

# Oyster Creek's Environmental Record: A Checkered History

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## *Plant's Fish Kill History and Feasible Solutions*

The plant has had a history of problems since it was opened in 1969, in large part because the 1960s once-through cooling design called for the plant to be cooled by intaking and then discharging water on a daily basis. The plant intakes water to cool the reactor from the Forked River and then discharges the thermal pollution into Oyster Creek. Using pumps, the plant dilutes the thermal discharges to ensure that the temperatures do not exceed its permit limit. Fish are attracted to the discharges because of their warmer waters, and then during planned or emergency shut-downs, they become sitting targets as they are killed off as the water temperature becomes scalding or drops precipitously. In an attempt to amend for its record, the plant entered into a settlement agreement with the state in the 1980s to build an artificial reef to attempt to offset precious fisheries.

The plant has struggled with compliance with its thermal discharge Clean Water Act permit since the 1970s. In a 1975 court ruling – DEP v. Jersey Central Power & Light – the state upheld a DEP fine against the plant for a massive fish kill of upwards of 500,000 menhaden created by a plant shut-down and a plant failure to turn off dilution pumps, which led to a massive fish kill in January, 1972. Over the last decade, the plant has continued this trend. A fish kill of over 1,500 was recorded in December, 1995, after a pump malfunction led to a fish kill. A January, 2000 fish kill was recorded in a Nuclear Regulatory Commission logs as a cold-shock kill. And the September, 2002 fish kill was the largest since 1985.

Documentation of a comprehensive record of fish kill incidents are difficult to find in state records, and recreating a record means relying on state lawsuits and settlements, recollections of local fisherman, recent newspaper articles and Nuclear Regulatory Commission reports. When enforcement action is taken, there is state documentation, but there has not always been a record of enforcement actions. Even the actual counting of fish kills is contested. Local fishermen have often complained of undercounting of the actual magnitude of fish kills, and this has been exacerbated when the plant counted only fish found within the reactor's property perimeter and not those beyond plant boundaries.

Closed-cycle cooling, with installation of cooling towers, has proved as the most effective way to reduce environmental impacts. This proven technology reduces the amount of water needed to cooling a nuclear plant by 95 percent and increasingly has become the industry standard since the passage of the Clean Water Act in 1972. By creating a closed-cycle system, you eliminate the extensive intake and discharge cycle, reducing the threat of fish kills at both the discharge and intake points. Currently, PSE&G's third nuclear generating station at Salem has a closed-cycle system with a cooling tower.

Over a decade ago, in 1990, the NJDEP issued a draft permit, citing environmental destruction of fish and habitat that would have required the Salem Nuclear Power Plant to retrofit their plant with closed cycle cooling towers. Ultimately, the DEP granted a permit that allowed that plant to use a mitigation project to offset their impact on local fisheries. But earlier this month, this mitigation approach was ruled unlawful by the U.S. Court of Appeals for the Second Circuit. Based on this new ruling, the DEP would have new legal grounds to require both the Salem and Oyster Creek nuclear power plants upgrade to a closed-cycle cooling as opposed to relying on mitigation, as both plants have done.

After the last fish kill at the plant, the new plant management cited as causes of the fish kill included “a less than vigorous” approach to complying with the state environmental law; “inaccurate risk perceptions” and “mental shortcuts.” In addition, the state Attorney General’s office reopened their investigation last year after plant workers disclosed that the plant management had ignored their warnings about a plant shutdown before the September 2002 fish kill.

“This method of cooling was chosen in days when we were less environmentally conscious than now. It was purely an economic decision, the cheapest way to cool the plant. This cooling system has created a fish trap of monstrous proportions,” wrote local fisherman Jim White, who lives right off Oyster Creek, in response to a prior fish kill from late 1995.

Mr. White established a dialogue with the former owners of the plant, GPU Nuclear, who conceded in a written correspondence that fish kills event could not be prevented. “Much as we have strived to avoid automatic shutdowns, especially during the colder winter months, they are occasionally unavoidable,” wrote Keith Bromery, a plant spokesman, in a letter from January 5, 1996, in response to Mr. White’s inquiries.

### ***Cooling Water Intake***

While fish kills from thermal discharge events are often the most visible sign of aquatic damage at the Oyster Creek plant, it is not the only one. The plant discharges over 1.2 billion gallons of water a day – where does it come from? From cooling water intakes along the Forked River. However, despite grates over the intakes, this water flushing in creates a giant suction action that brings with it an assortment of aquatic life. Some of it is small – spawn, eggs and young larvae – and flows right through. Some of it is larger – anywhere from large striped bass, white perch and menhaden to endangered sea turtles – and species get pinned on the grate, where they often die from the rush of the oncoming water.

Strong new federal EPA regulations on how the plant takes in the cooling water address this daily fish kill issue and present a sizeable problem for the plant. In the past, they have not been forced to meet strict standards on how much fish –adult and larvae – are killed by the plant’s constant water intake. New federal standards require a 80 percent reduction of the number of adult fish killed – called impingement – against the cooling

intake grate and the number of larvae and spawn killed that go right through the grate – called entrainment. Despite these new protections, a two-year study would be sufficient to gain a new permit for the plant.

Repeatedly in the last year, arguments for once-through cooling systems used by power plants have ruled as inadequate and in violation of the Clean Water Act. Earlier this month, the U.S. Court of Appeals for the Second Circuit ruled that power plants cannot mitigate their responsibilities for fish kills by doing “restoration programs,” and must use technology that does not kill aquatic life in the first place. In a decision in November, 2003, New York’s Department of Environmental Conservation said that the Indian Point nuclear power plant would be required to install a closed-cycle cooling system if it sought a renewal of its license to alleviate the aquatic impact.

Currently, the Oyster Creek plant intakes and discharges discharges 1.2 billion gallons of cooling and dilution water daily. Its water intake, at 1,000 cubic feet per second (which gets up to 2,000 cubic feet per second) represents the force of a medium-sized river. The Salem Nuclear Power Plant, which is considerably larger with three reactors, creates a force of 5,000 cubic feet per second, and intakes over 3 billion gallons of water daily. The annual fish kill impact at Salem is tremendous because of the importance of the Delaware River fisheries and the size of its intake, leading to estimates of 845 million fish a year to 3 billion killed. Prior to the NJDEP issuing a draft permit requiring cooling towers at Salem, they commissioned an environmental impact study by the Versar Associates that documented the impact of impingement, entrainment and unnaturally high thermal discharges. It was on the basis of this study that led the DEP to recommend using best available technology to reduce the ecological impact.

The plant has also developed a record of killing threatened and endangered species, specifically sea turtles, over the last 10 years. Even though the plant is allowed a certain quota of “takings”, it has exceeded its allowance. From 1992 to 2000, the plant recorded 17 captures of sea turtles and six mortalities. A 2001 report on the issue found discrepancy in the kills that were reported in the Nuclear Regulatory Commission register and those kept in archives, and cited the “inconsistent and erratic availability of data on sea turtle captures at Oyster Creek underscores a wider unreliability of information supplied to the public.

### ***Thermal Plumes***

Even the current thermal discharges allowed at the plant have every-day environmental impacts on aquatic life in Oyster Creek and the wider Barnegat Bay. The discharge creates a thermal plume that travels much farther than the outfall, creating a “fry” zone for young larvae and spawn. In addition, the Nuclear Regulatory Commission has cited studies that indicate the thermal plume has increased the population of tropical wood-boring species, that serve as aquatic termites for boat bottoms in the Barnegat Bay.

Research from as far back as the 1970s has documented the impact of thermal pollution on fish species, including the Oyster Creek Site. The thermal plume has been documented

by infra-red flyovers by the EPA, and extends from the mouth of Oyster Creek to across the entire width of Barnegat Bay, a distance of over four miles.

“Since temperature is one of the major factors regulating spawning behavior in fishes, early spawning within a plume can result in loss of larvae when they drift out of the thermal plume and enter the cold region surrounding it,” according to a study published by two state biology professors in the *Underwater Naturalist*.

Again, the study by the Versar Group, the consultants used by the DEP at the Salem plant found that one of the main ecological impacts was the unnatural temperatures of the thermal plumes. These findings – that thermal plumes create a destructive ecological impact – has been documented at once-through cooling plants across the country, most dramatically at the El Diablo plant in California. More examples of this problem are documented by the 2001 report, “Licensed To Kill,” issued by the Humane Society and the Nuclear Information Resource Service.