



Fact Sheet

Salem Generating Station Largest Predator in the Delaware Estuary

According to section 316(b) of the Clean Water Act (CWA), the Salem Nuclear Generating Station's CWA Permit, known as a NPDES Permit, must ensure "that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." For facilities such as the Salem (which has a cooling water intake structure) this means reducing their impingement and entrainment fish kills.

Every year the Salem Nuclear Generating kills over 3 billion Delaware River fish. According to a review of Salem's permit application by the US Fish and Wildlife Service the Salem facility kills 5.5 million weakfish, striped bass, white perch, blueback herring, spot and other fish as the result of impingement. 3,327.9 million fish are lost due to entrainment – that translates into over 3.3 billion.

According to a 1990 review of the Salem facility conducted by Versar, Inc. on behalf of NJDEP, installation of closed cycle cooling (cooling towers) at Salem would reduce its fish kills by over 95%.

In 1994, rather than require PSE&G to install cooling towers, or some technology that would reflect the minimization of impacts that cooling towers could achieve, i.e. reducing their fish kills by 95%, NJDEP allowed PSE&G to embark on a series of paper changes, mitigation experiments and studies. None of the actions required reflected a 95% reduction

in the fish kills inflicted by Salem's cooling water intake structure. In fact, the permit primarily relied on a wetlands mitigation experiment designed to eradicate phragmites using herbicides (much of it applied aurally), burning, mowing and other marsh manipulations to some how fulfill the requirements of 316(b). Such actions are contrary to the clear letter, intent and history of the Clean Water Act as it pertains to fulfillment of section 316(b).

What is Impingement and Entrainment?

Entrainment occurs when organisms are drawn through a cooling water intake structure into the facility's cooling system. Organisms that become entrained are generally relatively small forms of fish and shellfish species. As entrained organisms pass through a plant's cooling system they are subject to mechanical, thermal, and toxic stress. The mortality rate of entrained organisms is high.

Impingement occurs when organisms are trapped against screening devices by the force of the water passing through the cooling water intake structure. Impingement can result in starvation and exhaustion, asphyxiation and descaling.

In either case, a substantial number of the organisms that are impinged or entrained are killed or subjected to significant harm as a result.

Versar, Inc., a consultant hired by NJ DEP, estimated that the total annual fish kills at the Salem intakes translate into fish losses which are over four times the total taken by commercial fishing (bay anchovy and weakfish) in the Delaware Estuary, specifically:

- 30,000,000 lb. per year of bay anchovy and weakfish were the losses due to entrainment and impingement at Salem
- 6,800,000 lb. per year was the total taken for commercial landings (1975-1980)

As explained in the Trenton Times:

"Enough eggs, larvae, and young fish are killed on the plant each year that the potential weakfish population, the most sought after species in the bay, is reduced by 7 percent each year. That is the equivalent of about 11.4 million pounds of weakfish. There would be 1.12 million more weakfish in the bay if the cooling system weren't destroying them." (7/9/90, pg 1)

Salem kills over 3 billion RIS fish a year

Every year the Salem Nuclear Generating Station kills over 3 billion Delaware River fish including:

- Over 59 million Blueback Herring
- Over 77 million Weakfish
- Over 134 million Atlantic Croaker
- Over 412 million White Perch
- Over 448 million Striped Bass
- Over 2 billion Bay Anchovy

(Figures provided are numbers of fish killed. Source: correspondence from US Fish & Wildlife Service to NJDEP, June 30, 2000 relying on PSE&G permit application data)

The outdated once through cooling system at Salem affects six aquatic species that are federally listed as endangered or threatened by the U.S. Fish & Wildlife Service: the shortnose sturgeon; the recently listed Atlantic sturgeon; the Kemp's ridley sea turtle; the leatherback sea turtle; and the green sea turtle are listed as "endangered," while the loggerhead sea turtle is listed as "threatened."

Salem is currently operating under an expired 2001 permit. The June 2001 permit expired on July 31, 2006. However, NJDEP considers the permit administratively extended because the Company submitted a permit renewal application at least 180 days before expiration of the June 2001 permit. This allows Salem to continue to operate under the conditions of the expired permit.



Some basics:

The Salem Nuclear Generation Station (Salem) 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. Behind the trash racks are vertical traveling screens 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 the estuary .

There are twelve 264 million gallons per day (MGD) pumps for a design withdrawal capacity of approximately 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%.