



Regulatory Discussion

Paul J. Ponturo, P.E.
Senior Water Resources Engineer, H2M Architects + Engineers

2017

Regulatory Discussion

Paul J. Ponturo, P.E., Senior Water Resources Engineer, H2M architects + engineers

Abstract	33
Source Water Protection: Federal Regulations	44
Sole Source Aquifer (SSA) Designation, Safe Drinking Water Act (SDWA)	44
Water Pollution Control Act and Clean Water Act (CWA) – NPDES Permit System	44
Resource Conservation and Recovery Act (RCRA)	44
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)	44
Underground Storage Tank (UST) Laws and Regulations – 40 Code of Federal Regulations (CFR) 280 and 281	55
Underground Injection Wells - SDWA Authority	55
Source Water Assessment Program – SDWA Authority	66
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)	77
Source Water Protection: State Regulations	77
State Pollution Discharge Elimination System (SPDES)	77
State Superfund Program	88
State Brownfield Program	88
Watershed Rules and Regulations	88
State Pesticide Program	88
Long Island Landfill Law	99
Spill Response Program	99
Major Oil Storage Facility (MOSF)	99
Petroleum Bulk Storage (PBS)	99
Chemical Bulk Storage (CBS)	99
Source Water Protection: Nassau and Suffolk Counties Regulations	1010
Sanitary Code Overview and History	1010
Chemical Storage Tank Approaches	1010
Wastewater Management Approaches	1010
Groundwater Resource Monitoring Activities	11
Open Space, Farmland Acquisition, and Transfer of Development Rights Programs	11
Source Water Withdrawal Regulations	12
Public Water Supply Regulations	13
History	13
Primacy under the SDWA	14
SDWA Drinking Water Standard Setting	14
EPA’s New Regulation Strategy and Possible VOC Group Regulation	15
Emerging Contaminants and Risk Communication	15
State and County Sanitary Codes	15
Conclusion	16
Recommendations for Changes Going Forward	17

Abstract

The Sole Source Aquifer (SSA) system serving businesses and homes where the 2.9 million residents of Nassau and Suffolk live and work requires a complex and interrelated regulatory structure in order to assure that it is properly protected and sustainably-utilized to meet public needs. This discussion will provide an overview of existing Federal, State, and County regulations that address various aspects of the management, protection, and utilization of the aquifer system for Long Island.

The discussion is organized by key topic area (Source Water Protection, Source Water Withdrawal Regulations, and Public Water Supply Regulations) and describes programs both focused broadly on water resource management and protection and those specifically directed towards the Long Island aquifer system. The inter-relationships between levels of government, program authority, and delegated authority of programs are discussed.

Source Water Protection: Federal Regulations

Sole Source Aquifer (SSA) Designation, Safe Drinking Water Act (SDWA)

The Safe Drinking Water Act (SDWA) authorizes the Environmental Protection Agency (EPA) Administrator to determine “that an area has an aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health.” EPA defines such a “Sole Source Aquifer” as one supplying at least 50% of the drinking water for its service area and where no reasonably available drinking water source would be available should the aquifer become contaminated. Nassau and Suffolk Counties were so designated in 1978; Kings and Queens Counties followed in 1984. There are 68 designated SSAs in the United States.

While the designation is significant regarding community planning and awareness, the power designated to the EPA regarding SSAs is limited. The SDWA requires that the EPA Administrator determine that a project incorporating federal financial assistance (through a grant, contract, loan guarantee, or otherwise) will not result in a significant public health hazard through recharge zone contamination of a SSA. Measures to mitigate contamination can be incorporated into project planning.

Water Pollution Control Act and Clean Water Act (CWA) – NPDES Permit System

The regulation of pollutant discharges began with the Federal Water Pollution Control Act in 1948. This Act was significantly reworked in 1972 as Clean Water Act (CWA). CWA authority is statutorily limited to navigable waters. The CWA regulates discharges through a permitting process known as the National Pollution Discharge Elimination System (NPDES). NPDES authority is substantially delegated to New York State Department of Environmental Conservation (NYSDEC), which, under the State Environmental Conservation Law (ECL), greatly broadened its scope to include groundwater discharges.

Resource Conservation and Recovery Act (RCRA)

The Resource Conservation and Recovery Act (RCRA) was enacted in 1976. Its primary purpose was to establish a system for the environmentally-responsible management of hazardous and non-hazardous wastes from point of origin to final disposal point—most commonly referred to as “cradle to grave.” Although not fashioned as a source water protection regulation, aspects of RCRA regarding waste-tracking (manifesting and labeling) and solid waste disposal do facilitate groundwater protection measures and activities. Four federal agencies have specific responsibilities under RCRA, including the promotion of research, regulations for waste management and disposal, and financial aid to states to manage their programs. They include the EPA and the Departments of Commerce, Interior, and Energy.

RCRA authorizes states to develop and enforce their own hazardous waste programs in place of the implementation elements assigned to EPA. Delegated authority is a common feature of many of the source water protection and public water supply programs described in this discussion. All contain an important feature - that delegated regulations must be at least as stringent as their Federal counterparts.

The delegated program in New York State includes a requirement that all Large and Small Quantity Generators over sole source aquifers that store greater than 185 gallons of liquid hazardous wastes at one time have secondary containment for this storage. In addition, Large Quantity Generators of liquid hazardous wastes must have a Closure Plan and close the storage areas in compliance with this plan.

Federal regulations for Underground Storage Tanks (discussed below) are authorized by RCRA.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was enacted by Congress on December 11, 1980. Funded by a tax on the chemical and petroleum industries,

CERCLA established broad EPA response authority over releases of hazardous substances that may endanger public health or the environment. CERCLA accomplished several objectives: (1) it established requirements concerning closed and abandoned hazardous waste sites, (2) it placed liability on those responsible for releases of hazardous waste at these sites, and (3) it provided a cleanup mechanism (through a trust fund) when a responsible party could not be identified. CERCLA response authority includes short-term actions requiring immediate response, as well as remedial actions to reduce dangers that are more significant in the long term. This latter authority is limited to sites placed on the National Priorities List (NPL), commonly referred to as the Superfund List. The NPL was amended in 1986 (Superfund Amendments and Reauthorization Act - SARA) to work out some of the complexities of the original Act and to broaden public participation in the cleanup decision-making process.

Underground Storage Tank (UST) Laws and Regulations – 40 Code of Federal Regulations (CFR) 280 and 281

Nationally, problems involving leaking underground storage tanks (LUSTs), primarily those holding petrochemicals, became groundwater contamination issues in the mid-1980s. Initially, federal efforts were directed at cleanups, through existing Superfund authority. Initial regulations were published in 1988. In 2005, Congress directed the EPA to establish a spectrum of operational, training, and facility requirements. Nassau and Suffolk County and New York (NY) State UST requirements predate these federal requirements and, in some respects, are more restrictive. The State has not sought Federal delegation authority; however, DEC implements all aspects of the program. Nassau and Suffolk Counties are two of five NY counties for which DEC delegated authority for petroleum bulk storage (PBS) management. LUSTs were long recognized as significant groundwater contamination issues well before national regulations came forward; state and local (county) UST management is discussed later.

Underground Injection Wells - SDWA Authority

Injection wells became fairly common in the first quarter of the 20th century, primarily to dispose of wastes from industries such as petrochemical drilling. As defined by the EPA, an injection well is generally any hole that is deeper than it is wide and is used to emplace fluids underground. The Underground Injection Control (UIC) Program was created pursuant to the SDWA in 1974. The EPA regulations under the SDWA are primarily designed to protect groundwater sources of potable supply. Therefore, under the SDWA regulations, the EPA expanded the definition to establish control over 5 classes of injection wells. A sixth class, geological sequestration wells, was established in 2010 to address emerging issues relating to the potential subsurface disposal of carbon dioxide to reduce industrial air emissions. The EPA intent in categorization was to assure that wells with common design and operating techniques would be required to meet appropriate performance measures. Certain basic criteria went into the establishment of these classes, including the types of fluid injected, the method of injection and the depth to which the wastes are injected, and if that strata is being used for potable water supply.

On Long Island, Class V injection wells are most common. These are generally shallow waste disposal wells, septic systems, storm water and agricultural drainage systems, or other devices used to release fluids either directly into underground sources of drinking water or into the shallow subsurface that overlies such sources. In order to qualify as a Class V injection well, the fluids released cannot be a hazardous waste as defined under RCRA. Frequently, Class V injection wells are designed as simple shallow holes or septic tank and leachfield combinations intended for sanitary waste disposal. The “leachfield” concept is an important one, as it has been applied by the EPA to establish Class V categorization (and EPA jurisdiction under the UIC Program) for interconnected leaching systems or systems served by a common distribution point, even if the individual leaching structures do not meet the structural injection well definition of being deeper than it is wide. Under the UIC program regulations, Class V injection wells are “authorized by rule”. This means that Class V injection wells do not (under federal rules) require a permit if they do not endanger underground sources of drinking water and comply with other UIC program requirements - the foremost of which is the submission of basic inventory information.

The Class V classification (and the lack of specific detailed regulation) has been controversial and has led to legal challenges. The main criticism is that Class V injection wells can potentially be used to dispose of other waste categories. Under a 1997 consent decree with the Sierra Club, the EPA was required to evaluate the risk to underground sources of drinking water associated with Class V injection wells. The EPA also was required to determine whether existing federal UIC regulations were adequate to prevent these wells from endangering water supply wells, whether additional federal regulations for any of the well types were warranted, and, if so, how each well type should be regulated. The resulting 23-volume Class V Underground Injection Control Study (EPA/816-R- 99-014, September 1999) summarizes the occurrence and numbers of Class V injection wells of each type. It also covers what is being injected into these wells and how states regulate them. The Class V Report contains sections on six other subcategories of wells: storm water drainage wells, special drainage wells (examples include swimming pool drainage and construction dewatering injection wells), aquifer remediation wells, non-contact cooling water wells, geothermal direct heat wells, heat pump/air-conditioning-return flow wells, and agricultural drainage well and food processing wells.

Two specific types of Class V injection wells - motor vehicle waste disposal wells and large-capacity cesspools, were banned under the Class V Rule promulgated in December of 1999. The EPA recognized that these wells posed the highest risk to underground sources of drinking water (USDW). On June 7, 2002, the EPA published its Final Determination that existing federal UIC regulations were adequate to prevent Class V injection wells from endangering USDW and additional federal requirements were not needed. The EPA has been working directly with both Nassau and Suffolk County health departments in addressing specific categories of Class V injection wells and certain types of businesses. Corrective measures, where needed, are carried out through county health ordinances.

The EPA recognized that the State's Source Water Assessment Programs, which were under development at the time the Class V Report was finalized, also could necessitate the need for further controls. This assumption proved correct. The Suffolk County Department of Health Services considers the groundwater-contributing areas to public supply wells in review of new discharges for two injection well subcategories: sewage treatment effluent wells and large-capacity septic systems.

Source Water Assessment Program – SDWA Authority

The 1996 Amendments to the SDWA required each state to develop a Source Water Assessment Program (SWAP) and complete assessments of the sources of water used by public drinking water systems by May 2003. The New York State Department of Health (NYSDOH) developed the New York Source Water Assessment Plan and ensured that the assessments were completed for all the public water systems. The New York Source Water Assessment Plan was approved by the EPA in November 1999.

The NYSDOH worked with the Nassau and Suffolk County health departments and other interested parties to develop a specific approach appropriate for Long Island. The Long Island SWAP noted that the regional aquifer systems on Long Island had been extensively investigated and assessed and that extensive groundwater resource management and protection efforts have evolved related to Long Island's unique regional setting and hydrogeological characteristics. Because of the technical nature of the approach, the NYSDOH assigned a contractor, Camp, Dresser, and McKee (CDM), to complete initial source water assessments for public water systems in Nassau and Suffolk Counties.

CDM was responsible for specific tasks related to conducting source water assessments on Long Island, such as:

- Review and compile aspects of historical and ongoing ground water management programs.
- Evaluate emerging contaminant issues, relevant well data, inventory of specific contaminant sources, and land use within a well's recharge area.

- Delineate Source Water Assessment and Well Recharge Areas utilizing a refined Nassau-Suffolk Groundwater Model, providing additional detail about the origins of the source water to each well, travel times, and likelihood of contaminant impact.
- Determine each well's susceptibility to contamination by looking at sources of contamination within the groundwater recharge area for a well and considering the likelihood that contamination will reach that well.
- Source water assessments for each well, digital Geographic Information System (GIS) contaminant source, and land use information which were initially intended to be readily-accessible public documents. However, access is somewhat restricted as a matter of security.

Although the federal enabling legislation anticipated that updates to the Assessments would be needed, no further federal funding has been provided. In Suffolk County, the Assessments were subsequently updated as part of the recent Suffolk County Comprehensive Water Resource Management Plan, adding newly constructed wells and updating contaminant inventory information. Full digital-format groundwater contributing area information is forthcoming.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

FIFRA requires the EPA to register a pesticide if it meets certain specific conditions: labelling and application material must be complete and conform to FIFRA requirements and it will work as intended without unreasonable human health or environmental effects.

Although FIFRA does not exist specifically as a groundwater protection regulation, a discussion is appropriate in the context of the objectives of this report. In the United States, no pesticide can be sold or distributed that is not registered under FIFRA. There are a number of types of registrations which reflect on labelling conditions and/or conditions of sale.

FIFRA allows the EPA to delegate certain limited powers to the states. States are permitted to regulate the sale and use of pesticides but cannot impose labelling that conflicts with FIFRA. This provision does not bar ordinances that restrict application or which require pesticide applicators to post notices informing the public of a pesticide application. FIFRA permits State laws such as California Proposition 65, which requires manufacturers and distributors to inform the public that a given product contains a chemical that the State of California has determined causes cancer or birth defects.

Under delegated authority, FIFRA encourages and historically has provided limited funding for Ground Water State Management Plans. The NYSDEC requests additional information on chemical properties of proposed pesticides and has limited use permits with objectives of protecting the State's water resources. This objective is discussed in more detail below.

Source Water Protection: State Regulations

State Pollution Discharge Elimination System (SPDES)

As discussed previously, the NPDES program is delegated to the NYSDEC which administers its own State Pollution Discharge Elimination System (SPDES) pursuant to Article 17 of the ECL ("Water Pollution Control"). SPDES regulations are more extensive than the NPDES requirements in that they control point-source discharges to groundwater as well as the surface water pollution sources authorized by the federal CWA.

Like the CWA, the permit system is directed at maintaining water quality to permit its best use. Under that system, groundwater and surface waters are classified. All fresh groundwater in NY State is classified as GA. An important guidance document of relevance to NYSDEC analytical processes in groundwater protection is the *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (Division of Water Technical and Operational Guidance Series (1.1.1, October 22, 1993

Reissued Date: June 1998)). This document has been effective in helping regulators respond to a number of emerging contaminant issues. For many of these contaminants, *Values* were developed utilizing the NYSDOH's drinking water standards for two broad organic contaminant groups, known as Principal Organic Contaminants and Unspecified Organic Contaminants.

State Superfund Program

Originally enacted in 1979 as the Abandoned Sites Act, Article 27, Title 13 of the ECL predates the federal Superfund program (CERCLA). With amendments in 1982 and 1985 and certain other provisions of the Public Health Law, it provides state legal authority for what is most often referred to as the State Superfund. NY State also cooperates with both counties in their efforts to obtain voluntary remediation at sites with contamination issues that may not rise to the level of qualifying under State Superfund.

State Brownfield Program

In 2003, the New York State Legislature created the Brownfield Cleanup Program (BCP). Administered by the NYSDEC, the program provides a process for voluntary cleanup of sites contaminated with hazardous waste or petroleum. In exchange for the cleanups, the Law provides the applicant with a liability release and tax incentives. Three types of costs can qualify for tax incentives: site preparation costs, tangible property costs, and ongoing on-site water treatment costs for five years.

Watershed Rules and Regulations

Article 11 of the Public Health Law authorizes the NYSDOH to adopt rules and regulations for watersheds within the State. This authorization dates back to 1885, predating the NYSDOH (which was not created until 1900). Watershed Rules and Regulations are considered largely outdated and effectively replaced by other regulations with two notable exceptions: New York City and the City of Syracuse. Both were substantially updated as part of Filtration Avoidance Determinations pursuant to the EPA's Surface Water Treatment Rule.

State Pesticide Program

Under FIFRA, the NYSDEC has been assigned limited authority in the regulation of pesticides. Every pesticide product used, distributed, sold, or offered for sale in NY State must be registered with the NYSDEC Bureau of Pest Management. The *New York State Pesticide Product Registration Procedures* informs potential registrants with the guidelines for product registration submission. The registration period is two years. Prior to registration, products must provide "an overview of the potential for the pesticide product to contaminate groundwater from normal labelled use in New York State (including Nassau and Suffolk Counties) conditions". Given prevailing subsurface conditions, Long Island is usually considered a worst-case scenario for potential groundwater contamination.

The *Procedures* explain a labelling provision known as a Long Island Restriction (Prohibition), which reflects the NYSDEC's evaluation that use of the pesticide, as labelled, would pose an unacceptable risk to Long Island's Sole Source Aquifer.

According an October 2016 search of NYSDEC's New York State Pesticide Administration Database (NYSPAD), 527 product names are listed indicating product labelling not for use, sale, and/or distribution on Long Island (including statewide limitations). The current NYSDEC groundwater management approach to address low detections of pesticide-related compounds is the Long Island Pesticide Pollution Prevention Strategy (LIPPPS). LIPPPS lists 61 pesticide-related chemicals detected in Long Island groundwater at least once between 1996 and 2010 and associated with 47 active ingredients currently registered for use in Nassau and Suffolk Counties. LIPPPS outlines a process to prioritize and evaluate the 47 active ingredients detected in groundwater during this period by the Suffolk County Department of Health Services (SCDHS). An additional 56 pesticide-related compounds associated with 35 active

ingredients are restricted from further use and continue to be monitored. LIPPPS is not focused exclusively on water supply issues; it is one of the ways in which pesticides are evaluated as potential emerging contaminants in the NYSDOH/NYSDEC collaborative efforts in the NY Ocean Action Plan.

LIPPPS incorporates ongoing Workplan activities conducted under the NYSDEC contract with SCDHS. Since 1996, these Workplan activities are carried out pursuant to the Pesticide Reporting Law. Workplans cover sampling activities in both Nassau and Suffolk Counties, water analyses completed by the Suffolk County Public and Environmental Health Laboratory (SCPEHL), and monitoring well installations by the SCDHS Bureau of Groundwater Resources.

Long Island Landfill Law

The Long Island Landfill Law, ECL 27-0704, effectively closed all solid waste disposal by 1990. Currently, there are 6 operating landfills on Long Island, 2 of which are ash monofills. Landfills or expansions are permitted if located outside the deep-flow recharge area. These facilities can accept material that is the product of resource recovery, incineration, composting and downtime waste, and untreatable waste. These landfills require a double-composite liner system with a primary and secondary leachate collection and removal system. Any new landfill or expansion, located within the deep flow recharge area, can accept only clean fill, and must have, at a minimum, a double liner system consisting of an upper geomembrane and a lower composite liner system with a primary and secondary leachate collection and removal system. Clean fill landfills outside the deep-flow recharge area must have a single composite liner system with a provision for leachate collection and removal.

Spill Response Program

In 1978, the State established regulations under Article of the Navigation Law to require prompt cleanup of oil discharges, provide liability for damage and a Spill Fund for cleanup and removal costs. Under this program, DEC responds to, and manages real time emergency spills of petroleum, hazardous materials and non-hazardous materials that range from several gallons to several thousand gallons and oversees all petroleum subsurface investigation and remediation projects by responsible parties or contractors hired with Spill Fund monies.

Major Oil Storage Facility (MOSF)

In 1978, the State established regulations under the Navigation Law for the safe transfer and storage of petroleum at MOSFs. The MOSF program applies to facilities that store a total of 400,000 gallons or more of petroleum in aboveground and underground storage tanks. Facilities must be licensed by the DEC and managed in compliance with applicable regulations for the storage and handling of petroleum. On Long Island, this includes groundwater monitoring at all facilities.

Petroleum Bulk Storage (PBS)

In 1985, the State established regulations under the ECL for the registration, handling, and storage of petroleum. The PBS program applies to facilities that store more than 1,100 gallons of petroleum in aboveground and larger than 110 gallons in underground tanks. All tanks (except in delegated counties) for the storage of petroleum at facilities must be registered with the DEC and managed in compliance with applicable regulations for the storage and handling of petroleum. In October 2015, DEC modified the regulations to consolidate and increase consistency with updated federal regulations. With the modification, the counties must implement changes to their codes to continue with delegation.

Chemical Bulk Storage (CBS)

In 1994, the State established regulations under the ECL listing hazardous substances subject to handling, storage, and release reporting requirements. The CBS program applies to facilities that store a

listed "hazardous substance" in an aboveground storage tank larger than 185 gallons, any size underground storage tank, and some non-stationary tanks. All regulated tanks at facilities must be registered with the DEC and managed in compliance with applicable regulations for the storage and handling of hazardous substances. Unlike the PBS program, CBS authority is not delegated to any local entity and many of the county regulations have been superseded.

Source Water Protection: Nassau and Suffolk Counties Regulations

Sanitary Code Overview and History

Pursuant to Sections 347 and 348 of the State's Public Health Law, county Boards of Health are empowered to promulgate rules and regulations to protect the health and safety that are consistent with the State Public Health Law and its Sanitary Code. The provisions of a sanitary code of a county have the force and effect of law.

While both counties historically enforced regulations aimed at protection of the water resource, these regulations developed over time with increasing knowledge and understanding of Long Island groundwater and its contamination. The most significant and innovative county regulations date to the Long Island 208 Plan in 1978. These new regulatory measures primarily built on the 208 study's development of hydrogeological zones, which opened up regulatory approaches that would cross municipal boundaries and which could better accommodate and respond to innovative land-use approaches such as clustering and transfer of development rights. In addition to the Long Island 208 Plan, the Long Island Regional Planning Board completed a Special Groundwater Protection Area (SGPA) study in 1992. The nine SGPAs consisted of large fairly continuous undeveloped tracts – 2 in Nassau County and 7 in Suffolk County - and received additional planning recommendations.

Chemical Storage Tank Approaches

Suffolk County regulations specifying storage and handling requirements for defined toxic and hazardous materials include Suffolk County Sanitary Code (SCSC) Article 12 (initially adopted in 1979). These regulations cover both new and existing above-ground, in-ground, and indoor storage installations, permitting, inspectional right of access, standards for tanks, associated piping and spill containment, tank testing and tester qualifications, spill reporting, and seizure authority. Timetables for compliance were based upon age; upgrading spill containment and monitoring systems were similarly phased-in as standards were revised. Removal of existing tanks required department inspections which launched remediation by DEC when spills or failures were noted. Article XI of the Nassau County Public Health Ordinance is structurally identical to SCSC Article 12. The Nassau County Fire Marshall regulates flammable material storage.

With the establishment of CBS (non-petroleum) requirements, many of the county regulations have been superseded, except for certain chemicals which fell outside the state regulation. SCSC Article 7 (initially adopted in 1985) provided additional protection to deep recharge and designated water supply-sensitive areas from possible spills and discharges of defined toxic and hazardous materials by restricting the quantities that could be stored in these areas.

Wastewater Management Approaches

SCSC Article 6 (1980) ties communal sewerage requirements to SCDHS standards which limit nitrogen contribution for non-sewered developments to the equivalent of two single-family units per 40,000 square feet in Groundwater Management Zones (GMZs) III, V, or VI and one single-family unit per 40,000 square feet in all other GMZs. For other than single family homes, the SCDHS has provided Article 6 density design-loading rates for a range of common commercial facilities and other residential applications.

A 1995 Article 6 amendment included provisions to permit the transfer of the appropriate Density Equivalent from existing undeveloped open space controlled by the applicant to land proposed for development. The utilization of such transfers has been extensive. Article 6 empowers SCDHS to adopt standards for on-site sewage disposal systems (OSSDS). The Department currently is studying an array of advanced OSSDS systems said to reduce nitrate contribution to groundwater and has proposed Article 19 of the SCSC to register, manage, and oversee such systems in the future as a Responsible Management Entity.

Nassau County Article X (1985) focuses on new subdivisions and a limited range of property redevelopments in un-sewered areas countywide and in the 2 SGPAs designated in Nassau. The approach is similar to that in Suffolk County: aimed at limiting OSSDS to 40,000 square foot lot developments with an additional sewage design flow-equivalency approach to non-residential developments.

Groundwater Resource Monitoring Activities

Each county has operating workgroups charged with groundwater resource monitoring responsibilities. In addition to establishing Departmental authority in public and private (on-site drinking water well systems) water supply oversight and surveillance, Article 4 of the SCSC authorizes the Commissioner to collect and analyze appropriate water, soil, and geological information to determine if water quality is being maintained. It also authorizes the Commissioner to prepare, review, analyze, monitor, and evaluate comprehensive water supply plans and prepare necessary water resources management, as well as numerous other resource management tasks. It also authorizes the Commissioner to take appropriate legal action which may include fines for failure to comply with the intent of this Article. These responsibilities are assigned by the Commissioner to the Bureau of Groundwater Resources (BGR). Under the NY State Sanitary Code (NYSSC) Environmental Health Site Assessment requirements, these are delegated responsibilities and historically have received partial state reimbursement. The Bureau also has assigned responsibilities related to groundwater quality review issues associated with county acquisitions and has investigated groundwater impacts from county activities. This authority has been utilized by the Department to conduct investigatory monitoring of private wells. Private well survey work initially uncovered groundwater contamination from chlorinated solvents in the mid-1970s, water soluble pesticides beginning with aldicarb in 1979, methyl tert-butyl ether (MTBE) in 1990s, and pharmaceuticals in the first decade of this century.

Suffolk maintains drilling equipment for wells up to 300 feet deep. The county's ready access to public rights of way allows the Department to investigate suspected contamination sources for code implementation or formal Superfund applications to state or federal agencies, augmenting on-site inspections as needed. SCDHS builds on existing knowledge by seeking funding sources, such as the State Pesticide Program, and by working cost-effectively with agencies such as the United States Geological Survey (USGS). The BGR is also a repository of the CLEARs (Cornell Laboratory for Environmental Applications of Remote Sensing) mapping which was performed for Suffolk County.

Nassau County activities parallel these responsibilities under the Department of Public Works and usually reflect programmatic directions under Article XII of the County Charter. Like Suffolk County, Nassau County Department of Health maintains a private well program and enforces well construction standards authorized by Article IV of the County Public Health Ordinance. Both counties have experienced continued erosion of inspectional, field support, laboratory analytical capacity, and state and county financial support over the last 10 to 15 years.

Open Space, Farmland Acquisition, and Transfer of Development Rights Programs

Federal, state, county and local municipal governments have had a long history of open space preservation on Long Island. The 208 Study provided a foundation for a broad array of innovative land use and management approaches, prioritizing actions in the designated deep recharge Groundwater Management Zones. In the late 1970s and early 1980s, nearly every town with large tracts in the

designated deep recharge zones selected residential areas for less-intensive uses, re-designated industrial areas for low-density residential uses, and made undeveloped industrially-zoned lands subject to additional requirements involving storage of toxic and hazardous materials. Water recharge-overlay districts were incorporated into zoning categories in Southampton, East Hampton, North Hempstead, and Oyster Bay.

A program for outright purchases of areas of critical environmental significance was approved by voters in Suffolk in 1987 and 1988. A distinguishing feature for properties purchased under this program is that water supply facilities are a designated use and several Suffolk County Water Authority wells have been sited in lands acquired under this program. In 1993, the State Legislature passed the Suffolk County Pine Barrens Act which affected nearly 100,000 acres, adding 20,000 acres to 30,000 public domain acres to form a Pine Barrens Core in which no development would be allowed. The remainder acres, designated a Compatible Growth Area, received the cooperation of individual towns in the development of compatible land use schema. Town/county acquisitions continue in some parts of the protection area and East End towns have designated property transfer tax funding.

Source Water Withdrawal Regulations

Public supplier groundwater withdrawal permit procedures have existed in NY State since at least 1905. Permits for Public Water Withdrawal are currently issued by the NYSDEC pursuant to Article 15, Title 15 of the ECL (Water Supply), and covers Kings, Queens, Nassau, and Suffolk Counties. A new water withdrawal law became effective in August 2011 and regulations were issued in April 2013. These regulations cover the entire state and permits are required for *any* potable and non-potable water withdrawal system having the *capacity* to withdraw 100,000 gallons per day (gpd) or more of surface water, groundwater, or combination thereof.

In 1933, the Long Island Well Permit program, addressing water withdrawals exceeding 45 gallons per minute, was established to regulate most non-public water withdrawals in the four designated counties composing Long Island. This authority even includes relatively short term withdrawals exceeding that rate, such as dewatering activities. It initially required that a well permit be obtained from the Water Power and Control Commission. In 1935, a state well driller certification program for Long Island began, requiring filing of preliminary and well completion reports and certain operational reporting requirements for permittees. Permits for Public Water Withdrawal on Long Island are now issued for a maximum period of ten years, allowing for their modification. The applicant must apply for Permit Renewal at least 30 days before the current permit expiration date. Following review, the applicant receives a "Water Supply - Permit Renewal" letter which contains a permit expiration date extension. The letter is regarded to be an amendment to the original permit and, as such, shall be maintained and available with the original permit copy.

Permits often contain site-specific special conditions, general conditions relevant to water withdrawals, and general conditions applicable to all ECL-authorized permits. Over time, permit conditions also have changed to comply with amendments in the enabling legislation of the ECL, such as forbidding "operation of these works until, as constructed, they have been approved by the Department." Current policy reflects amended NYSDEC regulations, requiring professional engineer's written certification of construction in accordance with the issued permit and requiring proof of issuance of an Approval of Completed Works issued by the local Department of Health before the commencement of final operation.

Subsequent legislative initiatives focused on Long Island public water withdrawals. ECL Section 15-1527 amendments directed that the Department undertake, as part of the permit renewal process, categorization of areas of all Long Island groundwater that are exhibiting stress with respect to quality or quantity. The amendments directed the NYSDEC to re-open, review, modify, or delete permit conditions as necessary to reduce consumption in over-stressed areas. Resulting permit modifications imposed annual pumpage limits on 41 public water suppliers in Nassau County. Collectively, these permit modifications are commonly termed the Nassau "pumping caps."

In 1986, the State Legislature addressed Lloyd Aquifer access. By amending Section 15-128 of the ECL, it established a moratorium on the “granting of new permits to drill public water supply, private water supply, or industrial wells into the Lloyd Sands or to permit new withdrawals of water from the Lloyd Sands.” The moratorium applies “to all areas that are not coastal communities” and requires the NYSDEC to identify which areas of Long Island are to be considered “coastal communities.” ECL Section 1502 defines coastal communities as “those areas of Long Island where the Magothy Aquifer is either absent or contaminated with chlorides.” Exemptions to non-coastal communities can be granted “upon finding of just cause and extreme hardship.” A later amendment bans without exemption “the storage or pumping of water into the Lloyd Sands” which applies to both coastal and non-coastal communities.

Counties and, in some cases, local municipalities exercise some control over a certain range of non-public well applications. Nassau County controls private well water systems under Article IV of the Public Health Ordinance, while Suffolk’s control is under Article 6 of its Sanitary Code; both codes serve to limit proliferation of private potable residential and non-residential wells. Local ordinances focus on well construction, not aquifer system management.

Public Water Supply Regulations

History

Prior to the SDWA (1974), federal jurisdiction over public water suppliers was limited to only water supply systems involved in water transmission across state lines or via modes of interstate transportation. Standards developed for such systems which were created by the United States Public Health Service (USPHS) and were adopted by many states, including NY for in-state control. The USPHS standards for drinking water were first established in 1914, revised from 1925 through 1962, and regulated 28 contaminants. Many of these contaminant standards are still used today. Beginning in 1969, USPHS and the EPA, in 1975-77 surveys of public water suppliers, raised awareness of volatile organics and trihalomethane (THM) disinfectant by-products as emerging contaminants. These national findings prompted the New York State Department of Health (NYSDOH) and county Health Department surveys beginning in 1976, initially for six halogenated volatile organic compounds (VOCs). NYSDOH provided recommended guidance and public wells were removed from service voluntarily by water suppliers. In 1987, the EPA proposed its first “Phase I” VOC Maximum Contaminant Levels (MCLs) for seven organic contaminants ranging from 2 parts per billion (ppb) for vinyl chloride to 200 ppb for trichloroethane. Previously, the EPA formally adopted most of the USPHS standards as drinking water standards.

In 1989, the NYSDOH exercised its right under the SDWA to set MCLs which were more restrictive than those promulgated by the EPA. Amendments to Part 5 of the NYSSC created two broad regulated contaminant groups of organic compounds known as Principal Organic Compounds and Unspecified Organic Compounds (POCs and UOCs, with individual MCLs of 5 and 50 ppb, respectively, and 100 ppb for the total of all POCs and UOCs). The POC definition would prove significant, with an enforceable standard for trichloroethane of 5 ppb (as an MCL), substantially lower than the 300 ppb federal limit. The state MCL informed NY groundwater standards and remediation objectives. By early 1989, 36 Long Island public wells out of nearly 900 wells tested were restricted voluntarily. The POC and UOC contaminant definitions and MCLs proved invaluable as analytical capabilities brought to light occurrence of other contaminants (e.g. MTBE and freons) that would remain unregulated nationally after their initial detection on Long Island or not regulated or receive EPA Health Advisories for some time (e.g., tetrachloroethylene, dichloropropane, and dacthal).

Later SDWA amendments addressed specific issues, such as:

- provisions banning lead solder and revising “lead-free” definitions for plumbing fittings,
- requirements for public water supplier Vulnerability Assessments and Emergency Response Plans,
- promotion of transparency and public accountability,
- revision of the Public Notification process associated with regulated contaminants, and
- Consumer Confidence Reports beginning in 2000.

Primacy under the SDWA

The EPA delegates primary enforcement responsibility (also called Primacy) for public water systems to states and Indian tribes if they meet certain requirements. Under the SDWA, in order to receive and maintain primacy, a state must:

- Have regulations for contaminants no less stringent than the EPA's,
- Have adopted and be implementing procedures for enforcement,
- Maintain an inventory of public water systems,
- Have a program to conduct sanitary surveys,
- Have a program to certify laboratories for regulated water sample analyses,
- Have a laboratory that will serve as the state's "principal" lab that is certified by the EPA,
- Have a program for new/modified systems to have capacity for regulatory compliance,
- Have adequate enforcement authority to compel water systems to comply, to sue in court, to enter and inspect water system facilities, to require systems to keep records and release them to the state, to require systems to notify the public of any system violation of the state requirements, and to assess civil or criminal penalties for violations,
- Have adequate recordkeeping and reporting requirements,
- Have adequate variance and exemption requirements as stringent as the EPA's,
- Have a plan to provide for safe drinking water in emergencies like a natural disaster, and
- Have adopted authority to assess administrative penalties for violations.

A state can take up to two years to adopt a new rule. During this period, the EPA can choose to directly enforce its requirements. This has led to issues, primarily regarding the awareness/communication of a new rule to the regulated community. The NYSDOH historically has selected a process of formally adopting new EPA regulations into its code; other states have adopted some or all EPA SDWA regulations "by reference."

SDWA Drinking Water Standard Setting

As per the current standard-setting process (1996), the SDWA requires three criteria to be met for a contaminant regulation to move forward. It must have an adverse health effect, it must be known to occur in distributed public water at levels and frequency such as to constitute a health concern, and a regulation would have to present a meaningful opportunity for health risk reduction nationally. The SDWA requires that EPA simultaneously propose an MCL (the enforceable Maximum Contaminant Level) and an MCLG (Maximum Contaminant Level Goal) and that the MCLs are set as close to the MCLGs as possible based on use of Best Available Technology (BAT) and taking cost into consideration. The EPA is required to state the BAT as part of any SDWA regulation. The process is addressed by three interlinking regulatory operations timed to occur in overlapping five year cycles: the EPA has developed successive Contaminant Candidate Lists (CCL), Unregulated Contaminant Monitoring Rules (UCMR), and Regulatory Determinations (RD).

The CCL process has been to add contaminant nominees to the prior list, removing only those which have had formal prior Regulatory Determinations. The process is transparent and there are opportunities for contaminant nominations and public comment throughout each of these operational steps. The current CCL4 includes 100 chemicals or chemical groups and 12 microbial contaminants that are known or expected to possibly occur in public water systems.

The UCMR requires public water systems serving over 10,000 people to sample entry points (after treatment) for no more than 30 suspected contaminants in each UCMR cycle. The monitoring program is carried out over a three year period, intended to provide contaminant exposure information required in the Regulatory Determination process. Entry point is a statutory requirement. However, UCMR data, gathered post-treatment, inadequately reflects water supply source waters contaminant occurrence and concentrations. Counties have used Code-derived authority and required source water sampling of

detected UCMR contaminants in performing their own water resource evaluations. UCMRs also provide opportunities for new analytical methods to be evaluated. Because of this, the EPA maintains direct control over UCMR lab approval and quality control. This can restrict the number of labs willing to take on UCMR testing, impacting costs, and discourage the use of utilizing existing laboratory methods to expand the range of analyses performed.

The EPA must make Regulatory Determinations every 5 years for a minimum of 5 contaminants. In three successive actions since 2003, EPA determined not to regulate a total of 24 contaminants and to regulate 1 contaminant (strontium). The American Water Works Association (AWWA) has noted that the EPA faces a huge number of potential contaminants and inadequate evaluative resources. Under these circumstances, the EPA can more easily meet its statutory responsibility for Regulatory Determinations by addressing the “low-hanging fruit” of Candidates that have not been detected often or that have low health significance. Many emerging contaminants have significant exposure routes besides drinking water. Assigning a “relative source contribution” for such a drinking water contaminant is challenging, particularly for one with cancer risks demonstrated through limited animal studies. The slow evaluation process for perchlorate has been a recent challenge illustrating this issue.

The 1996 Amendments require the EPA to review all existing contaminant regulations every six years and to determine if there is a need to revise existing regulations. One contaminant, coliform, has received a revised regulation (revised Rule effective April 1, 2016). Most notably, the EPA is in the process of developing revised regulations for two of the most commonly found chlorinated solvents: trichloroethylene and tetrachloroethylene. Originally, the MCLs for these contaminants were driven by the reliability of analytical detection limits and limited knowledge on effectiveness of BAT. Contaminant studies have since reinforced previous conclusions on health effects, detection limits have been lowered, and BAT systems are attaining excellent reliability.

EPA’s New Regulation Strategy and Possible VOC Group Regulation

In 2010, the EPA began a public process of a new strategy for contaminant regulation, focusing on contaminants as a group. Possible groups for regulation were considered on the basis of: similar health effects or endpoints, removal by common control or treatment processes, common analytical methods, and known or likely co-occurrence. Following an initial review, it was determined that a group of approximately 16 volatile organics (8 currently with EPA individual MCLs) was the most viable group to meet these criteria. A group regulation must still meet the three statutory conditions for any contaminant regulation, and depending upon the final list of contaminants, this may not prove to be a speedy process.

Emerging Contaminants and Risk Communication

Confronted with a growing list of “emerging contaminants” and an increasing number of contaminant detections due to improved analytical methods with lower detection limits, state agencies and public water suppliers are facing considerable challenges in risk communication and public perception. One problem is the finding and required public disclosure of detections of “new” contaminants in the most recent UCMR3 monitoring program. One result is that states have promulgated their own regulations, based on the current state of knowledge. This has led to many differing approaches and MCLs for contaminants, and differing targets for contaminants of concern at Superfund remediation sites. Recent examples can be seen in the conflicts in NY and several other states arising from dramatic changes in EPA advisory approaches to findings of two unregulated perfluorinated organic compounds PFOS and PFOA. Of greater concern on Long Island is the 1,4-dioxane. Although detected nationally in 22% of public suppliers in the UCMR sampling, only 7% of suppliers (336 suppliers) detected levels within an EPA range of levels of concern in at least one sample. Twenty-seven of these 336 suppliers are on Long Island.

State and County Sanitary Codes

NYSDOH is one of 49 state health departments granted SDWA enforcement authority (Primacy) by the EPA and, so, has elected to formally adopt new EPA/SDWA-derived Rules into the NYS Sanitary Code

as they are developed. NYSDOH has delegated to Nassau and Suffolk County health departments a broad range of public water supply regulatory responsibilities. Both counties have adopted their own local codes and have certain specific standards addressing local needs and concerns. NYSDOH has continually met the Primacy requirements of the SDWA. However, the State requirements for publication and public comment are slow and can miss EPA's Rule implementation deadlines. On occasion, this has resulted in compliance issues often relating to water suppliers' lack of awareness of the effective date of a federal rule. Most recently, the NYSDOH has shouldered compliance issues associated with the April 1, 2016 Revised Total Coliform Rule (RTCR) implementation date, although Part 5 incorporation of RTCR has not yet run its course.

As described previously, the NYSDOH has formally adopted some MCLs for contaminants which are not regulated by EPA and also has the POC/UOC definition for state regulation of organic chemical groups. Part 5 establishes discretionary authority allowing monitoring of contaminants and at set frequencies which can differ from that adopted in federal rules. Part 5 also addresses issues of plan approval, completed works approval, and design standards which are not for the most part addressed in federal rules. Part 5 incorporates *Recommended Standards for Water Works* as the basis for approval of public water systems. The sanitary code also incorporates Standards for Water Well Construction. Although cross-connections have been documented as sources of waterborne disease outbreaks, there are no implicit federal requirements for cross connection control. Part 5 has specific requirements and the two counties have their own Code approaches as well. Much of the Sanitary Code is devoted to operational requirements and, perhaps most powerfully, statements referencing the exercise of "due care and diligence" in maintenance and supervision.

Although the NYSDOH had codified operator certification requirements in 2001, Subpart 5-4 of the NYSSC was amended to formalize certain operator certification baseline standards established by EPA pursuant to the 1996 SDWA amendments. In NY State, a county health department is fully authorized to directly enforce Part 5 and adopts its own county administrative code sections to accomplish this.

Suffolk County Sanitary Code Article 4 addresses both public and private water supply systems. Last revised in 1997, the sections pertaining to public supply largely mirror the NYSSC. Nassau County Public Health Ordinance Article VI was last revised in 1987 and contains a number of specific operational requirements for public suppliers. Proliferation of private potable wells in areas served by public water is discouraged by these regulations. Both counties require monitoring programs exceeding the minimum requirements of the NYSSC, but enforceable through the Part 5 discretionary authority in monitoring and regulatory reporting requirements.

Conclusion

Viewed collectively, existing federal, state, and county requirements constitute an effective watershed rule and regulation matrix, equivalent to and often exceeding the regulatory controls exercised over water resources elsewhere in the country. Strong levels of communication, regulatory compliance, and cooperation between regulatory agencies and among water suppliers are necessary in achieving common goals. There has been an ongoing commitment to expanding knowledge of the water resource, emerging contaminant research, and advancement of water supply and treatment technology.

However, as is true of many levels of government, funding limitations have slowly eroded the overall level of commitment in these areas. In addition to the erosion that has come with staffing reduction and loss of funds, there has been a loss of institutional knowledge and capacity due to ageing-out and retirements of specialized staff.

Many of the contaminant occurrence problems experienced by public suppliers reflect legacy contamination by industries that are no longer active or involve chemical storage and use practices that have been curtailed or changed. However, emerging contaminant challenges will likely continue. Some of these "new" problems will be found to be related to newer-developed chemicals that escaped notice of the regulatory agencies. In some cases, emergence of other "new" contamination problems may in fact be the result of lower limits of analytical detection. Regardless, the ability to respond effectively to

determine the extent of these contaminants throughout the system will be needed in order to implement appropriate measures. The absence of effective standard setting and groundwater remediation objectives for these “emerging” contaminants have been a consistent problem for many years.

Recommendations for Changes Going Forward

The following actions are recommended for future consideration:

- Restore and expand existing analytical capabilities at local health department laboratories. Independent laboratory capabilities focused on aquifer evaluation, emerging contaminant studies, development of new analytical procedures, and support of groundwater investigation are regarded as critical functions best directed and undertaken at a local level.
- Expand and enhance public water suppliers’ self-monitoring activities, as appropriate, recognizing the need for these additional monitoring commitments to augment the objectives described above.
- Support local laboratory and trained staff response capabilities to meet the objectives of the New York State Water Quality Rapid Response Task Force currently under development.
- Restore and expand existing county-level test well drilling capabilities in support of the functions described in the previous recommendation. Reliance solely on responsible parties to develop critical information on legacy or ongoing emergency contamination investigation is not desirable.
- Expand and assess a cooperative relationship with the USGS in a manner which optimizes and draws on the strength of local capabilities.
- Restore health department industrial waste inspections to previous levels.
- Develop and expand the new Geographic Information System (GIS)-based water quality database developed by Suffolk County Water Authority for the Long Island Commission for Aquifer Protection (LICAP).
- Commit to continued bi-county updates of water resource management plans. Existing SWAPs should be routinely be updated at some reasonable frequency and should include GIS output.