

IMPINGEMENT AND ENTRAINMENT STUDIES FOR NPDES PERMITTING NRG Energy Inc. Montville and Norwalk Harbor, CT

In 2002, Kleinschmidt Associates was contracted by NRG Energy Inc. to design and implement impingement and entrainment studies required for the renewal of their NPDES permits for Montville and Norwalk Harbor Generating Stations.

Impingement Study

The Montville Station is located in the estuarine portion of the Thames River in Connecticut. Norwalk Harbor is an open coastal facility located on Long Island Sound in Connecticut. The goals of the impingement studies were to estimate the annual number of total organisms (fish and invertebrates) impinged for each unit and use these data to project the maximum possible impingement rates per year based on station operating capacity.

Kleinschmidt designed a one-year impingement study to estimate the significance of impingement and the condition of fish and macrocrustaceans removed from the traveling screens. The studies focused on representative important species such as the winter flounder.

The impingement sampling schedule was conducted weekly during those seasons when the commercially and recreationally important winter flounder were abundant and bi-weekly throughout other seasons. Processing of samples involved the identification, enumeration, and measuring of all fish and macrocrustacean species, as well as recording the physical condition (alive, dead, mutilated) of each organism.

The final impingement report included seasonal species composition, species abundance, size frequency of impinged organisms, survival estimates and projected annual impingement rates based on actual cooling water useage as well as maximum cooling water withdrawal capabilities. Based on Kleinschmidt's recommendation, the fish return was redesigned at Norwalk Harbor to ensure that

organisms removed from the traveling screens alive are safely returned to the receiving waters.

Entrainment Study

The primary goal of the entrainment study was to determine the abundance and diversity of ichthyoplankton entrained through the cooling water intake structures at the facilities. In addition, the data collected were used to estimate equivalent adult losses for the principal entrained species, including winter flounder. A site-specific study plan was developed by Kleinschmidt's team of fisheries scientists and fish protection engineers in consultation with state and federal resource and regulatory agencies. In addition to the required two years of entrainment sampling, the study plan included a two-year evaluation of offshore source water ichthyoplankton communities. The ichthyoplankton samples were processed at Kleinschmidt's Connecticut office and all fish eggs and larvae were identified to the lowest distinguishable taxonomic category and enumerated by life stage.

Following the completion of the field studies and laboratory processing of the samples, a detailed study report including discussion of best management practices for reducing entrainment losses was prepared. The report also included estimates of larval abundances of ichthyoplankton in the source water, annual entrainment estimates for the principal species based on both actual cooling water useage and the maximum cooling water withdrawal capabilities, and estimates of equivalent adult losses for the target species.



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