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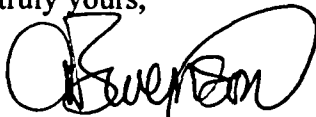
United States Nuclear Regulatory Commission  
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Washington DC 20555

Subject: Oyster Creek Generating Station  
Docket 50-219  
Non - Routine Environmental Operating Report

On January 29, 2006, the Oyster Creek Generating Station plant was secured to facilitate performing maintenance on a recirculating water pump. This resulted in a minor impact to cold sensitive fish, which was reported to New Jersey Department of Environmental Protection (NJDEP) in accordance with the New Jersey Pollutant Discharge Elimination System permit. The results of this occurrence are detailed in the enclosure to this cover letter.

If you should require any further information, please contact Ms. Kathy Barnes, of my staff, at 609.971.4970.

Very truly yours,



C.N. Swenson, Vice President  
Oyster Creek Generating Station

CNS/KB/MEB

Enclosure

cc: New Jersey Department of Environmental Protection (3 addressees)  
NRC Administrator, Region I  
NRC Senior Project Manager  
NRC Senior Resident Inspector

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**OYSTER CREEK GENERATING STATION  
PLANT SHUTDOWN MONITORING REPORT**

AmerGen Energy Company, LLC  
February 2006

## **Executive Summary**

During the morning of Wednesday January 25, 2006 Oyster Creek Generating Station (OCGS) was operating at 100 % power. At 8:45 AM Wednesday January 25, 2006, Oyster Creek reduced power to 50 % power, when a recirculation pump motor experienced an electrical problem.

Recirculation pumps continuously pump cooling water through the reactor. The plant can operate safely at reduced power with three reactor recirculation pumps. However, OCGS Technical Specifications require that the station operate at reduced power if only three reactor recirculating water pumps are available. The plant is most reliable when all five pumps are operable. Therefore, the decision was made to complete repairs to both defective recirculating pumps as soon as possible, which requires a complete shutdown of OCGS.

On January 26, 2006, AmerGen contacted USNRC and NJDEP and informed them of the proposed shutdown, termed the 1FO9 Outage, and actions the station was taking to minimize the effects of the shutdown on the fish populations. Because post-shutdown discharge canal water temperatures could be below the lower lethal temperature of some of the fish in the discharge canal, actions were taken intended to mitigate the potential consequences of possible cold-shock effects on the fish population. The environmental protection plan for 1FO9 included lowering reactor power at a slow rate of approximately 1 degree F / hour, so that the rate of change of discharge canal water temperature would not stress the fish within the canal. Additionally, the environmental protection plan included extensive plans to maintain water temperatures in a portion of the discharge canal as high as possible during the plant shutdown in order to provide a thermal refuge for the fish. Two temporary portable boilers, each of approximately 6.7 MBTU/hr capacity, were used post-shutdown to heat water and cycle it through heating coils submerged in the OCGS discharge canal. Two concentric booms were arranged in a manner intended to contain most of the heated water in one area of the canal, while allowing free movement by the fish into and out of the heated area.

A gradual shutdown from 50% power was commenced during the morning of January 28, 2006, and the OCGS achieved 0% power at 10:30 PM. Although no stressed or dead fish were observed immediately, dead bluefish began to be observed at 4:40 AM on January 29, 2006. Timely notifications of this event were made to NRC Region 1 as well as NJDEP. A few additional dead fish were collected as late as February 3, with a total of 80 dead fish being collected. Over 97% of the dead fish were bluefish, and one specimen each of scup and gizzard shad were also collected.

Attempts were made prior to the plant shutdown to identify what fish species inhabited the discharge canal. The fish protection and identification efforts were supplemented by extensive efforts using a variety of gear to remove for beneficial use from the discharge canal any cold-sensitive fish such as bluefish that would be most at risk for cold-shock subsequent to shutdown. Furthermore, a beneficial use for those fish subject to cold-shock was planned by arranging for the processing, freezing and subsequent donation of those fish to a local aquarium. These efforts

resulted in over 400 pounds of frozen fish filets being prepared and donated to a local aquarium. AmerGen's extensive measures to achieve a beneficial use of the natural resources at risk was commended by NJDEP Conservation Officers witnessing the efforts to be an unprecedented level of environmental stewardship. The donated fish filets were primarily bluefish, as well as lesser numbers of spotted sea trout and weakfish. Because of the extensive and proactive actions of station personnel, the potential extent of cold shock on fish in the discharge canal and magnitude of detrimental environmental impacts was effectively reduced.

## **Introduction**

This report documents the results of aquatic sampling conducted by AmerGen Energy Company, LLC (AmerGen) prior to and following a cold-shock event which occurred between January 29 and February 3, 2006, in the discharge canal of Oyster Creek Generating Station (OCGS), subsequent to a forced maintenance shutdown of the plant. The objectives of the sampling program were to:

- 1) Determine the species composition, relative abundance and distribution of fishes in the OCGS discharge canal prior to and following the OCGS shutdown,
- 2) Remove from the discharge canal those fish that may be at risk of cold-shock for beneficial use (i.e., subsequent donation), and
- 3) Quantify the extent of any fish mortalities.

The monitoring effort took place from January 28 through February 5, 2006.

During the morning of Wednesday January 25, 2006 Oyster Creek Generating Station (OCGS) was operating at 100 % power with four circulating water and two dilution pumps in operation. At 8:45 AM Wednesday January 25, 2006, Oyster Creek reduced power to 50 %, because two of the station's five reactor recirculation pumps were inoperable. A gradual shutdown from 50% power at a rate of only about 1 degree F / hour was commenced during the morning of January 28, 2006, and the OCGS achieved 0% power at 10:30 PM.

## **Discharge Canal Monitoring Activities**

Fish were collected from the discharge canal subsequent to the plant shutdown using dip nets by environmental consultants. Dead fish were gathered from a small boat, as well as by personnel walking along the discharge canal banks between the OCGS discharge and the bay front beaches near the mouth of Oyster Creek.

The results of the monitoring effort indicated that a total of 80 fish representing three different fish species died during this plant shutdown event. Most of the stressed or dead fish were bluefish that were collected from upstream portions of the discharge canal and shallow cove areas between the U. S. Route 9 bridge surface water and the mouth of Oyster Creek. The fish captured were identified, enumerated, and length ranges were determined for each species.

Bluefish Pomatomus saltatrix (n = 78) accounted for 97.5% of the mortalities. Northern scup Stenotomus chrysops (n = 1) and gizzard shad Dorosoma cepedianum (n = 1) accounted for the remaining 2.5%. The bluefish collected ranged from 410 to 860 mm (16.1 to 33.8 in) fork length (FL). The Northern scup specimen collected during this event was 247 mm (9.7 in) FL, and the gizzard shad was 195 mm (7.7 in) FL. Invertebrates were not involved in the event.

## **Discussion and Conclusions**

The evidence indicates that the observed fish mortalities on January 29, 2006 and the days immediately thereafter were caused by cold-shock. These fish, primarily bluefish, were residing in the heated condenser discharge of the OCGS and the discharge canal at the time of the plant shutdown. They were probably attracted to the elevated temperatures in the discharge canal during summer or early fall, and remained there. The death of these fish is consistent with what is known about their thermal tolerances, lower lethal temperature limits and past observations of cold-shock events.

As part of an extensive fish protection plan for this shutdown, two temporary portable boilers were used post-shutdown to heat water and cycle it through heating coils submerged in the OCGS discharge canal. Two concentric booms were arranged around the heated water in one area of the canal, allowing free movement by the fish into and out of the heated area, as well as providing a limited area of heated water as a thermal refuge for the fish. Observations made with an underwater camera confirmed that the heating boilers and heating coils attracted relatively large numbers of fish at various times during and following the reduction in plant discharge temperatures. Use of the underwater camera also allowed a determination of what cold-sensitive species were present in the discharge canal. This information was useful in targeting these fish for selective removal for subsequent donation to a local aquarium for use as fish food.

The January 29, 2006 plant shutdown event resulted from the inability of some of the fish species inhabiting the OCGS discharge canal to tolerate the relatively cold water temperatures they encountered in the discharge canal subsequent to shutdown of the plant. Intake canal temperatures were about 2.8 °C (37.1 °F), at the time of the OCGS ramp down on January 28 (Figure 1). The Main Condenser discharge temperature at the time of the shutdown was approximately 11.1 °C (52 °F), resulting in a delta T of about 8.3 °C (15 °F). The gradual decrease in discharge canal temperature that occurred following the OCGS shutdown (Figure 1) appears to have been effective in protecting all but the most cold-sensitive species. The discharge canal temperature decreased to about 3.4 °C (38.2 °F) at the Route 9 Bridge surface water about thirty hours after the plant shutdown, then remained below 8.9 °C (48 °F) until after the OCGS power ascension began early during the morning of February 5 (Figure 2).

At OCGS, several fish species collected during this event (including bluefish, Northern scup and gizzard shad) have been involved in cold shock events on previous occasions. However, large numbers of striped bass and a few winter flounder were observed to be within the discharge canal but appeared to be unaffected by the post-shutdown water temperature changes.

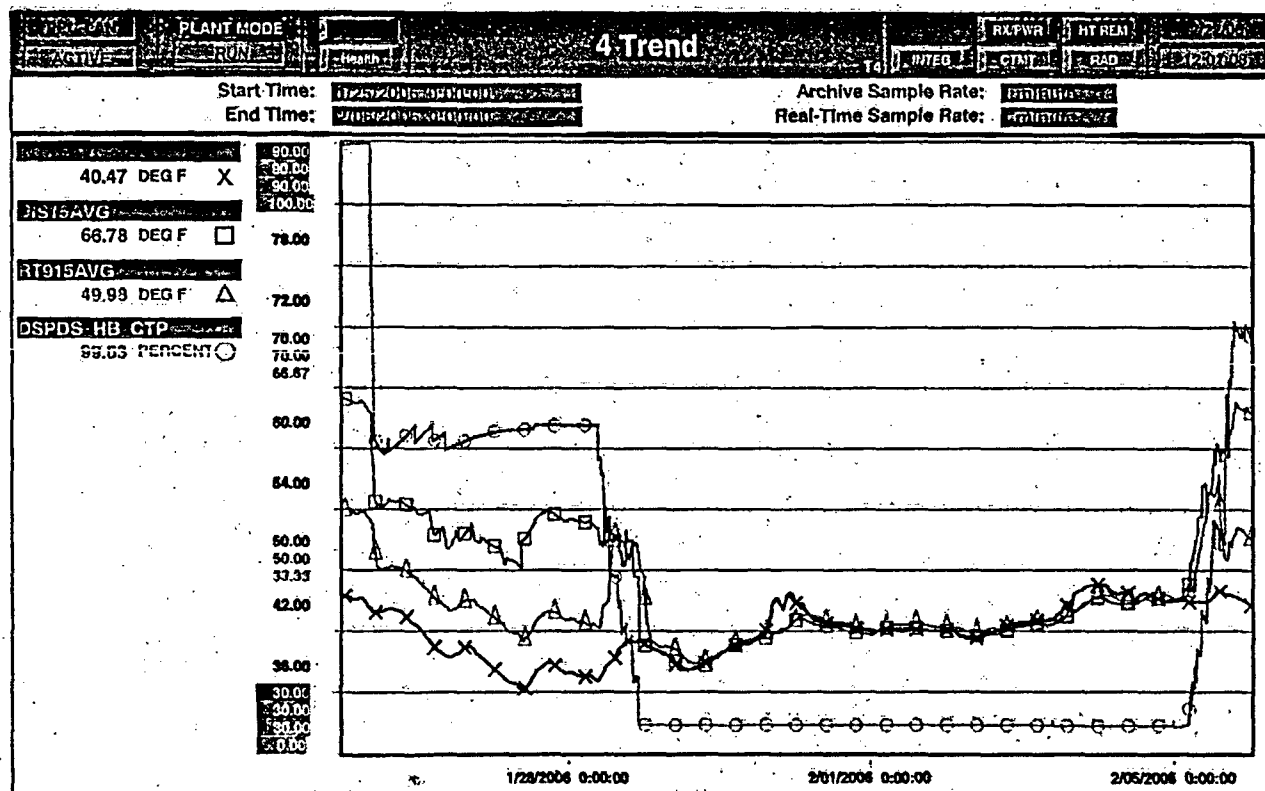


Figure 1

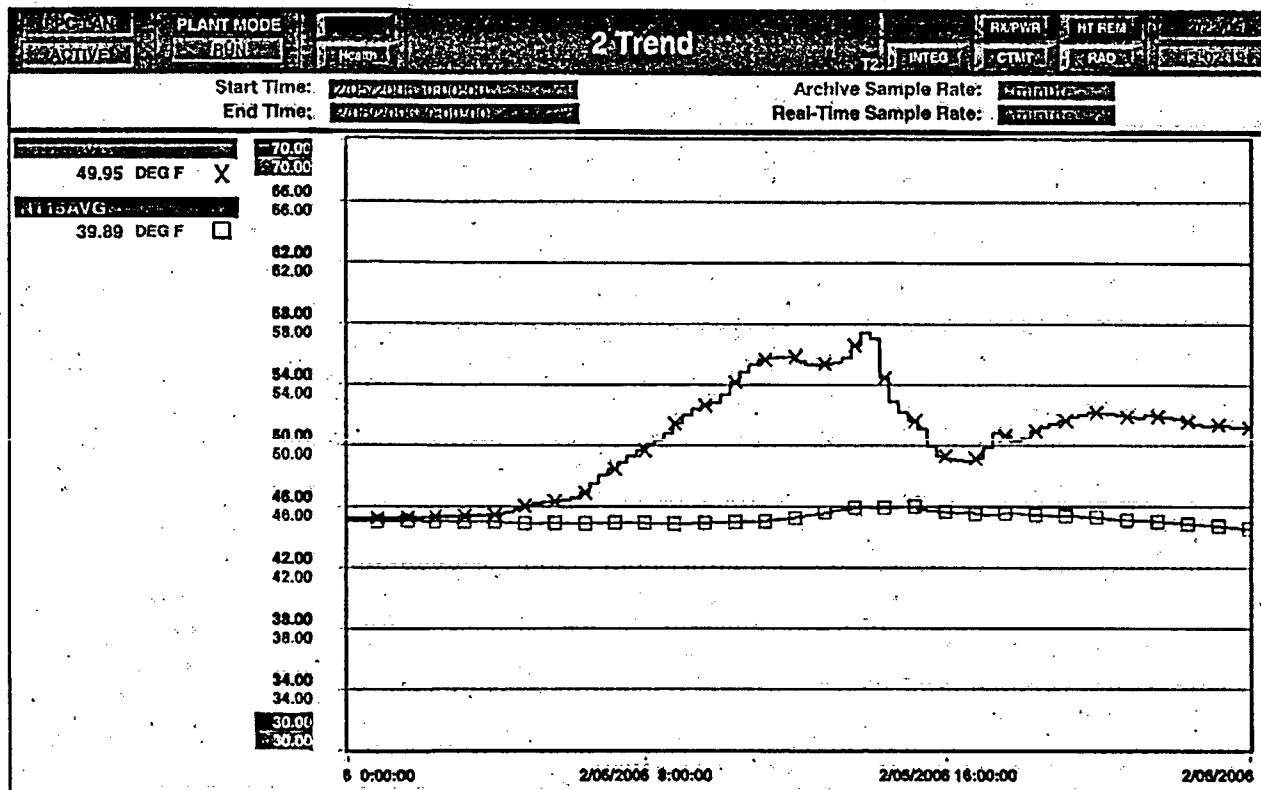


Figure 2