



Fact Sheet #1

# Watershed-Based Permitting Case Study: Final Permit

## General Permit for Nitrogen Discharges

### Watershed

Long Island Sound

### Permitting Authority

Connecticut Department of Environmental Protection  
(CTDEP)

### Point of Contact

Gary Johnson  
Planning & Standards, Water Bureau, CTDEP  
(860)424-3754  
Gary.Johnson@po.state.ct.us

### Permit Information

[www.dep.state.ct.us/pao/download.htm#watrgp](http://www.dep.state.ct.us/pao/download.htm#watrgp)

### Date Issued

January 1, 2002 (expires on December 31, 2006)

## Background

- ◆ Excessive nitrogen loading causes low dissolved oxygen (DO) in bottom waters of western Long Island Sound in the summer.
- ◆ Publicly-owned treatment works (POTWs) in Connecticut (CT) and New York (NY) are a dominant source of nitrogen.
- ◆ Through the Long Island Sound Study, a 2014 goal of 58.5 percent nitrogen reduction from baseline has been established for CT and NY.
- ◆ CT and NY have formalized the nitrogen reduction program in a TMDL approved by EPA in April 2001.
- ◆ The entire State of Connecticut is within the Long Island Sound watershed.

## Permit Type

- ◆ In CT, a nitrogen general permit has been issued for the 79 POTWs within the Long Island Sound watershed that discharge at least 20 pounds of total nitrogen (TN) per day.
- ◆ Individual permits continue to regulate non-nitrogen pollutants and protect against localized impacts.
- ◆ The general permit allows trading of TN loads.

## Permitting Strategy

- ◆ CTDEP covered all 79 POTWs under one general permit.
- ◆ The permit contains annual statewide aggregate target for each year based on cumulative TN removal as new nitrogen treatment upgrades are brought online each year.
- ◆ The permit also sets annual end-of-pipe permit limits in pounds of TN per day for each POTW, apportioned by plant discharge volume to meet the aggregate state target.
- ◆ In addition, the permit includes the first five-year annual permit limits and final 2014 limit.
- ◆ Under the permit, facilities can purchase or sell nitrogen credits annually based on each facility's performance with respect to their annual limit.

## Permit Overview

- ◆ The Permit became effective, with notification due process, on January 1, 2002.
- ◆ Requirements include scheduled effluent monitoring for flow and TN, reporting to the state on a monthly basis, and operating any installed nitrogen-removal equipment systems.

### **Permit Limits**

- Permit limits pro-rated based on 1997-1999 average discharge volume, assuming equal TN removal needed to meet aggregate state target each year.
- Annual limits are reduced each year and are set well below TMDL requirements to ensure compliance with the TMDL.
- Permit limits are set with the objective of balancing credits sold and purchased to prevent a large deficit or surplus of credits in any year.
- The permit may be reopened and limits adjusted to reflect new information on annual performance and to better balance the credits.

### **Monitoring Requirements**

- POTWs smaller than 10 million gallons per day (mgd) monitor on a weekly basis and larger POTWs monitor twice per week.
- All facilities required to take daily composite samples, flow proportioned over 24 hours.
- In addition, all facilities must monitor daily flow on a continuous basis to calculate average daily flow volume.
- The permit requires reporting on a monthly basis, with reports due by the 15<sup>th</sup> day of the following month.

### **Special Conditions**

- CTDEP equalized end-of-pipe TN loads to account for attenuation, based on watershed location and relative effect on DO in western Long Island Sound, to facilitate the Nitrogen Credit Exchange (i.e., trading).
- TN reductions in watersheds close to the low DO impact zone in the Long Island Sound are more “valuable” than TN reductions from more distant sources that are naturally attenuated.
- Disparity in credit value is the economic engine that makes it attractive for sources close to the problem to remove more nitrogen than the permit requires and sell credits.
- Adjustment also lowers the relative cost of purchasing credits by the more distant sources that may find it less expensive to buy credits rather than upgrade during the early years of implementation.
- Links cost of a TN credit to the statewide aggregate costs (capital and operation and maintenance) for nitrogen removal and will increase over time as more expensive projects are completed.
- Each facility must maintain and operate all nitrogen removal process equipment so as to reduce nitrogen discharges to the maximum extent practicable.

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### **Measures of Success**

- ◆ Progress measured based on monitored loads compared to the permit limit for each year.
- ◆ Compliance achieved by meeting the permit limit or by buying the equalized nitrogen credits if the limit is exceeded. The State will purchase all excess credits generated through the Nitrogen Credit Exchange.
- ◆ Ultimate measure of success is meeting, or exceeding, the wasteload allocation or nitrogen reduction schedule in the TMDL.

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### **Progress Update**

- ◆ Since 1993, CT’s state revolving fund has awarded about \$350 million in grants and loans for POTW upgrades that included nitrogen removal. The nitrogen removal portion of the construction cost about \$90 million.
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- ◆ POTW upgrades to include nitrogen removal have been implemented since 1993 in anticipation of the nitrogen permit with 27 projects completed from retrofits to full upgrades by the end of 2002. Projects are centered around western Long Island Sound where equalized nitrogen loads are more valuable, confirming the economic incentive for projects in the geographic area where they are most beneficial.
  - ◆ The Nitrogen Credit Advisory Board published the second annual Nitrogen Credit Exchange Program on September 25, 2003 to document milestones achieved during the second full year of the program.
  - ◆ Connecticut POTWs discharged an average of 15,840 equalized pounds of nitrogen per day during 2002, 13 percent less than the projected amount of 18,220 equalized pounds per day. The difference between expected and actual performance is largely due to favorable weather conditions (e.g., warm and dry conditions) and the efforts of POTW operators to maximize the nitrogen removal efficiency of existing treatment capacity.
  - ◆ Projected performance for 2003 is 16,955 equalized pounds per day, as a result of improved nitrogen removal through additional nitrogen removal upgrade projects. Based on early data, there will be less difference between actual and projected nitrogen removal during 2003 due to unfavorable weather conditions (e.g., colder and wetter winter and spring).
  - ◆ The cost per equalized pound of nitrogen in 2002 was \$1.65. To remain in compliance with the general permit, 38 municipalities purchased credits at this price for a total cost of \$1,317,223. Nitrogen removal at levels greater than required to comply with the general permit resulted in 39 municipalities selling credits for a total value of \$2,757,323. As stated in the permit, the State purchased all excess nitrogen credits generated during 2002 for \$1,440,100.
  - ◆ The cost per equalized pound of nitrogen in 2003 is likely to increase significantly due to unfavorable weather conditions. Therefore, municipalities that do not provide nitrogen treatment may face higher costs and municipalities that generate nitrogen credits may receive higher payments.
  - ◆ To assist POTWs covered by the general permit, CTDEP provided technical assistance in the form of outreach and training for POTW operators on enhancing nitrogen removal efficiency.
  - ◆ Each facility covered under the general permit participated in a comprehensive evaluation conducted by CTDEP staff. Evaluations included on-site inspections to examine monitoring and nitrogen removal equipment, documentation review, and split sampling.
  - ◆ State of Connecticut explored the expansion of the program to other point and nonpoint sources in an EPA-funded project. Project results are due in late 2003.
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