Killing both marsh and fish

In 1994 the New Jersey Department of Environmental Protection allowed PSE&G to embark on a mitigation experiment rather than installation of closed-cycle cooling, cooling towers, to fulfill the requirements of section 316(b) of the Clean Water Act. Section 316(b) of the Clean Water Act (CWA) mandates the use of best technology available to minimize adverse environmental impacts of intake structures.

Background
The Salem Nuclear Generating Station has two pressurized water reactors, each nominally rated at 1100 MWe PSE&G operates them and owns 42.59%. Other owners are Philadelphia Electric Co. (42.59%), Atlantic Electric Co. (7.41%) and Delmarva Power & Light Co. (7.41%). All are members of PJM (Pennsylvania-New Jersey-Maryland) Interconnection which supplies NJ, PA, DE, MD, VA and Washington DC.

SNGS is located in Lower Alloways Creek Twp., Salem Co., NJ, on the southern end of Artificial Island, approximately 50 miles NW of mouth of Delaware Bay and 30 miles SW of Philadelphia.

Cooling water intake for Salem's once-through cooling is located at southern tip of Island with 12 "intake cells" (6 for each unit) each with mechanically cleaned trash racks approximately 11 ft wide by 51 feet long with 0.5 inch wide steel bars on 3.5 inch centers. Slot opening is 3 inches. Behind trash racks are vertical traveling screens (3/8 in. mesh) with "Ristroph" type fish buckets and a low pressure spray to wash organisms to a fish return system and high pressure spray to remove "debris'. Fish and debris washed from screens are returned to estuary by sluices at each end of the intake structure.

Water Withdrawal
The are twelve 264 million gallons per day (MGD) pumps for a design withdrawal capacity of apx 3.2 billion gallons per day (GPD). Maximum operation is at a withdrawal rate of 3.024 billion GPD (3,024,000,000 gpd). Intake velocity exceeds 2 fps. Use of cooling towers would reduce withdrawals and associated destruction of organisms by approximately 95%.

Salem Kills Billions of Fish
In a study commissioned by NJ DEP in 1990, Versar consultants made the following statements/findings with regards to the Salem facility:

- "Entrainment, and to a much lesser degree impingement, losses to early life stages of RIS [Representative Important Species] populations are large and are projected to: 1) adversely affect important spawning and nursery functions for RIS, 2) result in adverse changes to the food web of the Delaware Estuary, and 3) adversely affect beneficial uses (i.e., commercial and recreational fishing) of the receiving water body. Plant-related losses are greater than the combined commercial and

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recreational fishery harvest for many of the RIS examined. Continued operation of the Salem NGS, without modification to intake structures and/or operating practices, threatens the protection and propagation of balanced indigenous populations"

- "Only major reductions in entrainment and impingement losses (e.g. greater than 50%) will reduce the risk of long-term population and ecosystem level impacts from occurring" p. VI-4
- Estimated losses in annual net productivity of Delaware Est. populations: 3.5% / 38,969 lb - white perch (age classes 0+ through 6+); 11.6% / 17,909,400 lb - bay anchovy (0+ -4+);
- .1% / 11,448,890 lb - weakfish (0+ - 4+)
- "The potential for long-term population declines of bay anchovy and weakfish is substantial."
- "Plant related losses to forage species (bay anchovy, opossum shrimp, spot) are sufficient to suggest the potential for food web alterations is great "
- "We concluded that the equivalent adult losses for herrings, spot, and white perch exceed the average commercial or recreational fishery for the Delaware Estuary for the period 1975-1980"

Table V-1l - Estimated annual loss (numbers of fish) ("equivalent adult")

- **Herrings (alewife & blueback):** 281,746
- **Atlantic croaker:** 61,100
- **American Shad:** 468
- **Spot:** 305,000
- **Striped bass:** 3,239
- **White perch:** 375,000
- **Bay anchovy:** 842,000,000
- **Weakfish:** 1,120,000

The Killing Goes On

PSE&G's mitigation experiment relies heavily on glyphosate to kill invasive populations of phragmites. 1998 will be the third year of herbicide application by PSE&G to sensitive marsh areas. PSE&G continues these efforts in spite of the fact that valued spartina communities have not yet reappeared. There are alternatives which can and should be used: discing, mowing and use of Integrated Pest Management techniques.

When NJDEP originally permitted this effort, PSE&G had committed to only one application of herbicides in 1996 followed by touch-up efforts in 1997. The initial application was 2,422 acres; the so called "touch-up" was 2,212 acres. In 1998, once again with DEP's blessing, herbicides will be applied to an additional 140 acres (40 acres along the Cohansey River and 100 acres on the Money Island area of Alloways Creek).

According to David Pimentel, Professor of Entomology at Cornell University, while herbicides temporarily kill vegetation, they don't remedy the underlying conditions that favor phragmites. True marsh restoration requires altering the hydrology of the marsh so as to favor spartina -- periodic flooding and drying of the marsh plain.