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 DONAHUE, J.W.      Carolina Power & Light Co.  
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SUBJECT: RO: on 960916, fish kill occurred in Harris Lake. Caused by heavy precipitation that accompanied Hurricane Fran. Will perform monitoring of dissolved oxygen concentrations to document return of sufficient oxygen to aquatic life.

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**Carolina Power & Light Company**

Harris Nuclear Plant

PO Box 165

New Hill, NC 27562

OCT 23 1996

United States Nuclear Regulatory Commission

ATTENTION: Document Control Desk

Washington, DC 20555

Serial: HNP-96-181

**SHEARON HARRIS NUCLEAR POWER PLANT  
DOCKET NO. 50-400/LICENSE NO. NPF-63  
REPORT OF FISH KILL IN HARRIS LAKE**

Sir or Madam:

On September 16, 1996 a fish kill occurred in a 25 to 30 acre isolated finger of Harris Lake. This was reported to the appropriate North Carolina wildlife and environmental agencies and to the NRC as a 4-hour non-emergency event per 10CFR50.72. Investigation determined that the fish kill was not causally related to plant operation, but was the result of heavy precipitation that accompanied Hurricane Fran. Additional details are provided in Attachments 1 - 3.

If you have any questions regarding this submittal, please contact Ms. D. B. Alexander at (919) 362-3190 or Mr. R.T. Wilson at (919) 362-2444.

Sincerely,

J. W. Donahue  
Director of Site Operations  
Harris Plant

MV

Attachments

c: Mr. J. B. Brady (NRC Senior Resident Inspector - HNP)  
Mr. S. D. Ebnetter (NRC Regional Administrator - Region II)  
Mr. N. B. Le (NRC Project Manager - NRR)

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Mr. G. A. Rolfson  
Mr. R. S. Stancil  
Mr. T. D. Walt  
Nuclear Records  
File: HI/A-2D  
File: H-X-230

## Attachment 1

### Fish Kill in the Thomas Creek Area of Harris Lake

At the request of Harris Plant personnel, members of the Biological Assessment Unit (BAU) investigated a fish kill located in the upper Thomas Creek area of Harris Lake (Attachment 2). The fish kill was reported to BAU personnel at approximately 9:45 a.m. on September 16, 1996, at which time most fish appeared to have been dead between 24 and 36 hours. Upon visiting the site no stressing fish were observed and the incident was presumed to be over.

The fish kill site was an isolated area, approximately 25-30 acres, located upstream of the Harris Nuclear Plant construction access road. This area was connected to downstream portions of Harris Lake by a submerged culvert under the road. The culvert appeared to be collapsed trapping the fish and water upstream of the road embankment.

Several naturally occurring events acting singularly or in concert and all the result of heavy precipitation accompanying hurricane Fran, are presumed responsible for the low dissolved oxygen concentrations observed in the fish kill area. Although the water level had declined to near normal levels at the time of the fish kill investigation, sedimentation deposits on shoreline vegetation indicate that large areas of terrestrial vegetation located in the Thomas Creek floodplain had been inundated. We believe that heavy hurricane precipitation resulted in a large-scale flood event in Thomas Creek. This flood not only floated large quantities of leaf litter and other naturally occurring organic material into the area, but also probably scoured and resuspended a portion of the lake bottom. Resuspended lake sediments usually contain large quantities of partially reduced naturally occurring organic material previously deposited in the lake sediment from the water column. This partially reduced material would include various sulfur and nitrogen containing compounds which would exert a Chemical Oxygen Demand (COD) on the water.

The organic material, which floated into the lake during the flood or entered the water when the surrounding lake shore was flooded, probably began decomposition which exerted a biochemical oxygen demand (BOD) on the water. The combined effects of an increased COD and BOD may have been sufficient to reduce dissolved oxygen concentrations to levels which initiated a fish kill. This explanation is substantiated by the elevated COD and BOD measurements. Total Organic Carbon (TOC) concentrations were also elevated indicating the presence of organic material (Attachment 2). With the exception of toluene, which was not at concentrations sufficient to cause a fish kill, all other measured parameters were either below quantitation limits or were within a range of values previously observed in Harris Lake.

Low dissolved oxygen concentrations were also observed in the White Oak Creek headwater area of Harris Lake during September 18, 1996 (Attachment 3). The White Oak Creek area was also subjected to a large flood which floated terrestrial vegetation into the lake and resuspended lake sediments. This material is suspected to have been responsible for reduced oxygen concentrations in the White Oak Creek headwater area of Harris Lake. These low concentrations appear to substantiate the theory that naturally occurring organic material reduced



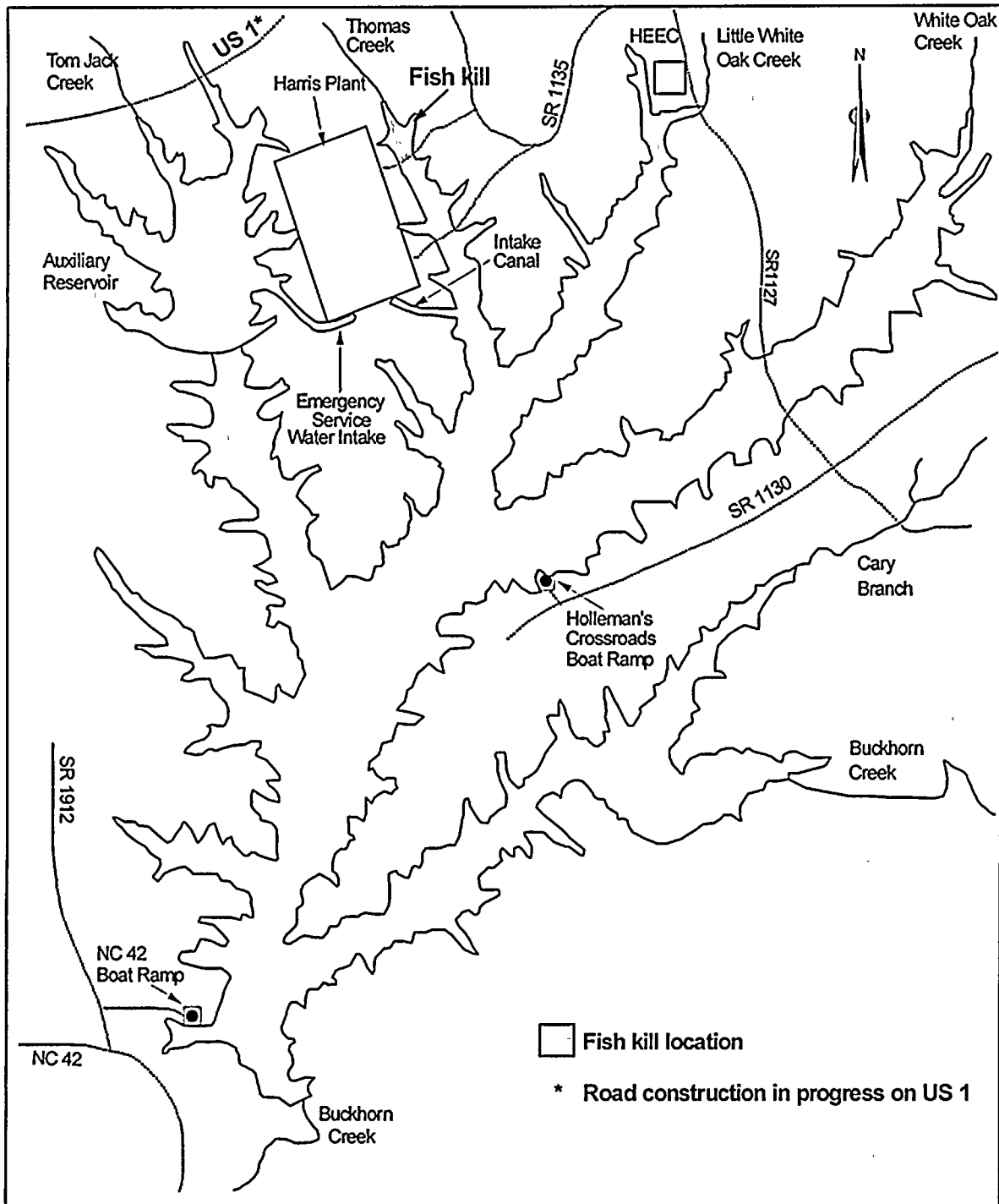
oxygen concentrations in the fish kill area.

Since dissolved oxygen concentrations less than 1.0 mg/liter are lethal of most freshwater fish, the primary cause of the fish kill was a lack of adequate dissolved oxygen in the water column. Surface water dissolved oxygen concentrations measured during the mid-day ranged from 0.2 to 0.4 mg/liter during September 16 to 18, 1996 (Attachment 3).

A visual inspection of roadway accessible creeks in the Thomas Creek drainage upstream of the fish kill area was conducted on September 18, 1996. There was no indication of any accidental chemical spill, animal waste lagoon breaches or extensive areas of soil erosion in these upstream reaches.

Remediation efforts for the fish kill area will include the periodic monitoring of dissolved oxygen concentrations to document the return of sufficient oxygen to support aquatic life and the eventual repair of the culvert to allow downstream fish to migrate into the area. Supplemental fish relocation by capturing fish in other areas of Harris Lake and stocking them in the recovering area may be implemented.

**Attachment 2**  
**Location of fish kill observed in Harris Lake, September 16, 1996.**



### Attachment 3

Selected limnological variables from the surface waters of the Thomas Creek and White Oak Creeks areas of Harris Lake, September 16-30, 1996.

Variable	Thomas Creek area				White Oak Creek area
	09/16/96	09/17/96	09/18/96	09/30/96	09/18/96
Temperature (°C)	22.8	23.0	23.0	20.8	24.3
Dissolved oxygen (mg/l)	0.3	0.2	0.4	0.2	2.7
pH	-	-	6.2	-	5.9
Conductivity (μS/cm)	-	-	67	-	79
Biological oxygen demand (mg/l)	13.1	15.8	-	-	-
Chemical oxygen demand (mg/l)	74	72	99	-	-
Total organic carbon (mg/l)	-	19.2	-	-	-
Volital organics (μg/l)					
Benzene		BQL*			
Bromodichloromethane		BQL			
Bromoform		BQL			
Bromomethane		BQL			
Carbon tetrachloride		BQL			
Chlorobenzene		BQL			
Chloroethane		BQL			
2-Chloroethylvinyl ether		BQL			
Chloroform		BQL			
Chloromethane		BQL			
Dibromochloromethane		BQL			
1,2-Dichlorobenzene		BQL			
1,3-Dichlorobenzene		BQL			
1,4-Dichlorobenzene		BQL			
1,1-Dichloroethane		BQL			
1,2-Dichloroethane		BQL			
1,1-Dichloroethene		BQL			
1,2-Dichloroethene (total)		BQL			
1,2-Dichloropropane		BQL			
cis-1,3-Dichloropropene		BQL			
trans-2,3-Dichloropropene		BQL			
Ethylbenzene		BQL			
Methylene chloride		BQL			
1,1,2,2-tetrachloroethane		BQL			
Tetrachloroethene		BQL			
Toluene		17			
1,1,1-Trichloroethane		BQL			
1,1,2-Trichloroethane		BQL			
Trichloroethene		BQL			
Trichlorofluoromethane		BQL			
Vinyl chloride		BQL			

\*BQL=Below Quantitation Limit.