



State of New Hampshire
Fish and Game Department

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Donald A. Normandeau, Ph.D.
Executive Director

July 29, 1991

Robert Varney, Commissioner
N.H. Department of Environmental Services
P.O. Box 95
Hazen Drive
Concord NH 03301

REF. Draft NPDES Permit
PSNH-Merrimack Sta.
Merrimack River
Bow NH
Permit #NH0001465

Dear Commissioner Varney:

The New Hampshire Fish and Game Department has reviewed the Draft National Pollutant Discharge Elimination System (NPDES) Permit by Public Service Company (PSNH) for the above referenced fossil fuel power station. The Department is providing comments pursuant to the Fish and Wildlife Coordination Act (48 Stat. 401 as amended; 16 U.S.C. 661 et seq.); NH RSA 206:9 and 206:10, as a cooperating agency under the National Environmental Policy Act, and RSA 485-A:8 VIII which states that the division (NHDES) shall adhere to water quality requirements and recommendations of the New Hampshire Fish and Game Department as they pertain to treatment for thermal wastes discharged to interstate waters.

Anadromous Fish Restoration Program

Since the issuance of the present Merrimack Station NPDES permit in 1985, the anadromous fish restoration program for the Merrimack River has proceeded to the point where several thousand river herring and American shad have returned to spawn in the New Hampshire reach of the river. These fish now have access to the Amoskeag impoundment and some herring, under certain flow conditions, can ascend the Hooksett Dam at the western spillway and come in contact with the thermal discharge from the Merrimack Station.

Atlantic salmon are also returning to the Merrimack River in increasing numbers. Already, the number of salmon returning this year has exceeded the total for any previous year. Those salmon that exceed the brood stock holding capacity at the Nashua Federal Hatchery will be allowed to swim upstream or will be transported to spawning habitats within the watershed. Beginning in 1993 a salmon brood stock program, approved by the Policy Committee for the Restoration of Anadromous Fish to the Merrimack River, will be implemented which will result in the release of 1500 large adult salmon, annually, throughout the river system. The objective is intended to increase angling opportunities.

Resident Fish Populations

Improvements in water quality throughout the river system have resulted in an increase in fishing. This demand has been met with the stocking of

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brook, rainbow and brown trout by this Department. The stocking has established popular year-round trout fisheries, not only in the headwaters but from Franklin to Nashua, as well. Smallmouth and largemouth bass are other species which are commonly sought by fishermen. One popular fishing area is immediately below the Hooksett Dam.

Temperature Tolerances of Trout and Atlantic Salmon

Trout and Atlantic salmon are sensitive to warm water temperatures and experience indirect and direct mortality from temperatures in the high seventies and low eighties. Near lethal temperature for brown trout is 27°C (80°F). Mortalities of adult Atlantic salmon can be expected at 28°C (81°F).

The annual environmental reports by PSNH for the Merrimack Station from 1987-1988 and 1988-1989 state that temperatures at sampling station S-4 were recorded on several occasions to be 30°C (100°F) on the surface of the river. Temperatures of 30°C can impede or prohibit the migration of anadromous fish, and are lethal to Atlantic salmon. Station S-4 was originally determined to be that point downstream from the discharge canal at which mixing should not result in a rise of 1°F over ambient river temperatures. The present NPDES permit contains a condition which requires PSNH "to direct and control the plume such that it does not interfere with the passage of migratory fish", which includes Atlantic salmon.

Impingement and Entrainment

The present NPDES permit calls for impingement and entrainment monitoring to be undertaken by PSNH when "significant numbers" of American shad have been restored to the Hooksett impoundment. Although American shad cannot reach the Hooksett impoundment due to lack of fish passage at the Hooksett Dam, this Department has been releasing adult shad into the river above Garvins Falls Dam with the objective of stimulating or increasing the spawning run of shad to the Merrimack River. Many of these relocated adult shad have been observed in the power canal and tailrace of the nearby Garvins Falls Dam, and undoubtedly spawn near the Merrimack Station. Since the operation of the fish ladder at the Amoskeag Dam, river herring have had access to the base of the Hooksett Dam. As stated before, under certain flow conditions the herring can pass over the western spillway and spawn in the Hooksett impoundment. From observations this past May and June, it is estimated that several thousand herring migrated into the Hooksett impoundment.

The permit was amended in 1987 to read that impingement monitoring would be undertaken when flows at the Garvins Falls Dam drop below 900 CFS during any period from July through October. This condition was added during the life of the permit as it became evident in a low flow period in the mid 1980's that impingement had increased. Based on the above, the Department recommends that monitoring be undertaken, annually, from July 1 to October 15, with the objective

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of eliminating impingement and entrainment.

The Department's concerns with the NPDES Permit were brought about by the progress of the anadromous fish restoration program, results of the environmental monitoring for the station, and the current weather conditions. At present, the extended period of little rainfall has resulted in a "worst case" condition. Flows in the Merrimack River at the Merrimack Station have dropped to 700 CFS which are close to 7Q10 conditions. When both units at the Merrimack Station are operating, 444 CFS of the river is withdrawn for cooling purposes. Combined with the present flow conditions, the station diverts over 60% of the river. This withdrawal results in a 2000 foot reach of river between the intake and the discharge canal which receives less than 40% of the flow necessary to support both resident and anadromous fish. In addition, some of the cooling water discharge may be circulating back into the upstream intakes, thereby increasing the thermal impacts to the river.

One of the conditions of the present NPDES permit states that the "Power Spray Module system shall be operated, as necessary, to maintain either a mixing zone station S-4 river temperature not in excess of 69°F, or a station N-10 to S-4 ΔT of not in excess of 1°F when N-10 ambient river temperature exceeds 68°F. All available PSM's shall be operated when the S-4 river temperature exceeds both of the above criteria". The intent of the condition was to afford protection to the fisheries resources of the river. However, a review of the annual reports of the environmental monitoring for the Merrimack Station revealed that on several occasions, the temperatures at S-4 were 9°F to 10°F above ambient. This was corroborated by a letter from your Department to PSNH, dated 12-15-86. On September 21, 1989 the recorded temperature at N-10 was 16°C (60°F), and at S-4 was 39°C (102°F). This reading exceeds the ΔT by 40°F!

Fish and Game Department's Free Flowing Stream Policy

The present operation of the Merrimack Station is inconsistent with the Free Flowing Stream Policy of the Fish and Game Department. This policy, adopted by the Fish and Game Commission in 1981, states that the Fish and Game Department discourages any significant diversions of water which would result in an adverse impact to the fisheries. Although it has not been documented that the above described diversion has an adverse impact, when combined with any thermal impacts, the potential becomes more likely.

Recommendations

The Final Report; Merrimack River Fisheries Investigations 1975-1976 (PSNH) states that "In the absence of specific knowledge concerning the effects of a power plant on American shad and/or Atlantic salmon, ... the permit was modified in 1975 in such a way that cold-water stream standards (FWPCA, 1968), which the thermal component of the plant's discharge may presently violate, would be enforced unless it could be shown within two years, through specific research,

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that less stringent standards will adequately protect the fisheries". Although studies were undertaken to assess the impacts to American shad, studies were never undertaken to assess the thermal impacts on the more temperature sensitive Atlantic salmon.

The Fish and Game Department recommends that as a condition of the new NPDES permit, PSNH undertake studies with the objective of determining if thermal impacts of the operation of the Merrimack Station adversely impact the fisheries of the Merrimack River. The target fish species for any studies will be the adult life stage of Atlantic salmon. The establishment of temperature criteria for the protection of Atlantic salmon will afford protection to all other resident and anadromous fish species of the river. The methodology and time frame for such studies must be jointly agreed upon by PSNH, the Fish and Game Department, Department of Environmental Services, the U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service.

Recently, your staff asked if this Department considered the power canal discharge from the Merrimack Station as "waters of the state", and if so, should the discharges from the station be regulated where the canal empties into the river, or where the outfalls discharge into the canal? The power canal is artificial as it was excavated when the plant was constructed in the 1960's. However, the canal does support fish life despite the fact that it receives discharges from the station. The Fish and Game Department recommends that the question of whether or not the canal is considered "waters of the state" should be determined by the Attorney General.

If you have any questions please contact Ecologist, William Ingham, Jr. at (603) 271-2224.

Sincerely,



Donald A. Normandeau, Ph.D.
Executive Director

DAN/WCI

cc: William Ingham, Jr.
Jonathan Greenwood
Duncan McInnes