KENSICO MODELING AND REMEDIATION ACTIVITIES	DUE DATE/ FREQUENCY
307c	<p><i>Revised, see 307c-1, 307c-2, 307c-3.</i></p> <p><i>If in-house design of Kensico remediation projects:</i></p> <ul style="list-style-type: none"> <li><i>o begin design</i></li> <li><i>o complete design</i></li> <li><i>o start construction</i></li> </ul> <p><i>If contract design of Kensico remediation projects:</i></p> <ul style="list-style-type: none"> <li><i>o begin design</i></li> <li><i>o complete design</i></li> <li><i>o start construction</i></li> </ul>	<p>3/95</p> <p>3/96</p> <p>9/96</p> <p>3/96</p> <p>3/97</p> <p>9/97</p>
307 c-1	<p><b>307c revised. (Interim FAD deliverable)</b></p> <p>Submit schedule for initiating construction on each of the Kensico Program's stormwater BMPs.</p>	2/97
307 c-2	<p><b>307c revised.</b> Initiate construction on each of the Kensico Program's stormwater BMPs according to the schedule identified in 307c-1.</p>	ongoing
307 c-3	<p><b>307c revised.</b> Complete maintenance dredging.</p>	10/98
307d	<p><b>Complete.</b> Provide detailed inventory of all septic systems in the Kensico watershed.</p>	3/94
307e	<p><b>Revised, see 307e-1.</b> Work with county and towns to assure all septic systems in sewer areas are disconnected and connected to sewers as soon as possible in accordance with local, county, NYC, or NYS regulations</p>	contin- uous
307 e-1	<p><b>307e revised.</b> Finalize protocol with county and towns to assure all septic systems in sewer areas are disconnected and connected to sewers.</p>	12/16/96
307f	<p><b>Revised, see 307f-1.</b> Work with county and towns to track down and insure prompt remediation of failing septic systems or discharge of wastewater into storm sewers ensuring disconnection and proper treatment as soon as possible in accordance with local, county, NYC or NYS regulations.</p>	ASAP
307 f-1	<p><b>307f revised.</b> Continue working with county and towns to track down and insure prompt remediation of failing septic systems or discharge of wastewater into storm sewers ensuring disconnection and proper treatment</p>	ongoing

TASK #	KENSICO MODELING AND REMEDIATION ACTIVITIES	DUE DATE/ FREQUENCY
307 g-1	New. Provide funding of \$300,000 for construction of a municipal sewer line to provide service to the Jenny Clarkson facility and submit reports on construction status.	12/96, 2/97
307 g-2	New. Perform weekly monitoring at the Jenny Clarkson facility to determine and assure pump-outs are done at adequate intervals to prevent overflow or system failure until sewer service connection is complete.	1/week until service connect
307 g-3	New. Submit final report 30 days after Jenny Clarkson sewer service connection completion.	4/97
307h	<i>Complete. Report submitted, no new sewerage will be done unless conditions dictate as necessary. Submit strategy for sewerage all feasible areas by the end of 12/98.</i>	12/94
307i	<i>Complete. Work with local authorities to develop strategy to be submitted to USEPA and NYSDOH including associated costs, funding and schedule for implementation, to replace or reline all unreliable stretches of sewer within the watershed with scheduling priority placed on those closest to the reservoir and along Malcolm Brook</i>	12/94
307 i-1	New. Complete contracted inspections of sewer lines and manholes determined inaccessible by NYCDEP in-house inspections and submit final report on inspection results with all identified defective sewer lines and manholes.	12/96
307 j-1	Continue to work with local authorities to repair all identified sewer leaks as promptly as possible	12 months from ID
307 j-2	New. (Interim FAD deliverable) Report on completion of repairs on defective sewers performed between 12/31/93 and 12/31/95.	12/16/96
307 j-3	New. Report on completion of repairs on defective sewers performed between 12/31/95 and 11/30/97.	12/97
307k	<i>Complete. Continue to fully implement interim waterfowl harassing effort and provide assessment of effectiveness.</i>	3/94

TASK #	KENSICO MODELING AND REMEDIATION ACTIVITIES	DUE DATE/FREQUENCY
307l	<i>Complete. Implement final water fowl management.</i>	12/94
307 l-1	<i>New. Continue implementation of final Waterfowl Management Plan. Submit report.</i>	annually, by May 31 each year
307m	<i>Complete. Reporting in 901a. Identify and evaluate feasibility of implementing short term interim remediation options for reducing contamination from Malcolm Brook.</i>	4/94
307n	<i>Revised, see 307n-1. Install and operate continuous recording flow meters and rain gauges on a minimum of four tributary creeks, including Malcolm Brook and N5</i>	4/94
307 n-1	<i>Revised. Continue operation of continuous recording flow meters and rain gauges on tributary creeks. Provide notification of changes in location and equipment needs as BMPs develop.</i>	ongoing
307o	<i>Combined with 308e report. Continue weekly sampling for giardia, cryptosporidium, and viruses.</i>	until 12/96
307p	<i>Revised. Reports on research efforts. Including, at a minimum:</i> <ul style="list-style-type: none"> <li>· the status of the ground water monitoring effort including analytical data, identification of "data of concern" and well water elevations.</li> <li>· routine monitoring (not including pesticides monitoring),</li> <li>· updates on Kensico modeling efforts.</li> </ul>	semi-annual
307q	<i>Incorporated into 501, 308e, 301y, 901a. Reports on watershed activities including SEQRA review projects, land acquisition, implementation of spill prevention plan and giardia/cryptosporidium/virus monitoring.</i>	quarterly
307r	<i>Complete. Submit Kensico, watershed land use maps.</i>	4/94
307s	<i>Complete.</i>  <i>Complete pilot infrared aerial survey of Kensico watershed.</i>  <i>Submit a report assessing the effectiveness as a tool for detecting possible subsurface septic failures.</i>	9/94  3/95
307t	<i>Complete. Complete implementation of spill response program.</i>	6/94

TASK #	KENSICO MODELING AND REMEDIATION ACTIVITIES	DUE DATE/FREQUENCY
307u	<i>Complete.</i> Complete implementation of access control measures, including fencing.	6/94
307v	<i>Complete.</i> Assure scheduled completion of contract with Weston to develop engineering solutions to Kensico's bacterial contamination problems: 307v series.	
307 v-1	<i>Complete.</i> Identify and study all existing sanitary sewers, storm sewers, and septic systems within the Kensico watershed/drainage area.	6/94
307 v-2	<i>Complete.</i> Select locations and design new detention basins and slope protection, submit report.	10/94
307 v-3	<i>Complete.</i> Study the feasibility of relocating the intakes, submit report.	11/94
307 v-4	<i>Complete.</i> Determine containment measures necessary to prevent a hazardous spill from entering the Kensico Reservoir, submit report.	4/94
307 v-5	<i>Complete.</i> Determine the contours of the reservoir bottom, study flow through patterns, and analyze bottom core samples to characterize and profile the reservoir bottom, submit report.	9/94
307 v-6	<i>Complete.</i> Evaluate potential sources of fecal coliform contamination and recommendations for mitigation including implementation of proven waterfowl management plan for Kensico, submit report.	6/94
307 v-7	<i>Complete.</i> Perform hydrological analysis of significant perennial streams within the watershed area to include determination of drainage areas, rate of flow and other parameters to study stream discharges and their impact on reservoir water quality, submit report.	10/94
307 v-8	<i>Revised.</i> See 307 v-8a, 307v-8b. Establish monitoring wells and implement a groundwater monitoring program within the Kensico watershed.	10/94
307 v-8 a	<i>New.</i> Continue ground water monitoring program as outlined in the December 1994 Kensico Long Term Monitoring Plan.	through 4/97
307 v-8 b	<i>New.</i> Submit final analysis of monitoring program and recommendations for future ground water monitoring.	7/97
307 v-9	<i>Complete.</i> Delineate and analyze wetlands within the reservoir drainage area.	6/94

TASK #	KENSICO MODELING AND REMEDIATION ACTIVITIES	DUE DATE/FREQUENCY
307 v-10	<i>Complete.</i> Assess the applicability of installing aeration/mixing equipment within Kensico Reservoir.	8/94
307 v-11	<i>Complete.</i> Submit draft EIS necessary to implement the preceding.	8/95
307 v-12	<i>Complete.</i> Submit final EIS.	12/95
307 v-13	<i>Complete.</i> Submit report identifying areas where sewerage is technically feasible.	6/94
307 v-14	<i>Complete.</i> Determine integrity of all sanitary sewers in Kensico watershed, submit report.	6/94
307 v-15	<i>Complete.</i> Submit a conceptual plan for the detention and/or diversion of flows from tributaries.	10/94
307 v-16	<i>Complete.</i> Submit a three-dimensional water quality model.	12/94
307 v-17	<i>Complete.</i> Complete calibration and verification process on water quality model.	12/95
307 v-18	<i>Complete.</i> Establish storm runoff model for all drainage areas in the watershed.	10/94
901a	<p><i>New.</i> Include in annual report:</p> <ul style="list-style-type: none"> <li>· report on progress in completing stormwater BMPs, maintenance dredging and the temporary curtain wall,</li> <li>· report on all repair of sewer leaks,</li> <li>· status of short term measures taken to reduce contamination from Malcolm Brook (report only until permanent measures are in place),</li> <li>· an update on hazardous materials pollution prevention measures implementation (corporate landscape maintenance, Westchester Airport BMPs and spill response),</li> <li>· monitoring results of the pesticide monitoring program,</li> <li>· identification of SEQRA projects reviewed,</li> <li>· an update on the Kensico Environmental Enforcement Program.</li> </ul>	annually

TASK #	NON-POINT SOURCE POLLUTION CONTROL	DUE DATE/ FREQUENCY
308a	<i>Complete. Review adequacy of overall strategy for reducing non-point source loadings.</i>	12/94
308 a-1	<b>New.</b> Continue implementation of strategy for reducing non-point source loadings.	ongoing
308b	<i>Complete. Identified mechanisms are integrated into routine enforcement activities and are reported in 502. Develop mechanism to assure that areas where high levels of fecal coliform bacteria in source reservoirs that are significantly contributed to by leaky sewers or failing septs are resolved.</i>	ongoing
308c	<i>Complete. Submit strategy for establishment of stream corridor protection programs.</i>	6/94
308d	<i>Complete. Assure that stream corridor protection programs are established along major tributaries.</i>	12/94
308e	<i>Revised, see 308e-1. Continue implementation of cryptosporidium, giardia, and virus monitoring for the entire watershed, Kensico Reservoir, and for farm study. Continue established routine and special study monitoring and submittal of reports.</i>	quarterly
308 e-1	<b>Revised.</b> Includes 306h, 307o. Continue, at current levels, implementation of cryptosporidium, giardia, and virus monitoring for the entire watershed, Kensico Reservoir, and for farm study. Continue established routine and special study monitoring. Submit reports.	semi-annually
308 e-2	<b>New.</b> Review suggestions for enhancing the current monitoring program provided by the Technical Advisory Committee. Submit Enhanced Monitoring Program based on suggestions. Submittal must contain implementation schedule.	90 days from recommendations
308f	<i>Incorporated into 901a. Reports on BMP strategy and turbidity reduction.</i>	quarterly

TASK #	NON-POINT SOURCE POLLUTION CONTROL	DUE DATE/FREQUENCY
308g	<p>New. Submit a strategy, which is not inconsistent with the MOA, for prioritizing and implementing non-point source programs including at least; stormwater controls, stream corridor protection/stabilization (including the local cooperative stream management programs), sand &amp; salt storage forestry BMPs and public education. Consult with all appropriate parties. The strategy will include a time frame and a mechanism for NYCDEPs agents to ensure that activities occur within that time frame.</p>	no later than 9/97
308h	<p>New. Submit a prioritized list of non-point source programs including at least; stormwater controls, stream corridor protection/stabilization (including the local cooperative stream management programs), sand &amp; salt storage forestry BMPs and public education.</p>	9/98
308i	<p>New. Submit reports on the status of implementing projects designed to reduce NPS pollution. Projects relating to stormwater control (including those reviewed by the Stormwater Technical Working Group), sand &amp; salt storage, stream corridor protection/stabilization (including the local cooperative stream management programs) forestry BMPs and public education should be included. Include also Catskill and Delaware NPS activities implemented East of Hudson.</p>	quarterly (beginning 12/97)
308j	<p>New. (Interim FAD deliverable) Submit a Wetlands Protection Program which provides informational and educational support. Include also an implementation schedule.</p>	12/16/96
308k	<p>New. Work with NYSDEC to develop and submit short and long term schedule for Pesticide and Fertilizer Technical Working Group.</p>	effective date of MOA + 6 months

TASK #	NON-POINT SOURCE POLLUTION CONTROL	DUE DATE/ FREQUENCY
3081	New. (Interim FAD deliverable) Develop a draft guidance manual for implementing the stormwater provisions of the watershed regulations, including guidelines for developing pollution prevention plans and individual residential stormwater management plans and wetlands and watercourse crossings, pipings and diversions. Submit report.	12/96
308m	New. (Interim FAD deliverable) Finalize the stormwater guidance manual based on the Watershed Protection and Partnership Councils review.	no later than the effective date of the WR&R
901a	New. Include in annual report: <ul style="list-style-type: none"> <li>· progress on NYCDEPs activities regarding the short and long term schedule of the Pesticide and Fertilizer Technical Working Group,</li> <li>· updates on the Routine Stream Pesticide Monitoring and Benthic Macroinvertebrate Monitoring,</li> <li>· a summary of NYCDEP activities as part of the cost-sharing program for stormwater BMPs,</li> <li>· status of periodic reviews of the water quality monitoring activities conducted by the Technical Advisory Committee subsequent to establishing the Enhanced Monitoring Program,</li> <li>· status of activities to implement the Wetlands Protection Program.</li> </ul>	annually

TASK #	WHOLE COMMUNITY PLANNING	DUE DATE/ FREQUENCY
309	Program incorporated in MOA. Progress reports on pilot communities.	quarterly

TASK #	SEPTIC SYSTEMS	DUE DATE/ FREQUENCY
310a	<i>Complete. Complete by the end of 1/96, based on favorable results from the pilot of Kensico (to be completed by the end of 9/94), infrared aerial surveys of each watershed to detect possible subsurface septic failures.</i>	1/96
310b	<i>Incorporated with 501. Continue submittal of quarterly activities and reports within 30 days of the end of each quarter including SEQRA reviews of new and remediated septic systems in each watershed.</i>	quarterly
310c	<i>Moved to deliverable 501. Continue enforcement reports that include septic enforcement actions under established regulations.</i>	quarterly
310d	<i>Complete. Submit plan that sets up a mechanism/procedure to negate the impact of failing systems that occur in the winter and cannot be remediated until the ground thaws in the spring. Such protocol would include temporary septic pump-out and water conservation methods to reduce flow. This plan should be incorporated into NYCDEP's procedures to handle failed septic systems.</i>	4/94
310e	<i>Complete. Independent of infrared survey results, establish plan to detect and remediate subsurface failures.</i>	6/94
310 e-1	<i>New. (Interim FAD deliverable) Submit a detailed methodology for prioritizing routine inspections to detect septic system failures. The methodology must include information such as; how inspections of septics and stream segments are prioritized, the frequency of inspections, routes covered and procedures used to determine failure.</i>	12/16/96
310	<i>Revised, see 310f-1, 301f-2. Implement transport study pilot submitted by NYCDEP in 9/93.</i>	12/94
310 f-1	<i>310f revised. Continue implementation of the Septic Siting Study. Submit status reports</i>	quarterly

TASK #	SEPTIC SYSTEMS	DUE DATE/ FREQUENCY
310 f-2	New. Complete design and approval of systems at six sites. (The 1993 Determination deliverable has been revised to reflect an extended implementation schedule.)	3/97
310 f-3	New. Begin bromide tracer studies at three sites. (The 1993 Determination deliverable has been revised to reflect an extended implementation schedule.)	5/97, 7/97
310 f-4	New. Begin microbiological spiking studies at three sites (fall and spring spiking events to occur at each site). (The 1993 Determination deliverable has been revised to reflect an extended implementation schedule.)	9/97, 9/98
310 f-5	New. Routine samples are being collected at all completed sites.	ongoing through 7/97
310 f-6	New. Submittal of final report on the results of the study and the implications on setback distances.	12/99
310 g-1	New. Develop and submit plan, not inconsistent with the MOA and in consultation with appropriate parties, for prioritizing, implementing and completing septic rehabilitation and replacement.	effective date of MOA + six months
310 g-2	New. Submit prioritized list of septic systems needing rehabilitation and replacement.	6/30/98
310 g-3	New. Ensure that measures required for implementing septic system rehabilitation and replacement in the Catskill/Delaware watersheds, such as contracts, are in place.	4/2002
310 g-4	New. Ensure completion of rehabilitation of septic systems identified in Task 310g-3	4/2003
310 g-5	New. Submit report identifying all failing or problem systems identified and corrective measures taken.	annually

TASK #	SEPTIC SYSTEMS	DUE DATE/ FREQUENCY
	<b>Galley Systems</b>	
310 h-1	New. (Interim FAD deliverable) Begin implementation the Galley System Study as described in the protocol.	11/96
310 h-2	New. Complete the Galley System Study and submit a final report assessing their treatment effectiveness.	3/2000
310i	New. Formally request NYSDOH revision of Watershed Rules & Regulations, if necessary, based on results of Septic Siting Study and/or Galley System Study.	2/2000
310j	New. Report on NYSDOH activities in response to formal request for revisions of the Watershed Rules and Regulations based on results of Septic Siting Study and/or Galley System Study.	2/2001
901a	New. Include in the annual report: · comprehensive progress report on the septic system remediation program.	annually

TASK #	WATERSHED RULES AND REGULATIONS	DUE DATE/ FREQUENCY
311	<i>Revised, see 311-a, 311-b. Demonstrate diligent pursuit of final promulgation and implementation of new watershed regulations as soon as possible, resulting in effective regulations.</i>	<i>no later than 12/94</i>
311-a	311 revised. Complete promulgation (in accordance with CAPA) of the new watershed rules and regulations. Submit SAPA documentation to NYSDOH	effective date of MOA + 90 days
311-b	311 revised. Implement and administer the new watershed rules and regulations	continuous
901a	New. Submit as part of the annual report described in 901a, a comprehensive discussion describing the efforts taken under task 311-b.	annually

TASK #	WASTEWATER TREATMENT PLANTS	DUE DATE/ FREQUENCY																												
312a	<i>Revised, see 312a-1. Complete all appendices to NYSDEC/NYCDEP MOU by the end of 3/94.</i>	3/94																												
312 a-1	<b>312a revised.</b> Within 30 days of receipt of final appendices to the NYSDEC/NYCDEP MOU from NYSDEC (Appendices F & D), obtain appropriate NYCDEP approval and signature and return to NYSDEC for full execution.	effective date of WR&Rs + thirty days																												
312b	<p><i>Revised, see 312b-1. Execute administrative orders on consent or with NYSDEC ensuring that the City will meet interim effluent limitations and upgrade the six NYC owned WWTPs providing phosphorous removal and microfiltration in accordance with requirements and following</i></p> <table border="1"> <thead> <tr> <th><u>Plant</u></th> <th><u>Start</u></th> <th><u>Finish</u></th> <th><u>Open</u></th> </tr> </thead> <tbody> <tr> <td>Tannersville</td> <td>2/95</td> <td>2/97</td> <td>3/97</td> </tr> <tr> <td>Grand Gorge</td> <td>4/95</td> <td>4/97</td> <td>3/97</td> </tr> <tr> <td>Grahamsville</td> <td>12/94</td> <td>2/97</td> <td>7/97</td> </tr> <tr> <td>Margaretville</td> <td>2/95</td> <td>1/97</td> <td>7/97</td> </tr> <tr> <td>Chichester</td> <td>3/95</td> <td>2/97</td> <td>9/97</td> </tr> <tr> <td>Pine Hill</td> <td>3/95</td> <td>2/97</td> <td>9/97</td> </tr> </tbody> </table>	<u>Plant</u>	<u>Start</u>	<u>Finish</u>	<u>Open</u>	Tannersville	2/95	2/97	3/97	Grand Gorge	4/95	4/97	3/97	Grahamsville	12/94	2/97	7/97	Margaretville	2/95	1/97	7/97	Chichester	3/95	2/97	9/97	Pine Hill	3/95	2/97	9/97	
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312 b-1	<p>Revised. Comply with Administrative Consent Orders or SPDES permit modifications executed with the NYSDEC for the following NYC-owned wastewater treatment plants ensuring completion of upgrades of the plants incorporating advanced treatment capability (ie. microfiltration or an approved equivalent and phosphorus removal) in accordance with Watershed Rules and Regulations and the following schedules. The decision whether a treatment technology is equivalent to microfiltration will be made by EPA.</p> <table border="1"> <thead> <tr> <th>Plant</th> <th>Begin Constr.</th> <th>End Constr.</th> <th>Comply w/FEL's</th> </tr> </thead> <tbody> <tr> <td>Tannersville *</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    (w/out micro.)</td> <td>2/1/95</td> <td>5/30/97</td> <td>8/31/97</td> </tr> <tr> <td>    (with micro.)</td> <td></td> <td></td> <td>8/31/98</td> </tr> <tr> <td>Grand Gorge *</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    (w/out micro.)</td> <td>4/1/95</td> <td>8/31/97</td> <td>10/31/97</td> </tr> <tr> <td>    (with micro.)</td> <td></td> <td></td> <td>8/31/98</td> </tr> <tr> <td>Grahamsville</td> <td>5/30/95</td> <td>3/31/97</td> <td>9/30/97</td> </tr> <tr> <td>Margaretville *</td> <td>7/31/95</td> <td>8/31/98</td> <td>3/31/99</td> </tr> <tr> <td>Chichester</td> <td>6/30/95</td> <td>6/30/96</td> <td>10/31/96</td> </tr> <tr> <td>Pine Hill</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    (temporary)</td> <td>4/1/96</td> <td>9/1/96</td> <td>11/1/96 (IELs)</td> </tr> <tr> <td>    (permanent)</td> <td>10/1/96</td> <td>8/1/98</td> <td>12/1/98 (FELs)</td> </tr> </tbody> </table> <p>** - Dates may be modified to be consistent with those contained in NYSDEC orders or permits subject to acceptability by EPA.</p> <p>* - NYSDEC, NYC, &amp; EPA have agreed to modify the existing 1994 Administrative Consent Order to contain the above compliance schedule dates for Tannersville, Grand Gorge, &amp; Margaretville to be executed by May 30, 1997. Final compliance date for microfiltration for these facilities includes, complete installation and commence operation of microfiltration to achieve 99.9% removal and/or inactivation of <i>Giardia lamblia</i> cysts as required by SPDES permit.</p>	Plant	Begin Constr.	End Constr.	Comply w/FEL's	Tannersville *				(w/out micro.)	2/1/95	5/30/97	8/31/97	(with micro.)			8/31/98	Grand Gorge *				(w/out micro.)	4/1/95	8/31/97	10/31/97	(with micro.)			8/31/98	Grahamsville	5/30/95	3/31/97	9/30/97	Margaretville *	7/31/95	8/31/98	3/31/99	Chichester	6/30/95	6/30/96	10/31/96	Pine Hill				(temporary)	4/1/96	9/1/96	11/1/96 (IELs)	(permanent)	10/1/96	8/1/98	12/1/98 (FELs)	** as ordered or permitted
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TASK #	WASTEWATER TREATMENT PLANTS	DUE DATE/ FREQUENCY
312c	<i>To be included in Task 312e. Submit quarterly progress reports within 30 days of the end of each quarter on NYC-owned wastewater treatment plant upgrades.</i>	quarterly
312d	<i>Revised, see 312d-1. Perform weekly monitoring at the City-owned wastewater treatment plants, and monthly monitoring at non-City-owned wastewater treatment plants for SPDES regulated parameters.</i>	quarterly
312 d-1	<b>312d revised.</b> Perform weekly sample monitoring at the NYC-owned wastewater treatment plants, and grab sample monitoring twice per month at all non-NYC-owned wastewater treatment plants discharging in the Catskill/Delaware Watershed for standard SPDES regulated parameters. At least once annually, samples from non-City owned WWTPs shall be collected in accordance with the monitoring requirements of the SPDES permit. If deemed beneficial for enforcement purposes, or to verify a WWTPs compliance status with respect to its SPDES permit, conduct additional sampling, including composite effluent sampling, and wherever possible, split sample monitoring with the facility in accordance with the monitoring requirements of the SPDES permit. Submit results quarterly.	quarterly
312e	Conduct quarterly on-site inspections and provide documented inspection reports including all sample monitoring data and progress reports on upgrades for all City-owned and non-City-owned SPDES permitted facilities discharging in the watershed.	quarterly

TASK #	WASTEWATER TREATMENT PLANTS	DUE DATE/ FREQUENCY																		
312f	<p>Revised, see 312f-1. Develop agreements, in consultation with NYSDEC to ensure appropriate SPDES permit modifications, including appropriate cost sharing according to the schedule specified below with all owners, excluding NYC and NYS owned, of wastewater treatment plants to assure within 24 months of the signed agreement compliance with the following (schedule allows four months following NYSDOH approval of watershed regulations):</p> <p>Phase I controls (compliance with all treatment, equipment and effluent standards outlined in watershed regs, except membrane filtration), O&amp;M agreement, including operator training, biweekly monitoring (not presently required under permit), preliminary design and cost estimate for Phase II controls (membrane filtration).</p> <table border="1"> <thead> <tr> <th># of WWTPs</th> <th>Draft Agreement Submittal</th> <th>Signed Agreement</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>6/30/94</td> <td>8/31/94</td> </tr> <tr> <td>6</td> <td>9/30/94</td> <td>11/30/94</td> </tr> <tr> <td>6</td> <td>12/31/94</td> <td>2/28/95</td> </tr> <tr> <td>6</td> <td>3/31/95</td> <td>5/31/95</td> </tr> <tr> <td>remaining 6</td> <td>6/30/95</td> <td>8/31/95</td> </tr> </tbody> </table>	# of WWTPs	Draft Agreement Submittal	Signed Agreement	4	6/30/94	8/31/94	6	9/30/94	11/30/94	6	12/31/94	2/28/95	6	3/31/95	5/31/95	remaining 6	6/30/95	8/31/95	
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312 f-1	<p>312f revised to reflect new time-frame for WR&amp;R promulgation. Within thirty days from the effective date of the watershed rules and regulations, develop form agreements for use with EFC and all owners of existing Catskill and Delaware wastewater treatment plants to assure that each such WWTP, to the extent required by NYCDEP, completes the necessary upgrades to comply with all treatment, equipment and effluent standards outlined in watershed rules and regulations. The scope of the form agreement must include provisions for development of a schedule and specifications for the required upgrade in accordance with the WR&amp;Rs and NYCDEP funding for such upgrades.</p>	effective date of WR&R + one month																		

TASK #	WASTEWATER TREATMENT PLANTS	DUE DATE/ FREQUENCY
312 f-2	New. NYCDEP assures execution of agreements specified in 312f-1 with all owners of WWTPs in the Catskill/Delaware Watershed. Submit quarterly reports.	effective date of the WR&Rs + 12 months  quarterly reporting
312 f-3	New. NYSDEC completes and issues appropriate draft SPDES permit modifications for all dischargers in the NYC Watersheds in accordance with the Watershed Rules & Regulations (No later than 60 days after effective date of the regulations).	4/97
312 f-4	New. NYSDEC completes and issues appropriate final SPDES permit modifications in accordance with the Watershed Rules & Regulations for all dischargers in the watersheds and consistent with the New York SAPA (Articles 3 & 4) and ECL procedures for SPDES permit issuance.	ASAP
312g	Compliance review is not applicable to 312f-1 form agreements. Review compliance with 312f agreements in its quarterly inspections and notify owner, EPA and NYSDEC within 45 days of the inspection.	as occurs
312h	Brewster pilot study on microfiltration completed and results documented. NYC conducting pilot studies on Dyna-sand filtration technology to prove equivalency to microfiltration. Delhi study completed and documented, Stamford study to be completed and documented by June 1996. EPA review to follow. Complete membrane filtration study and document results.	6/94

TASK #	WASTEWATER TREATMENT PLANTS	DUE DATE/ FREQUENCY
312i	<p>Report submitted. Mitigation of STP impacts on receiving streams to be addressed through plant upgrades to advanced treatment capability.</p> <p>Mitigation of STP impacts on receiving streams to be addressed through plant upgrades to advanced treatment capability (ie. microfiltration and phosphorus removal). Based on an evaluation of flow and monitoring results from all STP discharges and points upstream and downstream thereof, assess the incremental impact of microbial and nutrient loadings from STP discharges on downstream reservoir water quality.</p>	12/94
312j	<p>Report submitted. Phosphorus removal technology and point source/non-point source trading to be implemented. Evaluate the feasibility of an overall phosphorous reducing strategy for point and non-point sources prioritized on a cost effective basis.</p>	3/95
312k	<p>Included in 312e report. Submit quarterly reports on inspections, upgrades, and monitoring of STPs.</p>	quarterly
312l	<p>Microfiltration training completed. Secure training of NYCDEP WWTP inspectors on microfiltration technologies by the end of 12/95.</p>	12/95
312m	<p>Accomplished through WECC meetings. Submit quarterly reports within 30 days of the end of each quarter on NYCDEP/NYSDEC MOU and enforcement activities.</p>	quarterly
312n	<p>New. Work with 312f-1 WWTP owners and EFC to assure the development and submission of compliance plans and upgrade schedules for all existing non-City-owned wastewater treatment plants in accordance with the watershed rules and regulations within 12-months after promulgation of the watershed rules and regulations. Prepare and submit report at due date.</p>	effective date of WR&R + 12 months

TASK #	WASTEWATER TREATMENT PLANTS	DUE DATE/ FREQUENCY
312 n-1	New. Work with 312f-1 WWTP owners and EFC to assure that within 18-months after the effective date of the regulations that such owners secure NYCDEP approval of facility upgrade plans and compliance schedules consistent with the watershed rules and regulations. The schedules must reflect the ability of the owners to complete the required WWTP upgrades in accordance with the deadlines and other requirements of the watershed rules and regulations. Submit quarterly progress reports until all facility plans and compliance schedules have been approved.	effective date of WR&R + 18 months  quarterly reporting
312o	New. Undertake all necessary enforcement actions to assure the submission of appropriate facility upgrade plans and compliance schedules and completion of approved upgrades in Task 312n-1 including advanced treatment capability (ie. microfiltration or approved equivalent and phosphorus removal) 5 years after promulgation of the watershed rules and regulations. The decision whether a treatment technology is equivalent to microfiltration will be made by EPA. Submit annual progress reports.	ongoing  annual reporting
312 o-1	New. Monitor the completion of the 312f-1 WWTP upgrades in accordance with the requirements of the watershed rules and regulations. Submit annual progress reports.	ongoing  annual reporting
312p	New. Develop and submit circuit rider technical support plan for EPA approval providing owners/operators on-site technical assistance for the operation and maintenance of all WWTPs in the watershed	effective date of WR&R + 6 months
312q	New. Implement EPA approved circuit rider technical support plan.	upon EPA approval
312r	New. Submit status report on approved circuit rider technical support program. (may be included in task 312e report)	quarterly
	Phosphorus Off-set Pilot Program	

TASK #	WASTEWATER TREATMENT PLANTS	DUE DATE/ FREQUENCY
312 s-1	New. Report on applications to participate in the Phosphorus Off-set Pilot Program and identify the point and non-point source contributions to be used as off-sets with their credit quantifications	semi-annually
312 s-2	New. Submit the methodology for determining the credit quantifications of the pollution contribution and projected off-sets.	effective date of WR&Rs
312 s-3	New. Ensure the development and issuance of appropriate SPDES permits incorporating the identified "off-sets" and the 0.2 ppm phosphorus discharge limitation requirements for each new pilot plant	as needed

TASK #	COST SHARING	DUE DATE/ FREQUENCY
313a	<p><i>Cost sharing provisions in MOU. Implement cost sharing and mitigation measures listed in the Final Generic Environmental Impact Statement and included in NYC's four and ten year capital plans:</i></p> <ul style="list-style-type: none"> <li>o \$9M in 1994</li> <li>o \$14M in 1995</li> <li>o \$10M in 1996</li> <li>o \$10M in 1997</li> <li>o \$60M in 1998-2003</li> </ul> <p><i>NYC will assume the costs of the following programs mandated by the watershed regulations:</i></p>	
313b - 131n	<i>MOA includes provisions for community based programs.</i>	

TASK #	NON-TYPICAL OPERATIONS	DUE DATE/FREQUENCY
401a	<p><i>Revised, see 401a, 401b. Notify USEPA and NYSDOH if the 60 day travel time boundary condition is violated. In such circumstances, and subject to USEPA and NYSDOH's prior approval, specific operational procedures shall be instituted by NYCDEP to maintain the 60 day travel requirement. Examples of such procedures are:</i></p> <p><i>1) putting Kensico Reservoir on-line;</i>  <i>2) putting West Branch Reservoir on-line; and/or</i>  <i>3) not using water from the Cannonsville Reservoir.</i></p>	8/96
401a	<p><b>401 revised. (Interim FAD deliverable)</b>  Submit protocol for notification of EPA and NYSDOH if the 60 day travel time boundary condition is modified. The protocol will include the standard procedure for obtaining prior approval for operational procedures necessary to maintain the 60 day travel boundary.</p>	12/16/96
401b	<p><b>401 revised.</b> If the 60 day travel time boundary condition is modified, follow the protocol for notification and prior approval of operational changes, as identified in deliverable 401a.</p>	ongoing
402	<p>Croton system water, from the Croton Falls or Cross River pumping stations, or Hudson River water shall not be introduced into the Delaware Aqueduct without prior approval of EPA and NYSDOH.</p>	ongoing
403	<p>Report within 10 days of the end of each month the operational status of Kensico Reservoir, West Branch Reservoir (on-line or by-pass), Hillview Reservoir and whether any of these reservoirs experienced unusual water quality problems.</p>	monthly (10 days)

TASK #	ACTIVITIES REPORTS	DUE DATE/ FREQUENCY
501	<i>Revised, see 501a, 501b. Submit reports within 30 days of the end of each quarter describing activities, including enforcement, in the watershed that affect water quality; and describe any anticipated projects that may adversely impact water quality including how NYCDEP will address them.</i>	quarterly
501a	501 revised. Within thirty days of the close of each quarter, submit a report on NYCDEP activities in the watershed concerning projects and proposed projects that may adversely affect drinking water quality of the New York City water supply. Include reviews of new and remediated septic systems in each watershed.	quarterly
501b	501 revised. Within thirty days of the close of each quarter, submit a report on NYCDEP enforcement activities to protect the New York City watershed. Such report shall include: (a) the inspection and enforcement activities concerning septic systems; and (b) the enforcement activities concerning wastewater treatment plants; and (c) the remediation of leaky sewer lines WOH.	quarterly

TASK #	DISTRIBUTION SYSTEM	DUE DATE/ FREQUENCY
601	<i>Complete. Implement the Standard Operation Procedure (SOP), recommended in EPA's report on NYC's summer 1993 coliform incident, for response to positive coliform until an alternate procedure proposed by NYC is approved by EPA.</i>	3/94
602	<i>Complete. Implement the SOP, recommended in EPA's report on NYC's summer 1993 coliform incident, for operation of Hillview Reservoir until an alternate procedure proposed by NYC is approved by EPA</i>	3/94

TASK #	DISTRIBUTION SYSTEM	DUE DATE/ FREQUENCY
603	<i>Complete. Establish and convene the proposed expert panel to review distribution system operations and water quality, and to advise New York City on what measures to take in order to assure effective treatment and safe drinking water at the consumer's tap.</i>	4/94
604	<i>Revised, see 604a. Complete installation of sampling stations.</i>	12/96
604a	<i>604 revised. (Interim FAD deliverable) Complete installation of sampling stations, obtain approval from NYSDOH for the distribution system sampling stations site selection plan and have sampling stations in operation.</i>	2/97
605	<i>Complete. Submit detailed distribution system map showing pressure zones.</i>	7/94
606	<i>Complete. Install continuous monitoring/reporting equipment at treatment locations, Hillview, and Jerome Park.</i>	6/94
607	<i>Complete. Provide particle monitoring capability at Hillview and Jerome Park.</i>	6/95
608	<i>Complete. Prepare plan for development of distribution system model.</i>	6/94
609	<i>Revised, see 609a. Complete distribution system model.</i>	6/95
609a	<i>609 revised. Continue to improve and update complete distribution systems model.</i>	ongoing
610	<i>In DOH order. Determine feasibility of removing sediments from Hillview Reservoir.</i>	3/94
611	<i>In DOH order. If determined to be feasible, complete removal of sediments from Hillview Reservoir.</i>	9/94
612	<i>In DOH order. Complete design of cover for Hillview Reservoir.</i>	12/95
613	<i>In DOH order. Cover one half of Hillview Reservoir and transmit all water thru covered half.</i>	12/97
614	<i>In DOH order. Cover remaining half of Hillview Reservoir.</i>	12/99

TASK #	DISTRIBUTION SYSTEM	DUE DATE/ FREQUENCY
615	<i>Included in 109e. Submit annual report of cross-connection program at high risk facilities.</i>	4/94 4/95 4/96
901a	<b>New.</b> Submit status report on distribution system activities, including sampling station installation and model improvements.	annually

TASK #	DISEASE SURVEILLANCE	DUE DATE/ FREQUENCY
701	<i>Revised, see 701a. Assure that an active disease surveillance program for tracking the incidence of and gathering relevant epidemiological data on giardiasis and cryptosporidiosis is fully established and funded.</i>  <i>Through this program, New York City shall attempt to establish the endemic rates of these diseases in New York City.</i>	3/94  12/95
701a	<b>701 revised.</b> Continue implementation of the active disease surveillance program for tracking the incidence of and gathering relevant epidemiological data on giardiasis and cryptosporidiosis.	ongoing
702	<b>Complete.</b> Convene the proposed expert panel to advise New York City on examining the relationship between drinking water and any incidence of cryptosporidiosis or giardiasis, in the City. The panel will also review the City's active disease surveillance program and its findings.	3/94
703	<i>Revised, see 703a. Submit reports.</i>	quarterly
703a	<b>703 revised.</b> Submit reports on the status of the Active Disease Surveillance Program for giardiasis and cryptosporidiosis.	quarterly

TASK #	DISEASE SURVEILLANCE	DUE DATE/FREQUENCY
704	New. Provide updates on status of the Drinking Water Quality Waterborne Disease Program projects and activities.	semi-annually (mid-term meeting & end-of-year report)

TASK #	ADMINISTRATION	DUE DATE/FREQUENCY
801	Included in 901a report. Quarterly updates on water quality staffing enhancements, staff training and operator training.	quarterly
802	Complete. FY'93 hiring.	
803	Complete. FY'94 pilot plant design hiring.	
804	Complete. FY'94 hiring.	
805	Complete. FY'95 hiring.	
806	New. Approximately maintain the program staffing level achieved by the end of FY'95. The City must notify EPA and NYSDOH if it determines that a significant reduction in staffing is appropriate.	ongoing
901a	New. Include in annual report an update on water quality staffing enhancements, staff training and operator training.	annually

TASK #	COMPREHENSIVE WATERSHED PROTECTION PROGRAM REPORT	DUE DATE/FREQUENCY
901	<i>Revised, see 901a. Submit by the end of each January an annual report of the results of on-site inspections of the NYC watershed control program.</i>	annually
901a	<p><b>Revised.</b> Submit by the end of each March a comprehensive report describing the status of the watershed protection program as identified under each of the program headings of this Filtration Avoidance Determination. The following sections contain specified requirements for the 901a report:</p> <ul style="list-style-type: none"> <li>• Multi-tiered Water Quality Modeling</li> <li>• Kensico Modeling and Remediation Efforts</li> <li>• Non-point Source Pollution Control</li> <li>• Septic Systems</li> <li>• Watershed Rules and Regulations</li> <li>• Distribution System</li> <li>• Administration.</li> </ul>	annually

TASK #	NEW FILTRATION AVOIDANCE PROGRAM PLAN	DUE DATE/FREQUENCY
902	<i>Revised, see 902a. Submit a new Long-Term Watershed Protection and Filtration Avoidance Program including a report summarizing the effectiveness of each program in controlling non-point source pollution.</i>	09/30/99
902a	<b>902 revised.</b> Submit to EPA a future Long-Term Watershed Protection and Filtration Avoidance Program.	12/15/ 2001

## **ACRONYMS and DEFINITIONS**

### **Acronyms:**

**BMP - Best Management Practices**  
**CAPA - City Administrative Procedures Act**  
**CT - Contact time**  
**E.Coli - Escherichia coli**  
**EFC - Environmental Facilities Corporation**  
**EPA - Environmental Protection Agency**  
**EIS - Environmental Impact Statement**  
**FEL - Final Effluent Limit**  
**FY - Fiscal Year**  
**GIS - Geographic Information System**  
**IEL - Interim Effluent Limit**  
**LA - Load Allocation**  
**MOA - Memorandum of Agreement**  
**MOU - Memorandum of Understanding**  
**NPS - Non-point Source**  
**NYCDEP - New York City Department of Environmental Protection**  
**NYSDEC - New York State Department of Environmental Conservation**  
**NYSDOH - New York State Department of Health**  
**SEQRA - State Environmental Quality Review Act**  
**SPDES - State Pollution Discharge Elimination System**  
**STP - Sewage Treatment Plant**  
**THM - Trihalomethane**  
**TMDL - Total Maximum Daily Load**  
**WFP - Whole Farm Plan**  
**WLA - Waste Load Allocation**  
**WR&R - Watershed Rules and Regulations**  
**WWTP - Wastewater Treatment Plant**

Definitions:

The following terms used in this determination, shall have the meaning set forth below:

"Annual Reporting" means submittal of reports for the previous calendar year, due no later than March 31.

"Catskill and Delaware System" means the Ashokan, Cannonsville, Kensico, Neversink, Pepacton, Rondout, Schoharie and West Branch/Boyds Corner Reservoirs, Lake Gleneida, and the tunnels, dams and aqueducts which are part of and connect the above listed reservoirs and controlled lakes.

"City" means the City of New York, a municipal corporation with its principal office at City Hall, New York, New York 10007.

"East of Hudson" or "EOH" means the drainage basins of the specific reservoirs and controlled lakes of the New York City Catskill and Delaware System located east of the Hudson River in the New York counties of Dutchess, Putnam and Westchester.

"Quarterly reporting" means submittal of reports for the three month period ending the last day of the month prior to the due date, due no later than April 30, July 31, October 31 and January 31.

"Semi-annual Reporting" means submittal of reports for the six month period ending the last day of the month prior to the due date, due no later than January 31 and July 31.

"West of Hudson" or "WOH" means the drainage basins of the specific reservoirs and controlled lakes of the New York City Catskill and Delaware System located west of the Hudson River in the New York counties of Greene, Delaware, Ulster, Schoharie and Sullivan.

All compliance dates are on the last day of the month unless stated otherwise.