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RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Responds to final environ rept review questions.Hydrologic engineering questions & terrestrial & aquatic resource questions will be addressed in near future.

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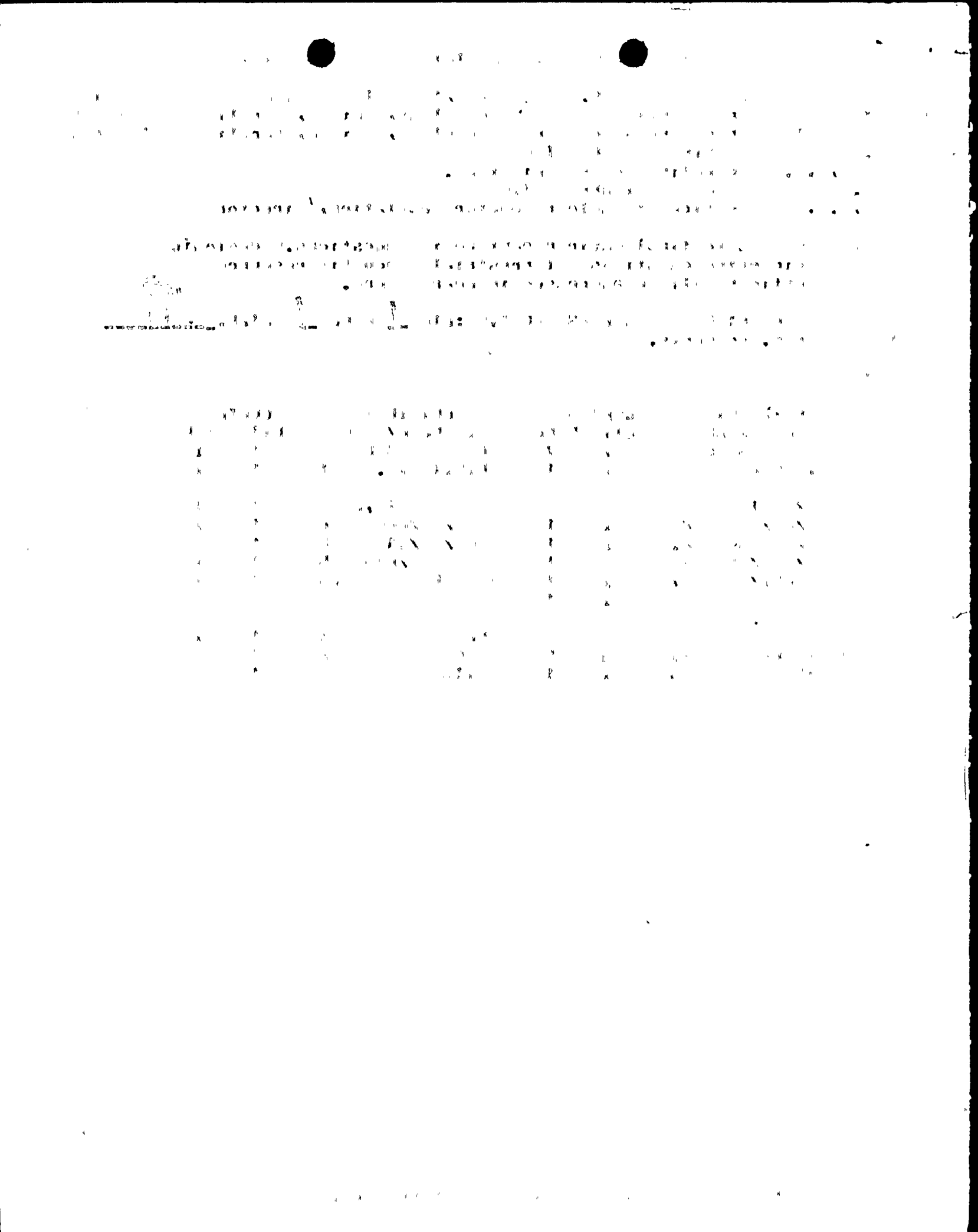

CP&L

Carolina Power & Light Company

JUL 14 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, D.C. 20555

SHEARON HARRIS NUCLEAR POWER PLANT
UNIT NOS. 1 AND 2
DOCKET NOS. 50-400 AND 50-401
ENVIRONMENTAL REPORT REVIEW QUESTIONS RESPONSES

Dear Mr. Denton:

Carolina Power & Light Company's response to the final Environmental Report (ER) review questions numbered 240.1, 240.2, 240.10, 290.5, 290.7, 291.7, 291.8, 291.9 and 291.13 (partial) is attached. This response supplements our letter of June 3, 1982, and completes our response to the ER review questions with the exception of certain Hydrologic Engineering questions and the reservoir reanalysis dependent portions of Terrestrial and Aquatic Resource questions 291.13 and 291.15 as discussed below.

Hydrologic Engineering questions 240.3 through 240.9 are being addressed in conjunction with the NRC questions resulting from the April 6-7, 1982 Hydrology Site Visit. The Hydrology Site Visit questions were expected to revise and clarify questions 240.3 through 240.9 and thus have a significant impact on the reanalysis of the SHNPP reservoirs. These questions arrived on July 9 by telecopy. Work has now begun on all of the remaining Hydrology questions.

Portions of Terrestrial and Aquatic Resource questions 291.13 and 291.15 are dependent on the above reservoir reanalysis and are still under review. Responses to these questions will be transmitted with the responses to the Hydrologic Engineering questions.

Yours very truly,

M. A. McDuffie
Senior Vice President
Engineering & Construction

GSC/lr (206C6T2)
Attachment

cc: Mr. E. A. Licitra (w/o att.)
Mr. J. P. O'Reilly (NRC-RII) (w/o att.)

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A002 B

240.1
(2.4.2.3)

a) What are the units for inflow on Figure 2.4.2-9?

b) Does inflow on Figure 2.4.2-9 include runoff from Buckhorn Creek and incident precipitation on the Reservoir surface as well as makeup water from the Cape Fear River? Please discuss.

RESPONSE:

a) The unit for the Main Reservoir inflow is ac-ft/day (0.5 CFS).

b) The direct rainfall on the surface of the Main Reservoir was not included as part of the inflow shown on Figure 2.4.2-9. The direct rainfall was, however, included in the mass balance consideration in the reservoir operation analysis to arrive at the reservoir outflow as shown on Figure 2.4.2-15. Runoff from Buckhorn Creek was included in the inflow shown on Figure 2.4.2-9.

240.2
(2.4.2.3)

Is seepage considered as part of the outflow in Figure 2.4.2-10? Please discuss.

Response:

The outflow shown on figure 2.4.2-10 represents the reservoir downstream release by way of spillway outflow. A constant seepage loss in the reservoir (or percolation) of 5 CFS as indicated in Table 2.4.2-19 was included in the mass balance consideration in the reservoir operation analysis to arrive at the reservoir outflow as shown on Figure 2.4.2-15. The seepage loss was, however, not considered as part of the outflow in Figure 2.4.2-10. Seepage flow below the Main Dam into the Buckhorn Creek was not considered in the analysis.

E240.10
(2.4.2.3)

Describe in greater detail the sediment rating formula used to calculate sediment inflow to the main reservoir. State the number of data points used to derive the relationship, the range of flows these data points represent, and the distribution by season of the data points. If the number of data points is relatively small, provide a plot of the data and the line of best fit. Otherwise, provide the pertinent parameters of the regression analysis including the correlation coefficient and the standard error of estimate.

RESPONSE:

To estimate the effect of sedimentation on the Main Reservoir bottom and shoreline configuration, the following sediment rating formula was deduced from the sediment sampling data of Buckhorn Creek near Corinth, North Carolina (D.A = 74.2 sq. miles) (Reference 2.4.2-6 of the SHNPP ER) by a regression analysis:

$$ISD = 0.0104\ IQ^{1.56}$$

in which

IQ = instantaneous streamflow rate in cfs

and

ISD = instantaneous sediment discharge in tons/day

The sediment discharge sampling record used is summarized in Table 240.10-1, attached. This record consists of 17 data points. The instantaneous streamflow rates associated with these samplings range from 1.1 to 4410 cfs. The seasonal distributions of these data points are six in winter, three in spring, five in summer and three in fall. On Figure 240.10-1, these data points are shown with the rating curve representing the above formula. The parameters associated with the regression analysis are r = 0.987 and S = 0.301 in which r is the correlation coefficient and S is the standard error of estimate.

The above formula which relates instantaneous streamflow rates and sediment loads is then converted to a formula relating daily streamflows and daily sediment discharges by introducing a factor, IQP/Q, to account for the diurnal variations of Streamflow:

$$SD = (IQP/Q)^{0.56} \quad .0.0104\ Q^{1.56}$$

in which

IQP = instantaneous daily peak flow in cfs

SD = daily sediment load in tons/day

Q = daily streamflow in cfs.

Conservatively, a constant value of IPQ/Q = 2.21 is used. This value represents the maximum ratio in the 1972 to 1977 streamflow record (Reference 2.4.2-6 of the SHNPP ER) and occurs during the flood of February 2, 1973 having a peak discharge of 6920 cfs, while the corresponding daily streamflow is 3130 cfs. The above formula then becomes:

$$SD = (2.21)^{0.56} \quad 0.0104 \quad Q^{1.56}$$

$$= 0.0163 \quad Q^{1.56}$$

To estimate the total sediment load for the plant life of 40 years, synthetic daily streamflow of Buckhorn Creek near Corinth, North Carolina, for the period were generated by employing two computing programs from the U.S. Army Corps of Engineers Hydrologic Engineering Center: Monthly Streamflow Simulation (HEC-4, Ref. 2.4.2-7 of the SHNPP ER) and Daily Streamflow Simulation. Five years (1972-77) of daily streamflow records of Buckhorn Creek near Corinth, North Carolina and thirty-eight years (1940-77) of monthly streamflow records of Middle Creek at Clayton, North Carolina (Section 2.4.2.3.1 of the SHNPP ER) were utilized as the inputs for the computer programs.

By assuming 100 percent sediment trap efficiency for the Main Reservoir, the total volume of sediment deposit is estimated to be about 460 ac. ft., accumulated over forty years of plant life. Since this amounts to only 0.7 percent of the reservoir capacity at the normal operating level, any noticeable effect of sedimentation on the shoreline and bottom configuration will be localized.

By assuming that the quantity of sediment loads is proportional to the drainage area, the total volume of deposit in the Auxiliary Reservoir for the length of the plant life is estimated to be 460 x 2.43/74.2 = 20 ac. ft., which is equivalent to 0.4 percent of the reservoir capacity at the normal operating level. The overall effect on the bottom and shoreline configuration is negligible.

TABLE 240.10-1

SUMMARY OF SEDIMENT DISCHARGE SAMPLING RECORD FOR BUCKHORN CREEK NEAR CORINTH FOR THE PERIOD OF 1972 TO 1977

Date (Month/Day/Year)	Instantaneous Streamflow Rate (cfs)	Sediment Discharge Rates* (tons/day)
12/15/72	1400	1290
02/02/73	2730	2059
02/02/73	4410	3266
02/05/73	188	15
04/27/73	1020	323
04/27/73	1180	165
06/29/73	196	40
06/29/73	301	228
06/29/73	326	293
06/29/73	352	185
12/21/73	238	87
12/21/73	233	71
07/21/76	3.0	0.06
09/03/76	1.1	0.01
10/01/76	16.0	0.62
11/23/76	19.0	0.80
03/28/77	60.0	3.22

*The sediment discharge rates are obtained by multiplying a factor of 1.04 to the suspended sediment discharge rates shown in Reference 2.4.2-6 to account for the bed-material discharge rates. This factor is derived from "Sediment characteristics of Streams in the Eastern Piedmont and Western Coastal Plain Regions of North Carolina," USGS Water Supply Paper 1798-0, 1976, which indicates that the bed loads for several representative gaging stations in the State of North Carolina are in the range of 1% to 4% of suspended loads.

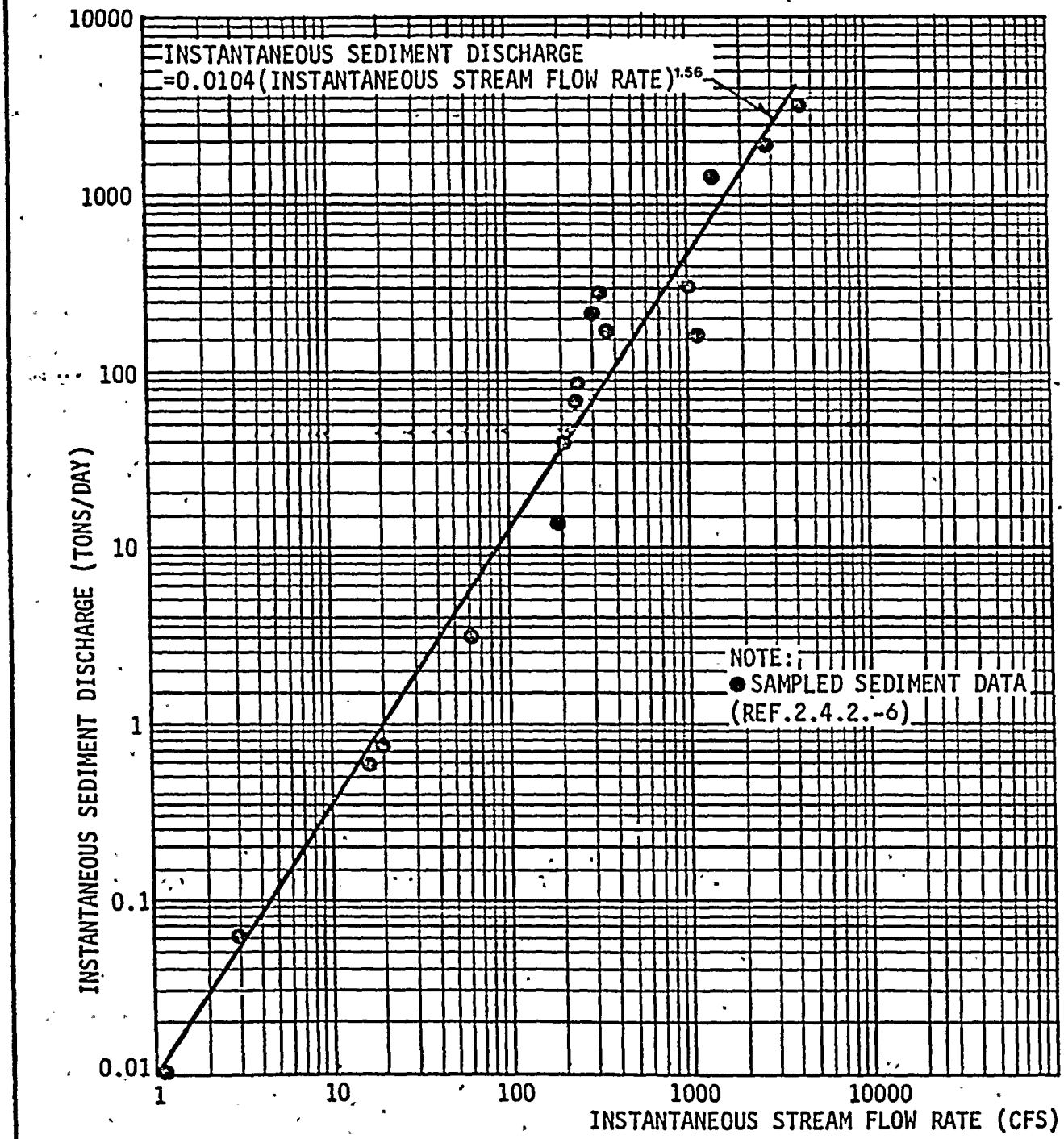

FIGURE 240.10-1
SEDIMENT DISCHARGE RATING CURVE
BUCKHORN CREEK NEAR CORINTH, N.C.

290.5
(ER Sec 3.4.2.9) Identify an onsite disposal area(s) for deposition of trash removed from the intake structures. How will this area be managed and ultimately reclaimed?

RESPONSE: A site for the landfill for trash removed at the intake structures has not be selected at this time. Establishment of a landfill onsite will require a permit from the State of North Carolina Department of Human Resources. This permit will specify requirements for management and ultimate reclamation of the site. ER Section 12.1 will be revised to include this permit when it is obtained. Applicable EPA and state of North Carolina requirements for landfills will be met.

290.7 (General) Provide for NRC review a copy of the proposed site fish and wildlife management plan.

RESPONSE: A copy of the SHNPP fish and wildlife management plan is provided in Attachment 1.

SHEARON HARRIS WILDLIFE MANAGEMENT AND PUBLIC ACCESS PLAN

INTRODUCTION

Section 2.1.3 of the Operating License - Environmental Report (OL-ER) states that CP&L will cooperate with interested state agencies in developing a wildlife management area adjacent to the reservoir and a wildlife management program for the Company owned lands. In addition, CP&L has adopted a policy to permit public use of the SHNPP lands. This policy, as presented in Section 2.1.3 of the OL-ER, states that the Company will cooperate with appropriate state agencies to provide public access for boating, fishing, hunting, and other uses which are not inconsistent with the primary purpose of the reservoir.

CP&L owns approximately 20,000 acres of land surrounding the SHNPP, of which about 4,000 acres will be reservoir. To mitigate for the loss in terrestrial production of this 4,000 acres, CP&L has developed a land and wildlife management program. The purposes of the wildlife management are to increase the production of wildlife on the land and to increase the attractiveness of the habitat to wildlife. The total acreage involved in the program will be approximately equal to the acreage committed to the reservoir (about 4,000 acres). The SHNPP wildlife management and public access plan will be fully implemented by 1985, the date of expected operation of SHNPP Unit 1.

WILDLIFE MANAGEMENT PLAN

Wildlife and Fish Management Areas

The wildlife management plan will provide improved wildlife habitat on the SHNPP site and will include the establishment of wildlife management areas. Five areas that have high wildlife productivity potential are (Figure 1):

1. A large tract of land southwest of Wake SR 1127 along both sides of Wake SR 1130/Chatham SR 1914 from Hollemans Crossroads to the reservoir at the end of abandoned Chatham SR 1914. This area is bounded on the northwest and southeast by the reservoir.

2. Land along Buckhorn Creek downstream of N.C. 42 to and along the Cape Fear River.

3. Land to the southeast of Wake SR 1134 bounded on two sides by the reservoir.

4. Land to the southwest of Wake SR 1152 along White Oak Creek is suitable for a small green tree reservoir for waterfowl management.

5. The Harris Reservoir fishery will develop from fish populations already existing in the Buckhorn and White Oak Creek system. To enhance the fishery, two artificial reefs have been established; and the need for further fishery management will be based on the results of fishery monitoring programs.

The wildlife management plan for these areas will include forest thinning and/or clearing operations, construction of a green tree reservoir, wildlife food planting, and establishment of cover and resting areas where deficient. Forest thinning and clearing operations are necessary to sculpt the existing forests into productive wildlife habitats and will result in a proper mix of forest age classes that provide a wide variety of habitat types. Establishment of food plots entails planting an area in crops (usually seed and fruit bearing shrubs) that are preferred food by various species of wildlife. Wildlife cover can be established by planting shrubby species and by windrowing the debris produced by forestry practices. A green tree reservoir provides food for wintering waterfowl and consists of a hardwood forest which is periodically flooded with several feet of water.

Management for a diversity of wildlife habitat and wildlife species rather than single (target) species management is planned. This will provide for mitigation of the loss of biological communities impacted by the SHNPP Reservoir construction and will benefit game and nongame species alike. One exception will be management of the wild turkey. This species occurred on the site in small numbers along the White Oak Creek bottom and probably still inhabits small sections of the SHNPP lands. There is concern for the wild turkey in North Carolina, as it is one of the least abundant large game animals. Management of this species will be undertaken on suitable SHNPP lands as mitigation for turkey habitat lost by the clearing of SHNPP reservoir basin. The purpose of this management will be to provide suitable turkey habitat and ultimately to increase production of turkeys on the SHNPP site.

Wildlife Refuge Areas and Game Lands

The entering of some lands into the North Carolina Wildlife Resources Commission (NCWRC) Game Lands Program has merit in that CP&L could stipulate specific areas to be posted by NCWRC as "safety zones." The safety zones would be closed to hunting and would be refuges for wildlife. Land within the exclusion area boundary (Figure 1) would also be closed to hunting and would thus be a wildlife refuge.

CP&L will work with the NCWRC to select the specific property to be entered into the Game Lands Program.

PUBLIC ACCESS AND NATURE TRAIL

Reservoir Access

CP&L will provide boat ramp facilities to assure adequate public access to the reservoir (Figure 1). One ramp already constructed near the main dam for Company use may be modified for public use. Some road improvement and a larger parking area would be required. A second public access area, possibly at the Wake SR 1127 crossing of the reservoir, will also be provided. These areas are next to state maintained roads and would not require passage through the plant site or the exclusion area boundary.

Nature Trail

Establishment of a nature trail on the SHNPP site will inform the public on the natural state of the SHNPP area and educate it on environmental aspects of power plant construction and operation as well as the mitigation efforts outlined in this plan. The trail will traverse the forest types common in the area and culminate on the reservoir shore. The trail would originate at the Harris Energy & Environmental Center for convenience of administration. The Harris Visitors Center was established to educate the public on CP&L's activities and provide information specific to the SHNPP.

SUMMARY

CP&L will assume the lead in management efforts to assure that this plan is effectively administered. The management program includes the establishment of wildlife management areas, wildlife refuge areas, a nature trail, and boat access areas. The acreage to be involved in management will be approximately 4,000 acres. This is equivalent to the size of the SHNPP reservoir. Administration of these lands will be undertaken by CP&L, although some lands will be entered into the NCWRC Game Lands Program. Management of wildlife species will emphasize habitat diversity and improvement rather than the target species approach. The exception would be management for wild turkey.

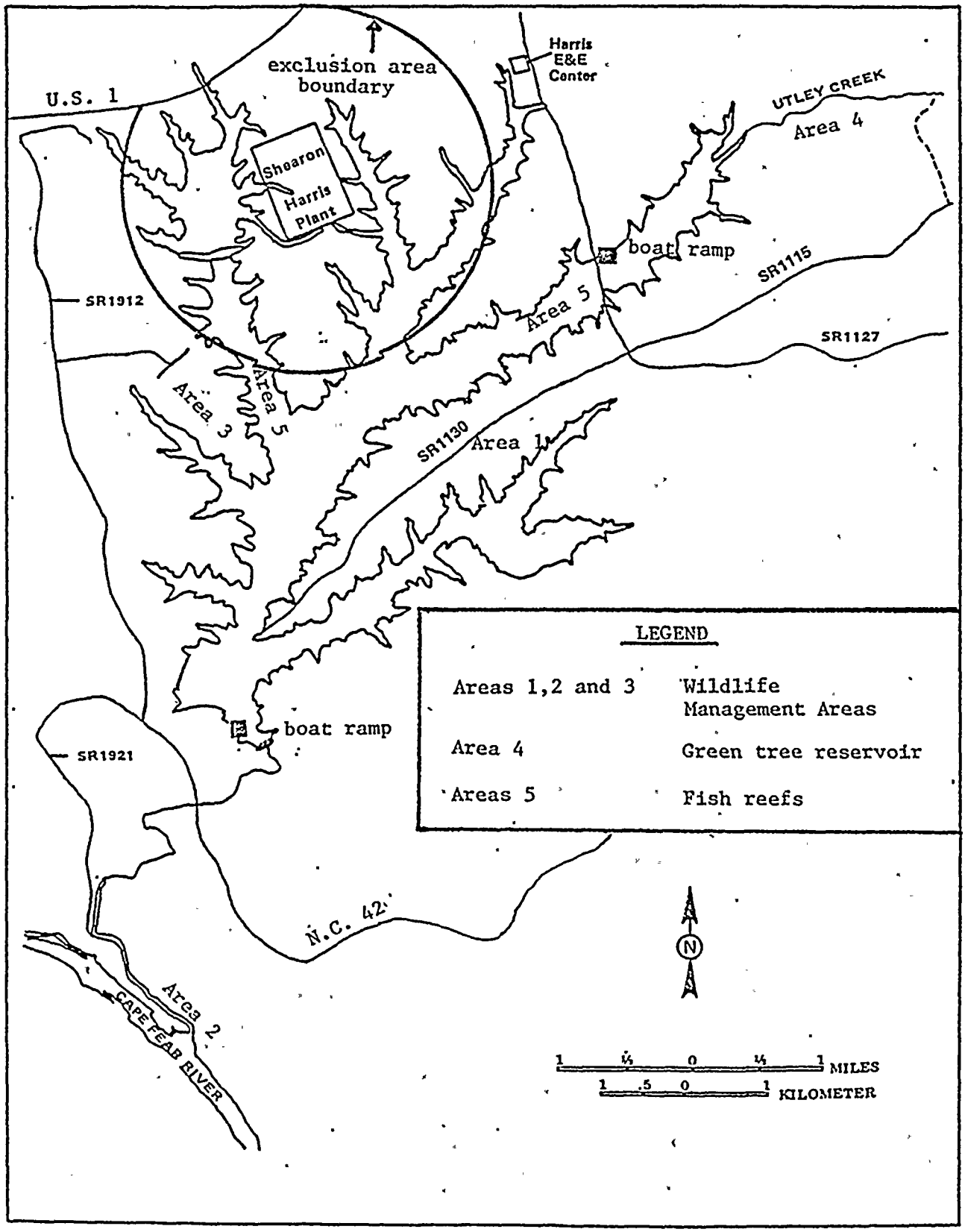

Figure 1 SHNPP wildlife management areas

291.7
(ER Sec. 3.3)

The time definition used for several of the plant water flows in Table 3.3-1 is unclear. That is, the term "million gallons per month" is undefined. Provide a clear definition of the time period used for these flows or present the information in more conventional terms (e.g., gallons per minute, cubic feet per second or their metric equivalents).

RESPONSE:

Each reactor is assumed to operate 85 percent of the time. This yields a 309 day operating year. A month is considered 1/12 of this 309 day operating year.

291.8
(ER Sec. 3.3)

Indicate which flows in Table 3.3-1 are continuous under normal conditions.

RESPONSE:

The following streams listed in Table 3.3-1 have continuous flow under normal conditions: 2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 15, 16, 17, 18, 19, 23, 24, 26, 43, 44, 45, 46, 67

291.9
(ER Sec. 3.4)

Define the terms "maximum power operation" and "minimum anticipated power operation". Indicate the proportion of time that the station is expected to be operated at these power levels. Indicate the normally anticipated station power level and how this relates to the "100% capacity" term given in ER Section 3.4.2.

RESPONSE:

Maximum power operation is 2785 MWt including 10 MWt from the reactor coolant pump or 100 percent power. Minimum anticipated power operation is 600 MWe or approximately 62 percent power. It is anticipated that the plant will operate 85 percent of the time, yielding a 309-day operating year. The station should operate at 100 percent power 95 percent of the operating year. The remaining 5 percent of the year will involve shutdown and startup operations and power will range between 0 and 100 percent.

291.13 (ER Sec. 3.3, 3.4, 5.1, 5.3)

Based on the reduction in project size from four units to two units, provide revised ER Sections 3.3 Station Water Use, 3.4 Heat Dissipation System, 5.1 Effects of Operation of Heat Dissipation System and 5.3 Effects of Chemical and Biocide Discharges. Where possible, the information should be provided for both one and two unit operation.

RESPONSE:

Revisions of ER Sections 3.3, 3.4, 5.1 and 5.3 are partially dependent on the results of the reservoir reanalysis. Therefore, only a portion of the information necessary for this response is provided below. Discussions of the Cape Fear River Makeup system deletion, the size of the reservoir, drawdown frequencies and other information dependent on the reanalysis will be provided with the response to the Hydrologic Engineering questions.

Deletion of SHNPP Units 3 and 4 has resulted in the following changes:

1. The total consumptive water use in the operation of the cooling towers and makeup reservoir has decreased from 106 cfs to 53 cfs under average meterological conditions and from 125 cfs to 62.5 cfs under extremely adverse meterological conditions with the plant operating at 100 percent capacity.

2. The maximum release rate of cooling tower blowdown has decreased from 60 MGD to 30 MGD.

3. Flow through the condensers in the closed cycle cooling tower system is reduced from 4300 cfs to 2150 cfs.

4. The maximum size of the mixing zone in the reservoir due to cooling tower blowdown decreases from 200 acres to 120 acres in the winter and from 90 acres to 20 acres in the summer.

5. Note that SHNPP ER Section 3.4.2.5, "Drift and Drizzle of Cooling Towers", has a typographical error in that the total evaporation and drift rate from the cooling towers is estimated at 17,500 gpm for two units rather than the 12,500 gpm given.

6. Due to the reduction in project size from four to two units, the portion of the Emergency Service Water and Cooling Tower Makeup Water Intake Structure that was intended to serve Units 3 and 4 will not be completed. Only the three cooling tower makeup pumps serving Units 1 and 2 will be installed. Therefore, there will be one cooling tower makeup pump per unit with one spare for the two units. The three cooling tower makeup pumps are connected to a header which supplies both Cooling Towers. With two units operating at maximum makeup rates, only two of the three pumps will be operating

simultaneously. Any two of the three pumps will supply that amount of makeup water required for the Circulating Water System. The withdrawal requirements for one and two unit operation are about 46 cfs and 92 cfs, respectively.

The cooling tower makeup pumps also supply makeup water to the plant water treatment facility at the rate of 600 gpm.

Each cooling tower makeup pump is located in a separate bay of the intake structure. Note that the intake structure bay traveling screens measure 10 ft. wide rather than the 9 ft given in the ER. Each traveling screen extends from the floor of the intake structure through the top deck where the drive mechanism and screen washing equipment is located. The traveling screens are fabricated of 14 gauge wire (0.08 in. diameter) with clear openings 3/8 in. square.

These responses and the changes resulting from the SHNPP reservoir reanalysis will be incorporated in an amendment to the appropriate ER Sections upon completion of the reservoir reanalysis.

(234R6T4)