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RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Forwards addl info re 840309 request to dispose slightly contaminated sediment from Unit 2 settling pond to Unit 1 ash pond using either hydrovacuum truck method or new direct piping sluicing method,per NRC 840503 request.

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JUN 22 1984

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Director of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
United States Nuclear Regulatory Commission
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
REQUEST FOR INFORMATION
DISPOSAL OF LICENSED MATERIAL

Dear Mr. Varga:

By letter dated March 9, 1984, Carolina Power & Light Company (CP&L) requested blanket approval to dispose of slightly contaminated sediment from the H. B. Robinson Steam Electric Plant Unit No. 2 settling pond to the Unit No. 1 ash pond using either a hydrovacuum truck method or a new direct piping sluicing method. Subsequently, on May 3, 1984, NRC informally transmitted a request for additional information regarding the March 9, 1984 disposal request. Attached is CP&L's response to NRC's request. For convenience, each NRC question is reiterated followed by CP&L's response.

If you have any further questions regarding this matter, please contact Mr. David Stadler at (919) 836-6739.

Yours very truly,

S. R. Zimmerman
Manager
Nuclear Licensing Section

CGL/ccc (107CGL)

Attachment

cc: Mr. J. P. O'Reilly (NRC-RII)
Mr. G. Requa (NRC)
Mr. Steve Weise (NRC-HBR)
Mr. B. H. Webster

411 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602

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Responses to NRC Request for Additional Information
Regarding the Direct-Pipe Sluicing of
Settling Basin Sediment to the HBR Ash Pond

Question 1

The licensee's Safety Analysis Report dated January 5, 1983, indicates in Section 1.0 that the source of the Cobalt-60, Cesium-137, and other gamma emitters detected in the sediment in the east and west settling ponds is primary-to-secondary leakage. In addition to gamma emitters, steam generator blowdown has been observed to contain beta emitters such as Carbon-14, Nickel-63, and Strontium-90 in concentrations comparable to those of the gamma emitters. Is there any reason to believe that the sediments in the east and west settling ponds do not contain these beta emitters in concentrations comparable to those reported for gamma emitters? Some concentration values for the beta emitters present should be provided.

Response

Strontium-89 and Sr-90 are analyzed in HBR Unit 2 steam generator blowdown per Reg. Guide 1.21. Analyses are performed on quarterly composites. Data available from the fourth quarter of 1980 through the fourth quarter of 1983 showed that Sr-90 was detectable in 5 of 12 samples at an average concentration of 5.14 ± 6.39 E-8 μCi/ml (error is 1 SD, sampling error). Sr-89 was detectable in only 1 of 12 samples at 6.5 ± 0.83 E-7 μCi/ml (error is 2 SD counting error). There is no reason to believe that the concentrations of beta emitters are significantly higher than those reported for gamma emitters. Therefore, the radiological impact of the beta emitters is inconsequential based on the pathway concerns expressed in the safety analysis.

Question 2

If approval is granted for periodic disposal of settling pond sediment in the Ash Pond, what quantities of radionuclides are likely to be accumulated in the Ash Pond over the period of its use?

Response

The following assumptions were used to determine a conservative estimate of the radionuclides that may accumulate in the pond over the period of use:

1. Eight-year life of ash pond.
2. About 6,000 cubic meters per year input to ash pond from settling basins. (Experience indicates that a disposal rate of 6,000 m^3/2 yr is more likely.)
3. Radiologic characteristics of the settling basin sediment is as in the Safety Analysis Report submitted to NRC by CP&L letter dated January 17, 1983.
4. Density of flyash and sediments is about 2.6 g/ml.
5. No credit is taken for radioactive decay.

(105CGL/cfr)

The following radionuclides and their respective concentrations and activities were estimated to accumulate over the life of the ash pond:

Nuclide	Settling Basin Concentration Weighted Average (μCi/g wet)*	Over 8-year Life of Ash Pond Activity (mCi)	Over 8-year Life of Ash Pond Concentration (μCi/g wet)
Mn-54	1.96 E-7	24	1.91 E-8
Co-58	4.36 E-7	54	4.25 E-8
Co-60	8.55 E-6	1100	8.34 E-7
Nb-95	2.54 E-7	32	2.48 E-8
Cd-109	2.44 E-6	300	2.38 E-7
Cs-134	5.53 E-7	69	5.39 E-8
Cs-137	4.61 E-7	58	4.49 E-8
Ce-144	5.16 E-7	64	5.03 E-8
Weighted Total*	9.72 E-6	1200	9.48 E-7
Column Total	1.34 E-5	1701	1.31 E-6

Question 3

What is the average fill rate of the ash pond in cubic meters per year? The documents supplied indicate that the current volume of the ash pond is 385,000 cubic meters. To what elevation MSL is that? When the ash pond is enlarged, what will its volume be to a water level of 264' MSL? Will the volume of the pond be sufficient for the expected lifetimes of the H. B. Robinson Units 1 and 2?

Response

The following assumptions were used to calculate the ash pond fill rate:

1. Ash pond is filled to 264' MSL; this gives approximately 400 acre feet.
2. Solid portion of slurry (flyash, dust) occupies 25 percent of the slurry volume.
3. Life of pond is eight years.
4. Density of flyash is 2.6 g/ml.

Calculated results for fill rate:

Mass input rate for solids	=	160,420 metric tons per year
Volume input rate for solids	=	61,700 cubic meters per year
Volume input rate for liquids	=	185,100 cubic meters per year
Total volume input rate	=	246,800 cubic meters per year or 124 GPM

The 385,000 cubic meter volume corresponds to about 262' MSL in the pond. This was estimated to be the volume of the pond following enlargement. Construction on the pond began in June 1982 and was completed in October 1982. Thus, it was possible to estimate the final volume of the pond prior to submitting the January 5, 1983, Safety Analysis Report (submitted to NRC by CP&L letter dated January 17, 1983).

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* See Assumption 3 above.

At 264' MSL the estimated volume of the pond is 400 acre feet or 493,000 cubic meters.

The ash pond is the second of three planned ash disposal sites at HBR. The first ash pond has already been covered and reclaimed with vegetation. The current ash pond was not designed to last the life of Unit 1; however, as the unit is operated per dispatcher load request, there is the possibility that the ash pond may last longer than anticipated.

Question 4

What is the approximate annual average volume of water inflow to the ash pond from natural drainage and from pumping ash slurry? What is the approximate density in pounds of ash per gallon in the as-pumped slurry? What are the characteristics of the leaks that have been experienced with the 12-inch line to the ash pond? What is the estimated maximum tonnage of ash that has been spilled from any single leak?

Response

The following assumptions and data were used to estimate the natural water inflow:

1. Surface area @ 264' MSL ~ 52 acres.
2. Average annual rainfall = 46.65 in/yr (ER, page 2.1-16).
3. Natural inflow occurs by direct downfall onto the pond surface only.

The natural water inflow is estimated to be 250,000 m^3/yr.

The ash slurry inflow is estimated (see response to Question 3) to be 246,800 m^3/yr.

The following assumptions were used to estimate the as-pumped ash density:

1. Solid flyash/slurry, vol/vol ratio ~ 1/4 or .25.
2. Density of flyash = 2.6 g/ml or 21.7 lb/gal.
3. Density of liquid = 1.0 g/ml or 8.4 lb/gal.

Therefore, in one gallon of slurry

(0.25 gal) (21.7 lb/gal) = 5.4 lb
(0.75 gal) (8.4 lb/gal) = 6.3 lb
11.7 lb/gal

or, the slurry density is estimated to be approximately 12 lb/gal.

The characteristics of the leaks in the 12-inch ash line have varied from small "drip" leaks to large breaks in the pipe. Experience has shown that leaks in the in-place ash line occur about seven times per year or on average about once every 50 days. The ash line is inspected daily. Plant experience indicates that approximately 400 pounds is the maximum amount of ash that has been spilled from any single leak. This is considerably less than the tonnage

estimated to be spilled in the "worst" case accident scenario that was described in the safety evaluation of September 19, 1983.

(105CGL/ccc)