Tennessee Valley Authority, 1101 Market Street, LP 5A, Chattanooga, Tennessee 37402-2801

August 14, 2008

10 CFR 52.79

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

In the Matter of)
Tennessee Valley Authority)

Docket No. 52-014 and 52-015

BELLEFONTE COMBINED LICENSE APPLICATION – RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION – LOCAL METEOROLOGY

Reference: Letter from Joseph M. Sebrosky (NRC) to Andrea L. Sterdis (TVA), Request for Additional Information Letter No. 077 Related to SRP Section 2.3.2 for the Bellefonte Units 3 and 4 Combined License Application, dated July 16, 2008

This letter provides the Tennessee Valley Authority's (TVA) response to the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) items included in the reference letter.

A response to each NRC request in the subject letter is addressed in the enclosure which also identifies any associated changes that will be made in a future revision of the BLN application.

The data provided on the attached CD-ROM (Attachment 02.03.02-04C) are SACTI input files so the staff may conduct a confirmatory analysis. The data is of a nature that it is not easily converted to PDF.

If you should have any questions, please contact Thomas Spink at 1101 Market Street, LP5A, Chattanooga, Tennessee 37402-2801, by telephone at (423) 751-7062, or via email at tespink@tva.gov

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 14th day of Aug, 2008.

Andrea L. Sterdis
Manager, New Nuclear Licensing and Industry Affairs
Nuclear Generation Development & Construction

Enclosure
cc: See Page 2

D085
NRO

cc: (Enclosures)

J. P. Berger, EDF
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K N. Slays, NuStart
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M.C Kray, NuStart
A.M. Monroe, SCE&G
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Enclosure
TVA letter dated August 14, 2008
RAI Responses

Responses to NRC Request for Additional Information letter No. 077 dated July 16, 2008
(12 pages, including this list)

Subject: Local Meteorology as presented in the Final Safety Analysis Report

RAI Number	Date of TVA Response
02.03.02-01	This letter – see following pages
02.03.02-02	This letter – see following pages
02.03.02-03	This letter – see following pages
02.03.02-04	This letter – see following pages
02.03.02-05	This letter – see following pages

Associated Additional Attachments / Enclosures	Pages Included
Attachment 02.03.02-04A	3
Attachment 02.03.02-04B	3
Attachment 02.03.02-04C	(Electronic File)

NRC Letter Dated: July 16, 2008

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 02.03.02-01

FSAR Tables 2.3-263 thru 2.3-265 are titled Temperature Means and Extremes for the individual data sets. Please clarify that all the data statistics presented in the tables are identified correctly as being monthly mean or extreme. For example, Table 2.3-264 (BLN 1979-1982) has a record minimum of -3.9°F. Table 2.3-263 (Scottsboro, AL) has a 28.3°F as the lowest temperature in the table. Please review these tables for consistency and add the second year (2007-2008) of BLN data where appropriate. Also add a statement/justify why Scottsboro was chosen for the temperature analysis when Huntsville data is used for other parameters.

BLN RAI ID: 0723

BLN RESPONSE:

FSAR Table 2.3-264 and Table 2.3-265 provide column headers which correctly describe the values presented (e.g., mean daily max, monthly mean, etc.). The BLN meteorological data from 1979–1982 is provided in response to NRC RAI Number 02.03.03-01 (see response to BLN-RAI-LTR-075). The current site temperature data given in Table 2.3-265 is provided only to show overall consistency with the historic temperature data from 1979–1982. Inclusion of an additional year of temperature data would not significantly affect the results currently provided. A 30-year Scottsboro, AL data set was provided to assist in any analysis requiring a longer term data span. Scottsboro is significantly closer to the BLN site than is Huntsville, AL and it offers geographical features similar to the BLN site; however, only a limited number of parameters are measured at Scottsboro. As such, Scottsboro data is the preferred data source for the available parameters.

FSAR Table 2.3-263 is a direct duplication of data tabulated in Reference 226, Climatology of the United States No. 81. The first three data columns are the same as given on page 10 of Reference 226 and the remaining data columns are the same as given on page 24 of Reference 226. FSAR Table 2.3-263 provides values that are monthly normal temperatures as specified on page 10 and 24 of Climatology of the United States No. 81. The site minimum recorded temperature of -3.9°F cannot be compared to the monthly normal minimum temperature of 28.3°F for Scottsboro.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. COLA Part 2, FSAR, Chapter 2, Subsection 2.3.1.1, seventh paragraph under the heading "Climate" will be revised from:

Table 2.3-263 presents temperature means and extremes for Scottsboro collected over a twenty-nine year period.

To read:

Table 2.3-263 presents monthly temperature means and extremes for Scottsboro collected over a twenty-nine year period.

2. COLA Part 2, FSAR, Chapter 2, Subsection 2.3.2.1.2 will be revised from:

Table 2.3-263 indicates that temperature extremes for Scottsboro, Alabama for the years 1971 through 2000 have ranged from the highest mean temperature of 81.8°F (July 1993) to the lowest mean of 26.8°F (January 1977) (Reference 226).

To read:

Table 2.3-263 indicates that monthly temperature extremes for Scottsboro, Alabama for the years 1971 through 2000 have ranged from the highest mean temperature of 81.8°F (July 1993) to the lowest mean of 26.8°F (January 1977) (Reference 226).

ATTACHMENTS:

None

NRC Letter Dated: July 16, 2008

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 02.03.02-02

FSAR section 2.3.2.1.3.2 states that Huntsville averaged 37 hours/year of fog from 2001 through 2005. The staff was unable to confirm the value from the reference (#227)/ website provided in section 2.3.7 of the FSAR. Additionally the 37 hours/year value seems low when compared to the NCDC LCD (SRP 2.3.1 reference #6) statistic of 19.9 days/year with "Heavy" fog. Please provide further clarification on where these data were obtained and how the annual estimate was calculated.

BLN RAI ID: 0724

BLN RESPONSE:

The unedited NCDC local climatological data set for Huntsville (FSAR Section 2.3; Reference 227) for the years 2001 through 2005 was imported into EXCEL. The duration of each unique instance of "FG" in the weather type column was summed, resulting in a total of 184 hours of fog. This total number was divided by the five year data span, resulting in 37 hours of fog per year. No distinction was made in the database relative to the fog intensity. Using this same data set to determine the number of days with recorded fog gives approximately 27 days of fog per year. Direct comparison of the number of days of "Heavy" fog reported in the LCD publication with this data is not possible because the incidence of heavy fog was not listed in the unedited NCDC local climatological data.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION REVISIONS:

No COLA revisions have been identified associated with this response.

ASSOCIATED ATTACHMENTS/ENCLOSURES:

None

NRC Letter Dated: July 16, 2008

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 02.03.02-03

Please verify that the monthly and average mixing heights and ventilation rates presented in FSAR Table 2.3-303 and Table 2.3-211 are correct. The staff was unable to reproduce the values presented in the tables. The staff values were higher. It appears that the missing/blank values in the mixing height data base were averaged into the calculation as zeros.

BLN RAI ID: 0725

BLN RESPONSE:

The monthly and average mixing height and ventilation rate values have been recalculated with the blank/missing data removed. FSAR Tables 2.3-303 and 2.3-211 and the associated text will be revised in a future COLA revision as indicated.

This response is PLANT SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. COLA Part 2, FSAR, Chapter 2, Subsection 2.3.1.1 will be revised from:

Based on the National Climatic Data Center (NCDC) SCRAM Mixing Height Data for Nashville, Tennessee (Reference 204), the mean midmorning mixing height for the area is about 572 meters in the winter, 542 meters in the spring, 405 meters in the summer, 415 meters in the fall, and 484 meters annually. The mean afternoon mixing height for the area is about 804 meters in the winter, 1527 meters in the spring, 1741 meters in the summer, 1231 meters in the fall, and 1325 meters annually (see Table 2.3-303).

To read:

Based on the Environmental Protection Agency (EPA) SCRAM Mixing Height Data for Nashville, Tennessee (Reference 204), the mean midmorning mixing height for the area is about 585 meters in the winter, 546 meters in the spring, 417 meters in the summer, 419 meters in the fall, and 492 meters annually. The mean afternoon mixing height for the area is about 843 meters in the winter, 1551 meters in the spring, 1796 meters in the summer, 1246 meters in the fall, and 1361 meters annually (see Table 2.3-303).

2. COLA Part 2, FSAR, Chapter 2, Subsection 2.3.2.1.5 will be revised from:

Morning ventilation is less than 4100 m^2/s throughout the year, and is less than 1500 m^2/s from June through October. Afternoon ventilation is higher than 7100 m^2/s from March through September, but lower than 5200 m^2/s from November through January.

To read:

Morning ventilation is less than 4300 m^2/s throughout the year, and is less than 1700 m^2/s from June through October. Afternoon ventilation is higher than 7300 m^2/s from March through September, but lower than 5600 m^2/s from November through January.

3. COLA Part 2, FSAR, Chapter 2, Subsection 2.3.7 will be revised from:

204. National Climatic Data Center (NCDC), Asheville, North Carolina, Website, SCRAM Mixing Height Data for Nashville, Tennessee for 1984 through 1991. http://www.epa.gov/scram001/mixingheightdata.htm, accessed 4/25/2007.

To read:

204. Environmental Protection Agency (EPA) Website, SCRAM Mixing Height Data for Nashville, Tennessee for 1984 through 1991, http://www.epa.gov/scram001/mixingheightdata.htm, accessed 4/25/2007.

4. COLA Part 2, FSAR, Chapter 2, Section 2.3, Table 2.3-211 will be revised from:

TABLE 2.3-211

MEAN VENTILATION RATE BY MONTH – NASHVILLE, TENNESSEE – 1984 – 1987 & 1990 – 1991

	Morning Ventilation Rate (m^2/s)	Afternoon Ventilation Rate (m^2/s)	Mean Ventilation Rate (m^2/s)
Jan	3076	4645	3860
Feb	4090	6643	5367
Mar	3605	9850	6728
Apr	2909	11472	7191
May	2355	8902	5629
Jun	1351	7164	4258
July	1264	7410	4337
Aug	1433	7292	4362
Sep	1492	7334	4413
Oct	1478	6873	4175
Nov	3041	5179	4110
Dec	3383	5017	4200

To read:

TABLE 2.3-211

MEAN VENTILATION RATE BY MONTH – NASHVILLE, TN

1984 – 1987 & 1990 – 1991

	Morning Ventilation Rate (m^2/s)	Afternoon Ventilation Rate (m^2/s)	Mean Ventilation Rate (m^2/s)
Jan	3259	5263	4261
Feb	4285	7041	5663
Mar	3633	10151	6892
Apr	3072	11943	7508
May	2351	8796	5574
Jun	1656	8594	5125
Jul	1382	8271	4827
Aug	1422	7385	4404
Sep	1507	7347	4427
Oct	1489	6958	4223
Nov	3193	5512	4352
Dec	3468	5375	4422

5. COLA Part 2, FSAR, Chapter 2, Section 2.3, Table 2.3-203 will be revised from:

TABLE 2.3-303

MIXING HEIGHTS AT NASHVILLE, TENNESSEE – 1984 – 1987 & 1990 – 1991

	Morning (m)	Afternoon (m)
January	566	747
February	595	949
March	580	1310
April	540	1718
May	505	1559
June	412	1706
July	382	1806
August	420	1709
September	376	1590
October	354	1244
November	518	857
December	559	726
Average	484	1327

To read:

TABLE 2.3-303

MIXING HEIGHTS AT NASHVILLE, TN

1984 – 1987 & 1990 – 1991

	Morning (m)	Afternoon (m)
Jan	583	805
Feb	611	977
Mar	584	1354
Apr	550	1747
May	505	1559
Jun	429	1779
Jul	399	1890
Aug	423	1718
Sep	378	1601
Oct	355	1255
Nov	525	881
Dec	564	756
Average	492	1361

Enclosure
TVA letter dated August 14, 2008
RAI Responses

ATTACHMENTS:

None

NRC Letter Dated: July 16, 2008

NRC Review of Final Safety Analysis Report

NRC RAI Number: 02.03.02-04

Please revise FSAR Section 2.3.2.2.1 to discuss the effects of salt and moisture deposition due to cooling tower operation on electrical transmission lines and other electrical equipment, including transformers and the switchyard.

Please describe any quantitative analysis performed to evaluate these effects, including providing a copy of the SACTI input files (*e.g., PREP.USR, MULT.USR, TABLES.USR, PAGE.USR*) and assumptions so the staff may conduct a confirmatory analysis.

BLN RAI ID: 0726

BLN Response:

A SACTI quantitative analysis was performed to determine plume characteristics of the cooling tower and the deposition rate of salt per area. It was determined that the towers do not deposit entrained moisture or salts within the first 6600 feet (~1.3 miles) due to high elevation of the discharge. This distance is well beyond the plants electrical substation and onsite transmission path. Attachment 02.03.04-04A indicates the direction of plume and the annual water deposition from the BLN Towers. As indicated, most deposition occurs to the S to SSW or NNE due to channeling of winds by the river valley (away from electrical equipment). The transmission lines are located northwest of the towers and enter the plant from the west and southwest. The substation is located almost due north of the towers and is outside the zone of influence of the plume. The assumptions used are included as Attachment 02.03.02-04B. An electronic copy of the SACTI input files are attached to this response as Attachment 02.03.02-04C.

Although the calculation referred to above was not intended to be relevant to an analysis of the effects of salt and moisture on electrical equipment, it did provide conclusions that show the results of plume behavior. The topic of electrical design and maintenance is the subject of FSAR Chapter 8, which provides for inspection of electrical equipment and necessary preventive and predictive maintenance tasks to prevent unanticipated failures. No changes are necessary to the BLN COLA as a result of the analysis.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION REVISIONS:

No COLA revisions have been identified associated with this response.

ASSOCIATED ATTACHMENTS/ENCLOSURES

Attachment 02.03.02-04A

Attachment 02.03.02-04B

Attachment 02.03.02-04C (Electronic)

NRC Letter Dated: July 16, 2008

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 02.03.02-05

FSAR section 2.3.2.1.3.1.2 states that the maximum snowfall at Scottsboro was 10.0 inches on February 15, 1958. FSAR section 2.3.1.2.2 states that the greatest snowfall in Scottsboro was 12 inches on March 13, 1993. The staff was able to verify the 12 inch value from the Southeast Regional Climate Center data for Scottsboro. Please review this apparent discrepancy for FSAR consistency.

Please also review for a typo the period of record and number of years reported (i.e., 1959-2005 not equal to 36 years).

BLN RAI ID: 0727

BLN RESPONSE:

The snowfall listed for February 15, 1958 in FSAR Subsection 2.3.2.1.3.1.2 is correct for this date but, as noted, this is not the maximum. The maximum snowfall of record is 12 inches on March 13, 1993. This information and the indicated typo will be corrected in a future revision to the COLA as indicated.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. COLA Part 2, FSAR, Chapter 2, Subsection 2.3.2.1.3.1.2, will be revised from:

Annual average snowfall in the BLN area is estimated to be two to four inches. This estimate is based on 36 years of record (1959-2005) at Huntsville...

To read:

Annual average snowfall in the BLN area is estimated to be two to four inches. This estimate is based on 47 years of record (1959-2005) at Huntsville...

2. COLA Part 2, FSAR, Chapter 2, Subsection 2.3.2.1.3.1.2, will be revised from:

The maximum snowfall at Scottsboro was 10.0 inches on February 15, 1958 (Reference 205).

To read:

The maximum snowfall at Scottsboro was 12.0 inches on March 13, 1993 (Reference 205).

ATTACHMENTS:

None

Attachment 02.03.02-04A

Cooling Tower Plume Deposition

TABLE 5.3-6
ANNUAL WATER DEPOSITION IN LB/(100-AC-MO)

Directions are directions that the plume is headed.

(mi)	(m)	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
1.24	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.3	2100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.37	2200	464	455	447	223	232	51	250	116	313	429	313	223	223	87	125	205
1.43	2300	1072	1072	1072	518	536	98	464	268	723	982	723	509	518	161	223	473
1.49	2400	393	384	375	188	196	37	179	98	268	357	268	188	188	63	88	170
1.55	2500	393	384	375	188	196	37	179	98	268	357	268	188	188	63	88	170
1.62	2600	393	384	375	188	196	37	179	98	268	357	268	188	188	63	88	170
1.68	2700	143	143	143	71	74	13	67	38	98	134	98	71	71	23	33	65
1.74	2800	143	143	143	71	74	13	67	38	98	134	98	71	71	23	33	65
1.8	2900	143	143	143	71	74	13	67	38	98	134	98	71	71	23	33	65
1.86	3000	143	143	143	71	74	13	67	38	98	134	98	71	71	23	33	65
1.93	3100	134	134	125	64	67	13	60	34	89	125	89	63	64	21	29	58
1.99	3200	5	1	1	3	3	0	0	1	3	1	0	3	3	0	0	2
2.05	3300	5	1	1	3	3	0	0	1	3	1	0	3	3	0	0	2
2.11	3400	5	1	1	3	3	0	0	1	3	1	0	3	3	0	0	2
2.17	3500	5	1	1	3	3	0	0	1	3	1	0	3	3	0	0	2
2.24	3600	5	1	1	3	3	0	0	1	3	1	0	3	3	0	0	2
2.3	3700	5	1	1	3	3	0	0	1	4	1	0	3	3	0	0	2
2.36	3800	5	1	1	3	3	0	0	1	3	1	0	3	3	0	0	2
2.42	3900	5	1	1	3	3	0	0	1	3	1	0	3	3	0	0	2
2.49	4000	5	1	1	3	3	0	0	1	3	1	0	3	3	0	0	2
2.55	4100	11	1	1	3	3	2	16	5	12	1	0	3	3	0	0	4
2.61	4200	57	1	1	10	10	10	77	38	85	1	0	3	3	0	0	24
2.67	4300	57	27	32	10	10	7	54	38	85	32	9	3	3	0	0	24
2.73	4400	35	134	161	7	7	4	33	22	50	161	42	3	3	0	0	15
2.8	4500	32	107	134	6	7	4	33	21	46	134	35	3	3	0	0	14
2.86	4600	28	61	72	4	4	4	33	20	43	72	20	0	0	0	0	12
2.92	4700	28	61	72	4	4	4	30	20	43	72	20	0	0	0	0	12
2.98	4800	24	61	72	3	3	3	27	17	38	72	20	0	0	0	0	11
3.04	4900	48	60	71	14	11	3	27	23	116	71	19	25	19	0	0	30
3.11	5000	268	48	57	107	79	3	27	86	848	57	15	250	188	0	0	214
3.42	5500	196	40	47	79	57	44	152	63	607	47	13	179	134	88	67	152
3.73	6000	81	39	46	32	23	12	46	28	250	46	13	71	53	22	17	63
4.04	6500	81	116	143	32	23	12	45	28	250	87	52	71	53	22	17	63
4.35	7000	76	107	125	31	22	12	40	24	241	74	48	71	53	22	17	61
4.66	7500	5	223	277	1	1	11	37	3	8	152	107	0	0	22	17	2
4.97	8000	241	500	598	152	50	14	36	52	152	313	232	84	70	25	28	98
5.28	8500	134	500	598	82	28	12	26	29	83	313	232	46	38	19	23	53
5.59	9000	107	179	196	68	22	9	20	22	66	85	63	38	31	15	19	43
5.9	9500	107	179	196	68	22	9	20	22	66	80	62	38	31	15	19	43
6.21	1e4	78	134	143	49	16	7	15	17	48	61	46	27	22	12	14	31

TABLE 5.3-7
ANNUAL SODIUM SALT DEPOSITION IN LB/(100-AC-MO)

Directions are directions that the plume is headed. Cutoff is 0.009 lb/(100-ac-mo). No deposition occurs in the first 2000m due to the high discharge of the plume.

(mi)	(m)	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
1.24	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.3	2100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.37	2200	0.036	0.036	0.036	0.018	0.018	0	0.018	0.009	0.027	0.036	0.027	0.018	0.018	0.009	0.009	0.018
1.43	2300	0.089	0.089	0.089	0.045	0.045	0.009	0.036	0.027	0.063	0.080	0.063	0.045	0.045	0.018	0.018	0.036
1.49	2400	0.036	0.036	0.036	0.018	0.018	0	0.018	0.009	0.027	0.036	0.027	0.018	0.018	0.009	0.009	0.018
1.55	2500	0.036	0.036	0.036	0.018	0.018	0	0.018	0.009	0.027	0.036	0.027	0.018	0.018	0.009	0.009	0.018
1.62	2600	0.036	0.036	0.036	0.018	0.018	0	0.018	0.009	0.027	0.036	0.027	0.018	0.018	0.009	0.009	0.018
1.68	2700	0.027	0.027	0.027	0.009	0.009	0	0.009	0.009	0.018	0.018	0.018	0.009	0.009	0	0.009	0.009
1.74	2800	0.027	0.027	0.027	0.009	0.009	0	0.009	0.009	0.018	0.018	0.018	0.009	0.009	0	0.009	0.009
1.8	2900	0.027	0.027	0.027	0.009	0.009	0	0.009	0.009	0.018	0.018	0.018	0.009	0.009	0	0.009	0.009
1.86	3000	0.027	0.027	0.027	0.009	0.009	0	0.009	0.009	0.018	0.018	0.018	0.009	0.009	0	0.009	0.009
1.93	3100	0.018	0.018	0.018	0.009	0.009	0	0.009	0.009	0.018	0.018	0.018	0.009	0.009	0	0.009	0.009
1.99	3200	0.009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.05	3300	0.009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.11	3400	0.009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.17	3500	0.009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.24	3600	0.009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.3	3700	0.054	0	0	0.027	0.018	0.009	0.027	0.018	0.045	0	0	0.027	0.027	0.018	0.018	0.027
2.36	3800	0.027	0	0	0.018	0.009	0	0	0.009	0.027	0	0	0.018	0.009	0	0	0.018
2.42	3900	0.009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.49	4000	0.009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.55	4100	0.009	0	0	0	0	0	0	0	0.009	0	0	0	0	0	0	0
2.61	4200	0.009	0	0	0	0	0	0	0	0.009	0	0	0	0	0	0	0
2.67	4300	0.009	0	0	0	0	0	0	0	0.009	0	0	0	0	0	0	0
2.73	4400	0.009	0.009	0.009	0	0	0	0	0	0.009	0.009	0	0	0	0	0	0
2.8	4500	0.009	0.009	0.009	0	0	0	0	0	0.009	0.009	0	0	0	0	0	0
2.86	4600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.92	4700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.98	4800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.04	4900	0	0	0	0	0	0	0	0	0.009	0	0	0	0	0	0	0
3.11	5000	0.009	0	0	0	0	0	0	0	0.036	0	0	0.009	0.009	0	0	0.009
3.42	5500	0.009	0	0	0	0	0	0.009	0	0.027	0	0	0.009	0.009	0	0	0.009
3.73	6000	0	0	0	0	0	0	0	0	0.009	0	0	0	0	0	0	0
4.04	6500	0	0.009	0.009	0	0	0	0	0	0.009	0	0	0	0	0	0	0
4.35	7000	0	0.009	0.009	0	0	0	0	0	0.009	0	0	0	0	0	0	0
4.66	7500	0	0.009	0.009	0	0	0	0	0	0	0.009	0.009	0	0	0	0	0
4.97	8000	0.009	0.018	0.027	0.009	0	0	0	0	0.009	0.009	0.009	0	0	0	0	0
5.28	8500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.59	9000	0.009	0.009	0.009	0	0	0	0	0	0	0	0	0	0	0	0	0
5.9	9500	0.009	0.009	0.009	0	0	0	0	0	0	0	0	0	0	0	0	0
6.21	10000	0.027	0.009	0.009	0.009	0	0	0	0	0.018	0	0	0.009	0.009	0	0	0.009

Attachment 02.03.02-04B

Cooling Tower Plume Analysis for
Assumptions made in SACTI Analysis

The assumptions used in the Seasonal and Annual Cooling Tower Impacts (SACTI) analysis performed for BLN Unit 3 and Unit 4 are as follows:

1. The meteorological data described in Section 5 are representative of future conditions, i.e.; past weather = future weather.
2. The Seasonal and Annual Cooling Tower Impacts (SACTI) computer software is used with its associated assumptions per Reference 1. It is noted that the SACTI code is mentioned in NUREG-1555, the Environmental Standard Review Plan, in Section 5.3.3.1, subsection III, Paragraph 5, where articles describing the Seasonal and Annual Cooling Tower Impacts code are cited (Reference 2).
3. Site met data was collected and data on an hourly basis is contained in the file Belldat.txt.
4. Since mixing height data was not available for the immediate area, mixing heights from Nashville, TN, were applied.

MIXING HEIGHTS AT NASHVILLE, TENNESSEE		
	Morning (m)	Afternoon (m)
Winter	573	804
Spring	542	1527
Summer	405	1741
Fall	415	1231
Average	484	1325

NOTES:

1. Data is from the EPA SCRAM Mixing Height Data collection for the period of 1984-1987 and 1990-1991 http://www.epa.gov/scram001/surfacemetdata.htm#tn.

5. The two NDCT towers are modeled together so that plume interaction is modeled.
6. A conservative air flow rate of 7 kg/s per MW is used for the analysis, since lower air flows promote plumes.
7. Water chemistry data show that dissolved solids and iron are not significant for this site. This is especially true since tall natural draft towers, like the ones proposed, disperse releases well and result in low deposition per area, as seen in the final results for sodium salt.
8. The surrounding valley is important primarily for determining that the prevailing winds are channeled along the valley (either NNE or more commonly SSW). The plume model itself is not modified for topography. That is a common approach for SACTI analyses when the terrain is relatively gentle. Here, the far side of the river has a ridge that rises 800 feet at a distance of about 2000m to the SE. As seen in the results, by the time the plume is 2000m in

length, the altitude is around 1000m (3000 ft). Therefore the impact of topography is assumed to be negligible.

References

1. SACTI User's Manual: Cooling-Tower-Plume Prediction Code, EPRI CS-3403-CCM, April 1984

2. NRC Environmental Standard Review Plan, NUREG-1555

Attachment 02.03.02-04C

SACTI Input Files

(Electronic copy)

Files (5) are:

tables.usr

Belldat.txt

prep.usr

mult.usr

mixht.tap