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SOUTHERN COMPANY
Energy to Serve Your World℠

August 13, 2007

Docket Nos.: 50-321
50-366

NL-07-1354

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Edwin I. Hatch Nuclear Plant
Request to Implement an Alternative Source Term
Response to Request for Additional Information
Regarding the Development of Atmospheric Dispersion Factors

Ladies and Gentlemen:

On August 29, 2006, Southern Nuclear Operating Company (SNC) submitted a request to revise the Edwin I. Hatch Nuclear Plant (HNP) licensing/design basis with a full scope implementation of an alternative source term (AST). By letters dated November 6, 2006, November 27, 2006, January 30, 2007, June 22, 2007, and July 16, 2007, SNC has submitted further information to support the NRC review of the HNP AST submittal. By letter dated May 30, 2007, the NRC requested additional information concerning the development of the atmospheric dispersion factors used in the AST analyses for the main control room and the technical support center. It is noted that no changes have been made to the current licensing basis offsite atmospheric dispersion factors for the AST analyses.

The enclosure to this letter contains the SNC response to the referenced NRC request for additional information (RAI).

The 10 CFR 50.92 evaluation and the justification for the categorical exclusion from performing an environmental assessment that were included in the August 29, 2006 submittal continue to remain valid.

(Affirmation and signature are on the following page.)

Mr. L. M. Stinson states he is a Vice President of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

This letter contains no NRC commitments. If you have any questions, please advise.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

L. M. Stinson
Vice President Fleet Operations Support

Sworn to and subscribed before me this 13th *day of* August, *2007*

Notary Public

My commission expires: July 5, 2010

LMS/CLT/daj

Enclosures: 1. Response to Request for Additional Information Regarding the Development of Atmospheric Dispersion Factors

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. D. R. Madison, Vice President – Hatch
Mr. D. H. Jones, Vice President – Engineering
RType: CHA02.004

U. S. Nuclear Regulatory Commission
Dr. W. D. Travers, Regional Administrator
Mr. R. E. Martin, NRR Project Manager – Hatch
Mr. J. A. Hickey, Senior Resident Inspector – Hatch

State of Georgia
Mr. N. Holcomb, Commissioner – Department of Natural Resources

Edwin I. Hatch Nuclear Plant
Request to Implement an Alternative Source Term

Enclosure 1

Response to Request for Additional Information
Regarding the Development of Atmospheric Dispersion Factors

Enclosure 1

Edwin I. Hatch Nuclear Plant
Request to Implement an Alternative Source Term

Response to Request for Additional Information
Regarding the Development of Atmospheric Dispersion Factors

NRC QUESTION 1

The Nuclear Regulatory Commission (NRC) staff estimated the following distribution of atmospheric stability in the 1996 though 1998 hourly meteorological data files provided as Enclosure 3 to the November 6, 2006, submittal letter:

Stability Category	A	B	C	D	E	F	G
Frequency Occurrence	19.9%	3.7%	3.5%	16.5%	29.1%	13.2%	14.1%

The frequency of category D appears to be considerably lower, and categories A, F and G higher, than generally observed for other sites with a 50-meter (m) temperature difference (-T) interval. This distribution appears to be more similar to measurements made from a smaller –T interval or possibly a temperature sensor less than 10-m above the ground. Please confirm that the category distributions are estimated from –T measurements between the 60-m and 10–m levels and, if so, describe how the data were converted to represent measurements of C/100 meters. If these data are –T measurements made between the 60-m and 10-m levels, what factors contribute to the relatively low occurrence of category D and moderately frequent occurrences of the A, F and G stability category meteorological conditions at the HNP site?

SNC RESPONSE

The atmospheric dispersion factors (χ/Q) used for the alternative source term (AST) submittal, dated August 29, 2006, were documented in AST enclosure 1 sections 2.1.7 and 2.4. In a letter, dated November 6, 2006, SNC provided further information regarding the atmospheric dispersion factors as requested by the NRC via facsimile on September 29, 2006.

The stability classification category was determined from a delta temperature measurement between 60 and 10 meters. The raw delta temperature measurements that are made at the site are made in degrees Fahrenheit per 164 feet (60-10 meters). The reading is then normalized to degrees F/100 feet and converted to a stability class. SNC agrees that the distribution of stability classes is somewhat irregular, in particular with a higher amount of "A" stability class and a lesser than expected amount of "D" stability class. However, for the three year period of meteorological data that was used for the AST submittal (1996 through 1998), the percentages of the seven stability classes are consistent. See Table 1 for a breakdown of stability classification both by year and for the three year period.

The stability classification may have been affected by the growth of trees near the primary meteorological tower during the period of 1996 through 1998. In the spring of 2000, a walkdown identified trees within 100 meters of the primary tower that were taller than the primary tower 10 meter instrumentation. There were no trees or other obstructions as tall as the 60 meter instrumentation on the primary tower. Section 2.3 of the HNP Unit 2 FSAR, titled "Meteorology (HNP-1 and HNP-2)," documents that the primary tower was designed in accordance with a proposed revision 1 to Regulatory Guide (RG) 1.23 (it is noted that revision 1 to RG 1.23 was not issued until March, 2007). The referenced proposed revision to RG 1.23 recommended that obstructions taller than the tower instrumentation heights be at a distance away from the tower of at least 10 times the height of the affected instruments. In response to the observed conditions around the primary tower, SNC removed the trees around the primary tower out to approximately 330 feet from the tower. In addition, administrative controls were created to ensure that any potential obstructions within 330 feet of the primary tower are maintained at a height lower than the lowest primary tower instrumentation height.

With respect to the subject three year period of meteorological data, 1996 through 1998, the trees, while not close enough to the primary tower to shade the instrumentation, may have somewhat restricted air movement around the tower, particularly under low wind speed conditions at the 10 meter level. This would have reduced the mixing in the lower levels near the ground and would potentially cause more stable and unstable conditions to occur in the HNP meteorological data during the three years of data that were used in the AST submittal.

The result of this delta temperature data being somewhat atypical is that the main control room and technical support center χ/Qs that were calculated for the AST submittal would be conservative. The high percentage of "F and G" stabilities assures that the 0.5% or the 5% χ/Q values used for the main control room and technical support center radiological consequences analyses would be more conservative than if the percentages were lower as might be expected.

NRC QUESTION 2

Wind speeds measured at the 10-m level from 1996 through 1998 appear to be lighter than generally reported for other sites, than would be estimated by exponential extrapolation of the 60-m measurements to the 10-m level, and in comparison to the early 1970's data presented in Table 2.3-14 of the HNP Final Safety Analysis Report. NRC staff estimated the 5-percentile 1996 through 1998 10-m measured wind speed to be about 0.4 meters/second (m/s) while extrapolation of the 1996 though 1998 60-m winds result in a 5-percentile 10-m wind speed estimate slightly less than 1m/s. Further, the extrapolated 1970's data suggests a 10-m 5-percentile wind speed of approximately 0.7 m/s. Both the 1 m/s and 0.7 m/s estimates are more similar to the 5-percentile 10-m wind speeds reported at other sites. Do you agree that the 5-percentile 1996 through 1998 10-m wind speed measured at HNP was about 0.4 m/s? If so, what factors contributed to these light winds?

SNC RESPONSE

SNC agrees that the 5% wind speed for the 10 meter level on the primary meteorological tower for the period of 1996 through 1998 was 0.4 m/s. As discussed in response to NRC question 1, instrumentation measurements at the 10 meter level may have been affected by the growth of trees near the primary meteorological tower during the period of 1996 through 1998. SNC addressed the issue in 2000 consistent with applicable regulatory guidance.

Table 2 shows the average wind speed and 5% wind speed for the 10 and 60 meter levels on the primary tower for 1996 through 1998 and also for the last 3 years. It shows that there has only been a slight increase in the wind speed values since the trees were removed. Since HNP, with its location in southeastern Georgia, would be considered a low wind speed site, one would expect the impact of normal year-to-year climatic variation to be similar to the impact of trees around the primary tower.

The result of having slightly lower wind speeds is that the main control room and technical support center χ/Q values will be higher than would occur if the average 5% wind speed was 0.45 m/s as has occurred during the last three years. The higher χ/Q values are conservative for their application in determining the radiological dose consequences for the main control room and technical support center.

NRC QUESTION 3

Figures 4 and 5 of Enclosure 1 to the November 6, 2006, submittal provide wind roses of the 1996 through 1998 meteorological measurements. Calm winds are listed as having a frequency of occurrence of 0.95% at the 10-m level and 2.05% at the 60-m level. Are calms in this figure defined as winds less than one knot (nautical mile per hour) as suggested by the figure legends? If so, please confirm these estimates. Based upon the 1996 through 1998 hourly data, NRC staff estimated a frequency of approximately 10% for winds less than one knot at the 10-m level and 1% for winds at the 60-m level.

SNC RESPONSE

SNC agrees with the NRC estimate of calms based on review of the submitted 1996 through 1998 hourly meteorological data. SNC also performed a review of the 1996 through 1998 hourly data with calms defined as wind speeds lower than 0.5 m/s, approximately equivalent to 1 knot. Based on this criterion, SNC's review yielded calm wind frequencies of approximately 12% for the 10 meter level and 0.7% for the 60 meter level. These frequencies are comparable to the stated NRC estimates.

With respect to the referenced wind rose Figures 4 and 5 from the November 6, 2006 SNC letter, their purpose was to demonstrate that the 1996 through 1998 prevailing wind directions, not calm wind frequencies, remain similar to the historical values. This information was provided in response to NRC question 5, in the same letter, which requested a comparison between the one year meteorological data set used previously and the three year meteorological data set used in the AST submittal. It is noted that wind rose Figures 6 and 7 from the November 6, 2006 SNC letter, based on the one year data set, did not include the calm wind frequencies. The referenced figures 4 and 5 were developed using commercial wind rose software. The commercial software supported the accurate depiction of prevailing wind directions, the focus of the response to the NRC question. However, the software does not produce high quality calm wind frequencies.

Accurate estimation of the calm wind frequencies should be developed from direct review of the submitted 1996 through 1998 hourly meteorological data. As previously stated, the SNC estimate of calms based on such a review yields comparable results to the stated NRC estimates.

NRC QUESTION 4

Do the control room atmospheric dispersion factors (χ/Q values) listed in the response to NRC Question 1 of Enclosure 1 of the November 6, 2006, submittal include consideration of χ/Q values applicable to the main steamline break accident (MSLB) and scenarios involving a loss of offsite power and other single failure? Which χ/Q values were used to model unfiltered inleakage into the control room and what is the basis for their use?

SNC RESPONSE

The χ/Q values listed in the response to NRC question 1 in the November 6, 2006 SNC letter are not design basis accident (DBA) specific. These χ/Q values were used for determining the radiological doses for occupants in the main control room and technical support center for each of the HNP DBAs, specifically the loss-of-coolant accident, main steam line break accident, control rod drop accident, and fuel handling accident. The impacts of loss of offsite power and other single failures were considered as part of the overall radiological dose consequences analysis consistent with the guidance of RG 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," dated July, 2000, and the HNP current licensing basis.

As stated in the referenced response to NRC question 1 in the November 6, 2006 SNC letter, of all the release points evaluated for releases from the turbine building, the Unit 2 reactor building vent yields the highest main control room and technical support center χ/Q values. Hence, this release point is conservative regardless of whether there is loss of offsite power. Therefore, the reactor building vent χ/Q values are used for main control room and technical support center filtered air intake from the outside.

It is important to note that unfiltered inleakage into the main control room is modeled without χ/Q values as a direct flow from the turbine building to the main control room, conservatively reflecting the plant configuration with the common main control room located inside the HNP Unit 1 and 2 turbine buildings. Consequently, doses due to unfiltered inleakage and ingress/egress account for 99.9% of the main control room dose. The outside air intake pathway, modeled with the subject χ/Q values, contributes only 0.1% of the main control room dose.

NRC QUESTION 5

Please justify use of the 10-m and 60-m meteorological data to calculate the control room χ/Q values for postulated releases from the 101.7-m stack rather than meteorological data measured at the 10-m and 100-m levels. Regulatory Guide (RG) 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," and NRC Regulatory Issue Summary 2006-04, "Experience with Implementation of Alternative Source Terms," recommend that if wind measurements are available at more than two elevations, the data at the height closest to the release height should be used when running the ARCON96 computer code.

SNC RESPONSE

The 60 meter level wind speed and direction values were used rather than the 100 meter level for the main control room and technical support center χ/Q values because the data recovery rates at the 60 meter level were much better than at the 100 meter level. For the year 1996 the data recovery rate at 100 meters was below the 90% allowable rate per RG 1.23 guidance. Therefore, it was decided to use the 60 meter level for all three years to be consistent.

Using the 60 meter level rather than the 100 meter level to calculate the χ/Q values will result in conservative χ/Q values since the average wind speed values are lower at the 60m level.

NRC QUESTION 6

NRC staff notes that there are no 0-0.5 hour fumigation χ/Q values explicitly given for postulated releases from the Hatch stack to the exclusion area boundary (EAB) and low population zone (LPZ). RG 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," states that fumigation should be considered where applicable for the EAB and LPZ. For the EAB, the assumed fumigation period should be timed to be included in the worst 2-hour exposure period. Do the elevated release 0-2 hour EAB and LPZ χ/Q values include fumigation? If not, why is fumigation considered inapplicable?

SNC RESPONSE

Section 5.3 of RG 1.183 states the following: "Atmospheric dispersion values (χ/Q) for the EAB, the LPZ, and the control room that were approved by the staff during initial facility licensing or in subsequent licensing proceedings may be used in performing the radiological analyses identified by this guide." In addition, previously referenced Regulatory Issue Summary 2006-04 section 4 states: "Licensees may continue to use atmospheric relative concentration (χ/Q) values and methodologies from their existing licensing-basis analyses when appropriate."

As stated in the previously referenced sections 2.1.7 and 2.4 of enclosure 1 of the AST submittal, for the AST DBA offsite dose analyses SNC continued to apply the current licensing basis offsite χ/Q values. The specific EAB and LPZ χ/Q values used for AST are listed in table 5 of enclosure 1 of the AST submittal. The source information for table 5 came from Unit 2 FSAR table 2.3-11 which is applicable to both HNP Units 1 and 2.

Table 1
PERCENT OF EACH STABILITY CLASS
(60-10 Meter)

Stability Class	1996	1997	1998	3 Year Average
A	20.3	17.7	20.8	19.6
B	3.6	4.2	3.3	3.7
C	3.5	3.7	3.5	3.6
D	18.0	17.6	14.9	16.8
E	28.4	30.5	28.3	29.1
F	12.6	13.9	13.0	13.1
G	13.6	12.4	16.2	14.1
Percent Data Recovery	99.1	97.8	99.5	98.8

Table 2
WIND SPEED COMPARISON

	10 Meter Wind Speed (m/s)			60 Meter Wind Speed (m/s)		
Year	**Annual Average**	**5%**	**% Data Recovery**	**Annual Average**	**5%**	**% Data Recovery**
Before Trees Were Removed						
1996	1.53	0.45	99.28%	4.45	1.61	98.91%
1997	1.41	0.36	98.60%	4.17	1.43	98.31%
1998	1.45	0.40	99.73%	4.17	1.34	94.61%
3 Years 1996 - 1998	1.47	0.40	99.20%	4.22	1.39	99.10%
Trees Removed During 2000						
2000	1.43	0.27	96.16%	3.95	1.34	94.27%
Recent 3 Years						
2004	1.66	0.45	99.09%	4.20	1.56	99.55%
2005	1.66	0.45	98.79%	4.16	1.52	98.68%
2006	1.59	0.45	97.32%	4.11	1.65	97.37%
3 Years 2004 - 2006	1.64	0.45	98.31%	4.16	1.56	98.45%