U.S. ATOMIC ENERGY COMMISSION

DIRECTORATE OF REGULATORY OPERATIONS

REGION I

RO Inspection Report No: 50-219/74-01 Docket No: 50-219

Licensee: Jersey Central Power and Light Company License No: DPR-16

Oyster Creek Priority:

Category: C

Location: Forked River, New Jersey

Type of Licensee: BWR, 1930 MWt (GE)

Type of Inspection: Special, Announced

Dates of Inspection: January 11-12, 1974

Dates of Previous Inspection: December 26-28, 1973

Reporting Inspector: Edward G. Greenman 2/1/74
E. G. Greenman, Reactor Inspector

Accompanying Inspectors: J F Stohr 2/6/74
J. P. Stohr, Senior Environmental Scientist

Other Accompanying Personnel: K. Abraham, Public Information Officer
J. W. Reintjes, Fishery Biologist, Atlantic Estuarine Fisheries Center

Reviewed By: D. L. Caphton 2/5/74
D. L. Caphton, Senior Reactor Inspector

B1643

SUMMARY OF FINDINGS

Enforcement Action

A. Violations

None

B. Safety Items

None

Licensee Action on Previously Identified Enforcement Items

Not inspected

Design Changes

Not inspected

Unusual Occurrences

A fish kill resulted when the plant was shutdown January 11-12, and the water temperature was lowered. (Details, Paragraph 5)

Other Significant Findings

A. Current

Unidentified leakage into the drywell - Increasing leakage was attributed to condensate drain valve packing. (Details, Paragraph 4)

B. Status of Previously Reported Unresolved Items

Not inspected

Management Interview

A management interview was conducted on January 12, 1974 with representatives of JCP&L, GPU, and State of New Jersey representatives to discuss plans related to surveys to be conducted on January 14, 1974 for the purpose of estimating the number and types of fish killed.

DETAILS

1. Persons Contacted

D. L. Reeves, Chief Engineer
J. L. Sullivan, Operations Engineer
E. J. Growney, Technical Engineer
R. L. Stoudinour, Staff Engineer
D. Weigle, Engineering Assistant
L. Drummond, Quality Assurance Specialist
R. Douglas, Life Scientist (GPU)
P. E. Hamer, N. J. Division of Fish, Game and Shellfisheries
R. R. Younger, Resource Management
F. B. May, Resource Management

2. Loss and Records

The following logs and records were reviewed without comment and for the periods indicated except as noted elsewhere within this report.

a. Station Log Book January 10-12, 1974
b. Bridge Temperature Readings January 10-12, 1974
c. Reactor Coolant Leakage Indication January 1-11, 1974

3. Operations

a. Power Data

Prior to the plant shutdown commencing at 10:05 p.m. January 11, 1974, the reactor was operating at a nominal 1820 MWt. The stack release rate was about 21,700 µCi/sec. Offgas rates were about 95,700 µCi/sec.

b. Scheduled Shutdown Sequence

Records reviewed and direct observations by the inspectors indicated the Oyster Creek shutdown sequence was as follows:

January 11	4:45 p.m.	Started Drywell Purge
	9:55 p.m.	System released plant
	10:05 p.m.	Load reduction started
January 12	1:05 a.m.	No. 1 Dilution pump off
	1:06 a.m.	1-4 circulating water pump off
	1:06 a.m.	Generator at 450 MWe

1:20 a.m. Reactor at 1317.6 MWt = 68.27%
3:21 a.m. MSIV valve closure testing
5:00 a.m. Reactor at 644 MWt
6:18 a.m. Turbine off line at ∿ 100 MWe
8:00-12:00 a.m. Reactor cooldown proceeding at approximately 50°/hour.

c. Discharge Canal Temperatures

Recorded temperatures as obtained from plant charts at 11:15 p.m. January 11, 1974, showed an inlet temperature of 35°F, discharge temperature of 55°F, and temperature at the U. S. Route 9 bridge (discharge canal) of 45°F. Records indicated that bridge temperatures prior to, during and following plant shutdown were as follows:

Date	Time	Indicated Temp	Actual Temp
11-11	5:00/p to 12:00 mid	42.5°F	45°F
11-12	12:30/a	42	44.2
11-12	1:00/a	41.5	43.5
11-12	1:30/a	41	43
11-12	2:00/a	40.5	42.5
11-12	2:30/a	46	48.8
11-12	3:00/a	46.5	49.5
11-12	3:30/a	46.5	49.5
11-12	4:00/a	45	47.7
11-12	4:30/a	43	45.5
11-12	5:00/a	42.5	45
11-12	5:30/a	42	44.2
11-12	6:00/a	41.5	43.5
11-12	6:30/a	41.5	43.5
11-12	7:00/a	39	41
11-12	7:30/a	37.5	39.5
11-12	8:00/a	37	38.5
11-12	8:30/a	36	37.5
11-12	9:00/a	34.5	36
11-12	9:30/a	34.5	36

4. Reactor Coolant

Reactor Coolant System Leakage

The inspector reviewed licensee leak detection records for the period January 1-11, 1974. The drywell floor drain sump and equipment drain tank provide the primary means of leak detection. Unidentified leakage is collected in the drywell floor drain sump and measured via a

totalizing meter. Records indicated unidentified leakage between January 1-10, 1974, increased from 2.05 gpm to 3.05 gpm. Identified leakage sources averaged approximately 4.0 gpm for this time interval. The licensee was taking leakage rate data on a two hour basis on January 10-11, 1974. Measured leakage (unidentified) varied from 2.78 to 4.13 gpm. The source of leakage was attributed to a leaking condensate drain valve for Isolation Condenser B, No. V-14-37, which was identified on the afternoon of January 11, 1974, when test equipment was installed. Between 1:00 p.m. and 9:00 p.m., January 11, 1974 unidentified leakage varied from 3.47 to 2.87 gpm. No change in identified leakage was observed. Technical Specification 3.3.D requires the reactor to be placed in the cold shutdown condition if unidentified leakage exceeds 5 gpm and additionally if total leakage exceeds 25 gpm. Records reviewed indicated the referenced limits were not exceeded.

5. Environmental

Fish kill

The inspectors met with licensee representatives on the evening of January 11, 1974 to discuss the method in which the plant would be shutting down and the possible subsequent fish kill due to lowered temperatures in the discharge canal. (Paragraph 3 provides data on the: rate of decrease in power level; mode of circulating and dilution pump operation; and temperatures recorded for plant intake and discharge and at the Route 9 bridge).

At approximately 2:00 a.m. the inspectors toured the canal area at the plant discharge and observed a considerable number of menhaden congregated at the plant circulating water discharge point. There were no signs of distress in the fish observed.

From approximately 8:00 a.m. until 10:30 a.m. on January 12, 1974 the inspectors toured the discharge canal area, from the plant to the lagoons near the point where the canal empties into Barnegat Bay. At that time several dozen bluefish and a few menhaden were observed dead along the canal. The RO:I consultant also accompanied the inspectors during the later portion of this period. (RO:I Consultant's report is included as Attachment 1.)

At approximately 11:00 a.m. the inspectors returned to the area of circulating pump discharge at the plant and observed a large number (several hundred) of menhaden congregated in an area of relatively

still water at the dilution pump discharge point. (See Exhibit 1 which shows three photographs of this.) The inspectors were accompanied at this point by a representative of the State of New Jersey. Dilution pumps were off. Occasionally a fish was observed to be in distress, then rise to the surface, and subsequently sink to the bottom - apparently in the act of dying. (See Exhibit 2 which shows two photographs of fish in distress. The water temperature in this area was measured by the licensee's consultant and found to be 38°F as compared to 36°F at the circulation pump discharge.

At approximately 1:30 p.m. the inspectors again toured the discharge canal in the area of the Route 9 bridge. At this time menhaden were observed to be dead and dying in this area of the canal. People were along the banks catching the fish in distress and placing them into pails, etc. This action continued for several hours. The inspectors met with the RO:I consultant, and it was decided that the RO:I consultant would remain at the facility to (1) observe subsequent development, and (2) participate with State of New Jersey personnel in sampling to be done on January 14, 1974. Based on discussions with all those involved, the indications at this time were that this fish kill was not as extensive as the previous winter fish kill in January 1973.

On January 15, 1974 the RO:I consultant reported to the inspectors that, based on his observations, he estimated that about 10,000 fish had been killed with all but a few dozen being menhaden. It was noted, however, that the majority of the menhaden were 12 to 14 inch adults, as compared to the January 1973 fish kill in which the menhaden had been primarily juveniles.

Attachment 1

FROM: John W. Reintjes, Fishery Biologist
Atlantic Estuarine Fisheries Center

Trip Report: Oyster Creek Nuclear Electric Generating Station,
January 11-15, 1974

January 12 -

9:00 A.M. Noticed about 10 large menhaden dead or flopping along the south bank of Oyster Creek near Highway 9 bridge. Two fishermen emptied a bag with 10 bluefish, 9-14 inches fork length, and 5 menhaden, 8-11 inches fork length. They said the fish started to show distress about 5 A.M. and they had gotten all the bluefish but not all the menhaden. They estimated that there were 10 times as many menhaden as blues.

9:30 A.M. Went out in boat operated by Resource Management Incorporated, (RMI), Cruised down Oyster Creek to the entrance to Barnegat Bay. Saw a few menhaden along the bank and saw several fisherman pick up a couple of fish near the entrance. They said they had a couple bluefish but saw mostly menhaden.

Another RMI boat was looking for fish along the bank. They reported the following:

Buoy No. 6 (at entrance) 43°F top and 36° bottom.

Said very few fish seen, all menhaden, along the bank.

11:00 A.M. Contact reported 45°F about 1-1/2 feet below surface by the Sand Point Marine recording thermograph.

11:30 A.M. Most of those that met later in the conference room went to the discharge structure. Several hundred large menhaden were schooled and swimming in the dilution pump discharge bays. One or two circulating pumps were on in the plant discharge bays with a noticeable flow entering the canal. It was supposed that the menhaden were clumped in the dilution bays because the water was stagnant and warmer.

Bay with menhaden 38°
Near barrier log outside bay 37°
In flowing water from plant discharge 36°

Some of the menhaden were in distress and occasionally one would turn on its side and settle out of sight toward the bottom.

12:00 Noon. Went to the power plant conference room and discussed mutual plans.

In attendance were:

E. J. Growney	Technical Engineer	JCP&L
Robert L. Stoudnour	Staff Engineer	JCP&L
Douglas R. Weigle	Engineering Assistant	JCP&L
Russel J. Douglas	Life Scientist	GPU Serv. Corp.
Roy R. Younger	Biologist	Res. Mgt. Inc.
Frederick May	Technician	RMI
J. Phillip Stohr	Environmental Scientist	AEC Region I
Edward G. Greenman	Reactor Inspector	AEC Region I
Karl Abraham	Public Information Officer	AEC Region I
Paul E. Hamer	Principal Fisheries Biologist N. J. Div. Fish, Game and Shellfisheries	
John W. Reintjes	Fishery Biologist	NMFS

The principal development was that the biologists and technicians from the N. J. Nacote Creek Station would survey the area for an estimate of the number and kinds of fish killed on Monday.

2:30-3:30 P.M. Looked around Oyster Creek and inspected Lagoons 1-4. No signs of dead or living fish. Gulls were relatively inactive. Occasionally a small group would become active over the creek that indicated surfacing dead or dying fish.

January 13 -

9:00 A.M. Drive along the south shore of Oyster Creek. Ice formed along the shore and the small cove and 4 lagoons were frozen over except for the immediate vicinity of a freshwater drainage culvert in the blind end of Lagoon 3. The cove beach was strewn with dead fish. A RMI representative and I estimated several thousand. We saw 3 small bluefish, the other were all menhaden ranging in size from 4 to 14 inches. We measure 100 at random. The fork length frequency distribution is attached. There were several dozen menhaden in the ice of the 4 lagoons.

11:00 A.M. Air temperature 23°F; water 6 inches below surface in ice free area near Sand Point Marine 34° and 39° on the bottom. Return to the cove and most of the menhaden had been picked up for bait. Several hundred of the smaller ones and some frozen in the ice along the east shore remained.

2:00-5:00 P.M. Spent much of the afternoon in the Oyster Creek area. Relatively little gull activity and no additional signs of dead or dying fish.

January 14 -

9:00 A.M. Proceeded along the south shore of Oyster Creek. Lagoon 1 and 2 frozen over, Lagoon 3 frozen except in blind end near culvert. Lagoon 4 was ice free in the blind end with dead menhaden floating and some distressed menhaden swimming eratically in the open water.

9:30 A.M. Walked along Barnegat Bay and along the south shore of the Creek. Saw 6 or 8 dead menhaden in the shallow water along the bayshore, and several along the bank of the Creek near the entrance.

10:15 A.M. Returned to Lagoon 4 and two men with a pickup truck were dipping and bagging the dead menhaden. They said they had 8 bags of about a bushel each and there were about 2 or 3 more in the water.

11:25 A.M. In boat near mouth of Oyster Creek near Buoy No. 6;

32^{o}F 6 inches from top and $32\text{-}1/2^{o}$ on the bottom.

11:45 A.M. Went back to Highway 9 bridge and met N. J. biologist and two assistants. 33^{o} top and $32\text{-}1/2^{o}$ on the bottom. Proceeded in RMI boat to Barnegat Bay. Biologist and crew launched 18-foot Boston Whaler with 20-ft. trawl aboard in Barnegat Bay and proceeded into Oyster Creek. We accompanied them in RMI boat and observed four 5 to 10 minute trawls in the vicinity of Briarwood and Sand Point Marinas. They had quite a bit of trouble with snags. They caught little or nothing that we could see by watching them haul in the trawl.

They trawled several more times to the east off the Lagoon entrances and in Lagoon 1 and 3. These were not observed but they reported that they got little or nothing except in Lagoon 3 where they got about a bushel of menhaden, a couple striped bass and several spot. The fish were alive but sluggish. The striped bass were in poor condition with fin rot, opalescent eyes and abraded skin.

They trawled the length of Lagoon 4, setting their trawl about 100 feet outward of the blind end. They caught about a bushel of menhaden and I noticed one striped bass and several spot. All appeared alive but sluggish. In all, approximately 10 trawling station were made. Except for the catches in Lagoon 3 and 4, few or no dead fish were taken.

Two other groups from N. J. Nacote Creek Station were collecting during the period from noon to 5 P.M. Monday. Two biologists in a boat were taking temperature, salinity, and water samples. Two technicians were walking along the shoreline counting and identifying dead fish. Representatives from Ichthyological Associates, Absecon, N. J. arrived and did some seining in several slips along the Marinas.

4:30 P.M. N. J. biologists went up the discharge canal with boat and haul net. They said it was a new device and were trying it out. The net had a square fixed opening and was set in the middle of the canal from the boat and pulled ashore. During two tows observed, nothing was caught.

January 15 -

7:30 A.M. Checked beach cove and 4 lagoons. Ice covered cove and Lagoon 2. Lagoon 1 was open in the center from yesterday's trawling. Lagoon 3 was open with no dead fish, no surface signs nor any gulls. Lagoon 4 had about a hundred gulls working over the surface which was occasionally broken by distressed menhaden. From the signs there appeared to be at least several hundred menhaden in the lagoon. A few dead menhaden were floating in the blind end, apparently remaining from yesterday's kill.

Conclusions

The fish kill commenced about 7:00 A.M. on January 12 when the Highway 9 bridge temperature dropped below 40°F. A few hundred menhaden and 25 to 30 bluefish were picked up or seen along the banks of the discharge canal and Creek by 10:00 A.M. Some distressed and dying fish were seen during the remainder of the day.

At 9:00 A.M. on January 13, menhaden and occasional bluefish were dead along the south shore of Oyster Creek. The only sizeable concentration was in the cove just west of Lagoon 1. An estimation of several thousand dead menhaden and 3 bluefish were made. The size range and frequency distribution would suggest that the population in the area was made up of all age groups. Because menhaden school by size, the wide range of sizes suggest that no large, uniform population of menhaden were overwintering in the area.

On January 14, the only other concentration of dead menhaden was found in the blind end of Lagoon 4. Approximately 10 bushels were picked up leaving only a few dead along the shore or visible on the bottom. From these observations I would conclude that the apparent kill through Monday night amounted to approximately 10,000 fish. Of these 99 percent were Atlantic menhaden. From the thermograph records and limited temperatures made in

the area, the lethal minimum of apparently 37°F for menhaden, bluefish and spot was reached in some parts of Oyster Creek by Saturday morning, January 12 and continued until Tuesday morning, January 15, when I terminated my observations.

FROM: John W. Reintjes, Fishery Biologist
Atlantic Estuarine Fisheries Center
Beaufort, N. C. 28516

Fork length frequency in millimeters of Atlantic menhaden dead in cove beach, Oyster Creek, N. J., January 13, 1973

Fork Length in mm	No. of Menhaden
145-149	1
150-154	
155-159	
160-164	
165-169	1
170-174	3
175-179	3
180-184	5
185-189	
190-194	8
195-199	4
200-204	11
205-209	
210-214	3
215-219	7
220-224	5
225-229	7
230-234	
235-239	2
240-244	3
245-249	1
250-254	3
255-259	
260-264	3
265-269	5
270-274	6
275-279	5
280-284	
285-289	3
290-294	2
295-299	1
300-304	
305-309	3
310-314	2
315-319	
320-324	
325-329	
330-334	1
335-339	2
	100

John W. Reintjes
NMFS
Beaufort,, N. C.

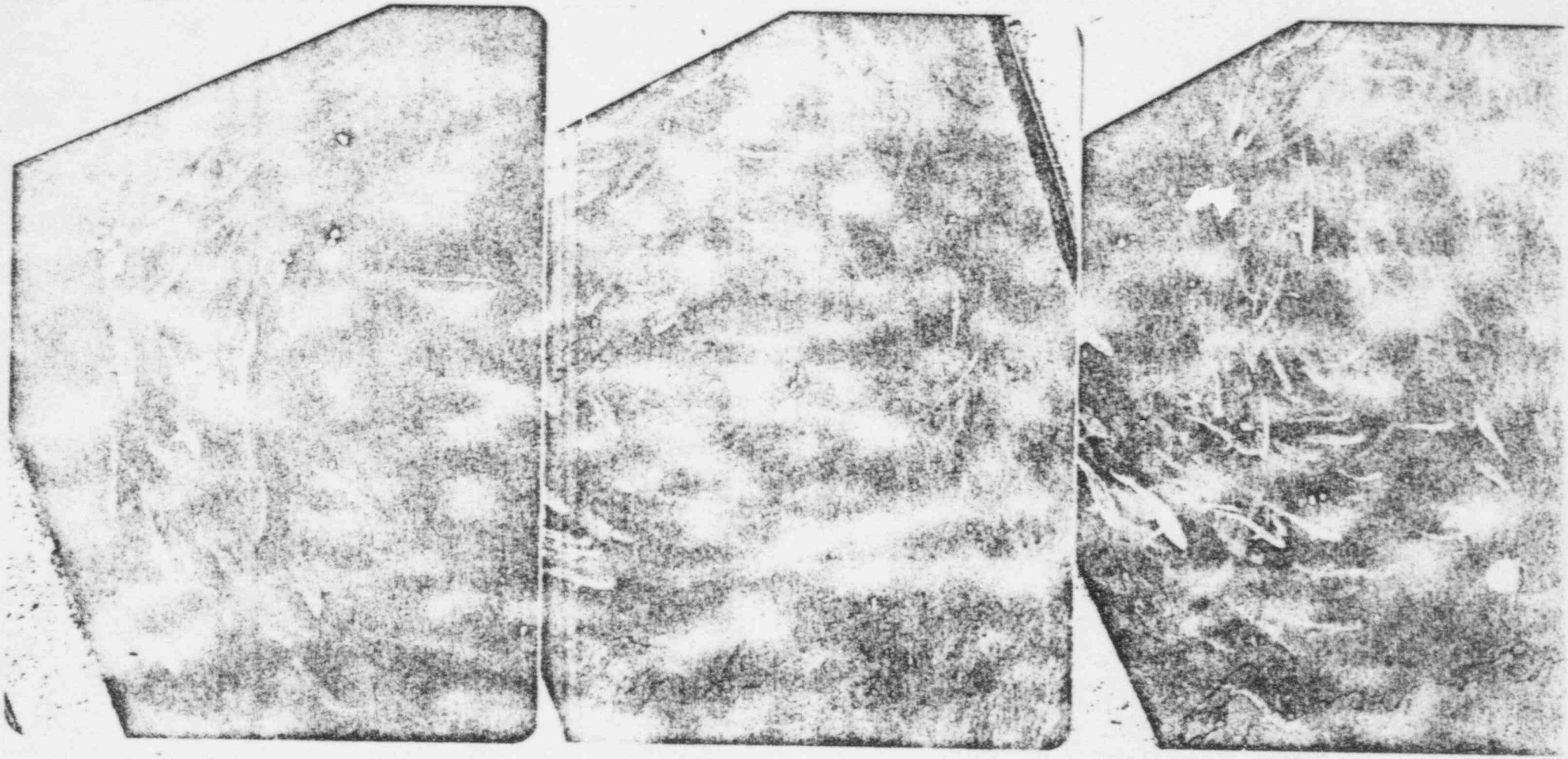

EXHIBIT 1

EXHIBIT 2