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UniStar
NUCLEAR ENERGY

10 CFR 50.4
10 CFR 52.79

October 30, 2008

UN#08-055

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

Subject: UniStar Nuclear Energy, NRC Docket No. 52-016
Submittal of Response to Requests for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3 – Meteorology

References:
1) John Rycyna (NRC) to J. Price (UniStar), "Calvert Cliffs Unit 3 COLA RAIs Nos. 1, 2, 3, 4, 5, FSAR Ch 2," dated June 27, 2008
2) George Vanderheyden (UniStar) to Document Control Desk (NRC), Submittal of Response to Request for Additional Information for the Calvert Cliffs Nuclear Power Plant, Unit 3 – Meterology, dated July 28, 2008

The purpose of this letter is to respond to requests for additional information (RAIs) identified in the NRC e-mail correspondence to UniStar Nuclear, dated June 27, 2008 (Reference). The referenced UniStar transmittal dated July 28, 2008 noted that responses for thirteen (13) of the thirty-six (36) questions would be provided by October 31, 2008. These RAIs address meteorology portions of the Final Safety Analysis Report as submitted in the CCNPP Unit 3 Combined License Application (COLA).

The enclosures provide responses to the RAIs and identify changes that will be made in future revisions of the CCNPP Unit 3 COLA.

D079
NRO

If there are any questions regarding this transmittal, please contact Mr. George Wrobel at (585) 771-3535.

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

Executed on October 30, 2008

for Greg Gibson

Enclosures: 1) Response Summary for NRC RAIs
2) Response to RAIs

cc: U.S. NRC Region I
U.S. NRC Resident Inspector, Calvert Cliffs Nuclear Power Plant, Units 1 and 2
NRC Environmental Project Manager, U.S. EPR Combined License Application
NRC Project Manager, U.S. EPR Combined License Application
NRC Project Manager, U.S. EPR Design Certification Application (w/o enclosures)

Enclosure 1

Response Summary for NRC RAIs

RAI Set 1

1)	02.03.05-1	This letter – see Enclosure 2.
2)	02.03.05-2	This letter – see Enclosure 2.

RAI Set 2

3)	02.03.04-2	This letter – see Enclosure 2.
4)	02.03.04-3	This letter – see Enclosure 2.

RAI Set 3

RAI Set 4

5)	02.03.02-1	This letter – see Enclosure 2.
6)	02.03.02-3	This letter – see Enclosure 2.
7)	02.03.02-7	This letter – see Enclosure 2.

RAI Set 5

8)	02.03.01-2	This letter – see Enclosure 2.
9)	02.03.01-5	This letter – see Enclosure 2.
10)	02.03.01-8	Follow-up response by this letter – see Enclosure 2
11)	02.03.01-9	This letter – see Enclosure 2.
12)	02.03.01-12	This letter – see Enclosure 2.
13)	02.03.01-13	Follow-up response by this letter – see Enclosure 2.

Enclosure 2

Response to RAIs

RAI No. 2.3.5-1

Please confirm the distance provided for the nearest garden in the West-Southwest (WSW) Sector. FSAR Table 2.3-130 listed the distance as 2414 meters, whereas the Land Use Survey from January 1 - December 31, 2006 lists the distance as 2253 meters. Please correct this discrepancy, including updating dispersion modeling results as appropriate.

Response:

The evaluations for the CCNPP Unit 3 FSAR were based on the CCNPP Units 1 and 2 Land Use Census data which uses those units as the reference point. The distances were recalculated to be specific to Unit 3. UniStar has reviewed the Units 1 and 2 data and determined that two values had been assigned to the wrong sectors.

The values have been corrected, recalculated for Unit 3, and are presented in a revised Table 2.3-130 (attached).

This change also affects values presented in Tables 2.3-120, 2.3-123, 2.3-126, and 2.3-129. Revised tables are attached.

FSAR Impact:

FSAR Section 2.3.5 tables 2.3-120, 2.3-123, 2.3-126, 2.3-129, and 2.3-130 will be revised as follows:

Table 2.3-120: CCNPP Unit 3 Normal Effluent Annual Average, Undecayed, Undepleted χ/Q Values for Mixed Mode Release Using 242,458 cfm Flow Rate for Special and Additional Receptors

Downwind Sector	χ/Q (sec/m^3) Site Boundary	χ/Q (sec/m^3) Nearest Residents	χ/Q (sec/m^3) Nearest Gardens
N	2.885E-06	N/A	N/A
NNE	9.558E-06	N/A	N/A
NE	1.379E-05	N/A	N/A
ENE	4.991E-06	N/A	N/A
E	2.778E-06	N/A	N/A
ESE	2.486E-06	N/A	N/A
SE	1.076E-06	8.707E-07	8.707E-07
SSE	5.252E-07	3.545E-07	3.054E-07
S	8.681E-07	3.717E-07	3.717E-07
SSW	8.366E-07	N/A	N/A
SW	4.960E-07	4.040E-07	3.009E-07
WSW	3.802E-07	4.279E-07	4.279E-07
W	2.914E-07	2.129E-07	1.495E-07
WNW	1.127E-07	1.053E-07	8.776E-08
NW	2.545E-07	5.686E-08	5.686E-08
NNW	1.699E-06	N/A	N/A

Table Table 2.3-123: CCNPP Unit 3 Normal Effluent Annual Average, Depleted χ/Q Values for Mixed Mode Release Using 242,458 cfm Flow Rate for Special and Additional Receptors

Downwind Sector	χ/Q (sec/m³) Site Boundary	χ/Q (sec/m³) Nearest Residents	χ/Q (sec/m³) Nearest Gardens
N	2.677E-06	N/A	N/A
NNE	9.030E-06	N/A	N/A
NE	1.301E-05	N/A	N/A
ENE	4.701E-06	N/A	N/A
E	2.597E-06	N/A	N/A
ESE	2.298E-06	N/A	N/A
SE	9.733E-07	7.859E-07	7.859E-07
SSE	4.789E-07	3.223E-07	2.773E-07
S	7.939E-07	3.389E-07	3.389E-07
SSW	7.759E-07	N/A	N/A
SW	4.573E-07	3.717E-07	2.758E-07
WSW	3.534E-07	3.980E-07	3.980E-07
W	2.753E-07	2.009E-07	1.407E-07
WNW	1.054E-07	9.872E-08	8.218E-08
NW	2.356E-07	5.233E-08	5.233E-08
NNW	1.570E-06	N/A	N/A

Table 2.3-126: CCNPP Unit 3 Normal Effluent Annual Average, Gamma χ/Q Values for Mixed Mode Release Using 242,458 cfm Flow Rate for Special and Additional Receptors

Downwind Sector	χ/Q (sec/m^3) Site Boundary	χ/Q (sec/m^3) Nearest Residents	χ/Q (sec/m^3) Nearest Gardens
N	1.872E-06	N/A	N/A
NNE	4.043E-06	N/A	N/A
NE	5.769E-06	N/A	N/A
ENE	2.580E-06	N/A	N/A
E	1.905E-06	N/A	N/A
ESE	1.733E-06	N/A	N/A
SE	8.150E-07	6.605E-07	6.605E-07
SSE	4.208E-07	2.810E-07	2.413E-07
S	7.118E-07	2.919E-07	2.919E-07
SSW	6.895E-07	N/A	N/A
SW	3.963E-07	3.218E-07	2.391E-07
WSW	3.261E-07	3.705E-07	3.705E-07
W	2.712E-07	1.900E-07	1.290E-07
WNW	1.171E-07	1.046E-07	8.503E-08
NW	2.580E-07	4.910E-08	4.910E-08
NNW	1.447E-06	N/A	N/A

Table 2.3-129: CCNPP Unit 3 Normal Effluent Annual Average, D/Q Values for Mixed Mode Release Using 242,458 cfm Flow Rate for Special and Additional Receptors

Downwind Sector	D/Q (1/m2) Site Boundary	D/Q (1/m2) Nearest Residents	D/Q (1/m2) Nearest Gardens
N	1.895E-08	N/A	N/A
NNE	5.101E-08	N/A	N/A
NE	8.617E-08	N/A	N/A
ENE	3.134E-08	N/A	N/A
E	1.978E-08	N/A	N/A
ESE	2.465E-08	N/A	N/A
SE	1.060E-08	8.234E-09	8.234E-09
SSE	4.730E-09	2.960E-09	2.475E-09
S	1.186E-08	4.068E-09	4.068E-09
SSW	9.686E-09	N/A	N/A
SW	5.493E-09	4.333E-09	3.074E-09
WSW	3.580E-09	4.115E-09	4.115E-09
W	2.159E-09	1.465E-09	9.487E-10
WNW	7.963E-10	6.835E-10	5.336E-10
NW	2.465E-09	3.322E-10	3.322E-10
NNW	2.064E-08	N/A	N/A

Table 2.3-130—Specific Locations of Receptors of Interest

Receptor	Distance Downwind m	Sector
Site Boundary	623.4 (2045.3)	N
Site Boundary	429.4 (1408.8)	NNE
Site Boundary	443.3 (1454.4)	NE
Site Boundary	471.0 (1545.3)	ENE
Site Boundary	554.1 (1817.9)	E
Site Boundary	692.7 (2272.6)	ESE
Site Boundary	1413.0 (4635.8)	SE
Site Boundary	1607.0 (5272.3)	SSE
Site Boundary	1385.0 (4544.0)	S
Site Boundary	1371.0 (4498).0	SSW
Site Boundary	1759.0 (5771.0)	SW
Site Boundary	1745.0 (5725.1)	WSW
Site Boundary	1732.0 (5682.4)	W
Site Boundary	2313.0 (7588.6)	WNW
Site Boundary	1662.0 (5452.8)	NW
Site Boundary	761.9 (2499.7)	NNW
Nearest Resident	1574.0 (5164.0)	SE
Nearest Resident	1969.0 (6460.0)	SSE
Nearest Resident	2206.0 (7237.5)	S
Nearest Resident	1945.0 (6381.2)	SW
Nearest Resident	1634.0 (5360.9)	WSW
Nearest Resident	2074.0 (6804.5)	W
Nearest Resident	2485.0 (8152.9)	WNW
Nearest Resident	4097.0 (13441.6)	NW
Nearest Garden	1574.0 (5164.0)	SE
Nearest Garden	2130.0 (6988.2)	SSE
Nearest Garden	2206.0 (7237.5)	S
Nearest Garden	2256.0 (7401.6)	SW
Nearest Garden	1634.0 (5360.9)	WSW
Nearest Garden	2529.0 (8297.2)	W
Nearest Garden	2795.0 (9169.9)	WNW
Nearest Garden	4097.0 (13441.6)	NW

RAI No. 2.3.5-2

FSAR Sections 2.3.4 and 2.3.5 stated that meteorological data summaries used as input to AEOLUS3 were provided in SAR Section 2.3.2. However, FSAR Section 2.3.2 only provided data summaries from 2000 through 2005, whereas SAR Sections 2.3.4 and 2.3.5 relied on data from 2000 through 2006. Furthermore, FSAR Section 2.3.5 states the following: "In Section 2.3.2, joint frequency distributions of wind speed and wind direction as a function of atmospheric stability class were determined using two sets of meteorological data from the on-site monitoring program: 2001-2005 and 2001-2006 (which included the most recent year of meteorological data)." FSAR Section 2.3.2 presented joint frequency distributions from 2000 through 2005. Please explain this apparent discrepancy.

Response:

The X/Q values provided in FSAR Sections 2.3.4 and 2.3.5 were determined using the 2001-2006 meteorological data. The joint frequency data were developed using two data sets as noted in the question. As stated in FSAR 2.3.5.2, paragraph 9, the differences in annual average atmospheric dispersion factor values seen when the 2006 meteorological data were included ranged from -3.4% to 6.8% over downwind distances from 0.5 to 50 miles, the impact of the difference in data sets is not significant. Nonetheless, the 2000-2006 joint frequency distribution tables of wind speed and direction as a function of atmospheric stability, provided below, will be presented in an update to FSAR Section 2.3.2.

FSAR Impact:

FSAR Section 2.3.2.1.1 will be updated to present the 2000-2006 joint frequency distribution tables of wind speed and direction as a function of atmospheric stability along with new Tables 2.3-138 and 2.3-139 as follows:

> Table 2.3-138 and Table 2.3-139 present annual joint frequency distributions (JFD's) of wind speed and direction as a function of atmospheric stability derived from the 2000-2006 data from the CCNPP on-site meteorological monitoring program. The hourly data used to calculate these tables were used to determine the atmospheric dispersion and deposition factors presented in Sections 2.3.4 and 2.3.5.

Table 2.3-138: CCNPP 33' (10-m) 2000-2006 Annual Joint Frequency Distribution Table
Page 1 of 8

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)

33.0 FT WIND DATA STABILITY CLASS A CLASS FREQUENCY (PERCENT) = 10.89

WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	LT .4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.2- .4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.4 - .9
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.5- 1.0	0	0	0	0	2	0	0	1	0	1	1	0	0	1	0	0	0	6	1.0 - 2.2
(1)	.00	.00	.00	.00	.03	.00	.00	.02	.00	.02	.02	.00	.00	.02	.00	.00	.00	.09	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	
1.1- 1.5	3	3	4	8	4	0	5	2	3	12	9	6	8	4	1	1	0	73	2.3 - 3.4
(1)	.05	.05	.06	.12	.06	.00	.08	.03	.05	.18	.14	.09	.12	.06	.02	.02	.00	1.11	
(2)	.00	.00	.01	.01	.01	.00	.01	.00	.00	.02	.01	.01	.01	.01	.00	.00	.00	.12	
1.6- 2.0	10	29	20	22	14	13	7	13	11	36	54	27	14	5	5	7	0	287	3.5 - 4.5
(1)	.15	.44	.31	.34	.21	.20	.11	.20	.17	.55	.82	.41	.21	.08	.08	.11	.00	4.38	
(2)	.02	.05	.03	.04	.02	.02	.01	.02	.02	.06	.09	.04	.02	.01	.01	.01	.00	.48	
2.1- 3.0	139	178	121	71	83	67	72	84	84	193	297	178	66	38	29	19	0	1719	4.6 - 6.7
(1)	2.12	2.72	1.85	1.08	1.27	1.02	1.10	1.28	1.28	2.95	4.53	2.72	1.01	.58	.44	.29	.00	26.24	
(2)	.23	.30	.20	.12	.14	.11	.12	.14	.14	.32	.49	.30	.11	.06	.05	.03	.00	2.86	
3.1- 4.0	317	280	120	21	31	39	112	168	73	152	329	215	99	92	76	60	0	2184	6.8 - 8.9
(1)	4.84	4.27	1.83	.32	.47	.60	1.71	2.56	1.11	2.32	5.02	3.28	1.51	1.40	1.16	.92	.00	33.34	
(2)	.53	.47	.20	.03	.05	.06	.19	.28	.12	.25	.55	.36	.16	.15	.13	.10	.00	3.63	
4.1- 5.0	179	105	49	9	5	10	54	110	36	88	183	84	76	117	136	49	0	1290	9.0 - 11.2
(1)	2.73	1.60	.75	.14	.08	.15	.82	1.68	.55	1.34	2.79	1.28	1.16	1.79	2.08	.75	.00	19.69	
(2)	.30	.17	.08	.01	.01	.02	.09	.18	.06	.15	.30	.14	.13	.19	.23	.08	.00	2.14	
5.1- 6.0	70	24	28	1	0	1	12	53	6	35	72	26	40	120	122	31	0	641	11.3 - 13.4
(1)	1.07	.37	.43	.02	.00	.02	.18	.81	.09	.53	1.10	.40	.61	1.83	1.86	.47	.00	9.78	
(2)	.12	.04	.05	.00	.00	.00	.02	.09	.01	.06	.12	.04	.07	.20	.20	.05	.00	1.07	
6.1- 8.0	16	1	15	3	0	0	0	28	1	9	19	13	17	80	106	16	0	324	13.5 - 17.9
(1)	.24	.02	.23	.05	.00	.00	.00	.43	.02	.14	.29	.20	.26	1.22	1.62	.24	.00	4.95	
(2)	.03	.00	.02	.00	.00	.00	.00	.05	.00	.01	.03	.02	.03	.13	.18	.03	.00	.54	
8.1-10.0	0	0	0	0	0	0	0	0	0	2	0	0	2	13	8	0	0	25	18.0 - 22.4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03	.00	.00	.03	.20	.12	.00	.00	.38	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	.01	.00	.00	.04	
10.1-89.5	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	22.5 - 200.2
(1)	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.03	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
ALL SPEEDS	734	620	358	135	139	130	262	459	214	528	964	549	323	470	483	183	0	6551	
(1)	11.20	9.46	5.46	2.06	2.12	1.98	4.00	7.01	3.27	8.06	14.72	8.38	4.93	7.17	7.37	2.79	.00	100.00	
(2)	1.22	1.03	.60	.22	.23	.22	.44	.76	.36	.88	1.60	.91	.54	.78	.80	.30	.00	10.89	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

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Table 2.3-138: CCNPP 33' (10-m) 2000-2006 Annual Joint Frequency Distribution Table
Page 2 of 8

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
33.0 FT WIND DATA STABILITY CLASS B CLASS FREQUENCY (PERCENT) = 4.50
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	LT .4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	.00	.00	.00	.00	.00	.04	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.2- .4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.4 - .9
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.5- 1.0	1	0	1	0	2	0	1	1	1	0	0	0	0	0	0	1	0	8	1.0 - 2.2
(1)	.04	.00	.04	.00	.07	.00	.04	.04	.04	.00	.00	.00	.00	.00	.00	.04	.00	.30	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	
1.1- 1.5	3	4	3	2	9	1	4	2	3	5	7	3	4	3	0	0	0	53	2.3 - 3.4
(1)	.11	.15	.11	.07	.33	.04	.15	.07	.11	.18	.26	.11	.15	.11	.00	.00	.00	1.96	
(2)	.00	.01	.00	.00	.01	.00	.01	.00	.00	.01	.01	.00	.01	.00	.00	.00	.00	.09	
1.6- 2.0	12	12	27	24	13	20	13	3	13	10	24	20	10	6	4	6	0	217	3.5 - 4.5
(1)	.44	.44	1.00	.89	.48	.74	.48	.11	.48	.37	.89	.74	.37	.22	.15	.22	.00	8.01	
(2)	.02	.02	.04	.04	.02	.03	.02	.00	.02	.02	.04	.03	.02	.01	.01	.01	.00	.36	
2.1- 3.0	103	132	74	70	53	36	48	44	40	58	69	70	46	31	17	15	0	906	4.6 - 6.7
(1)	3.80	4.87	2.73	2.58	1.96	1.33	1.77	1.62	1.48	2.14	2.55	2.58	1.70	1.14	.63	.55	.00	33.44	
(2)	.17	.22	.12	.12	.09	.06	.08	.07	.07	.10	.11	.12	.08	.05	.03	.02	.00	1.51	
3.1- 4.0	122	92	49	16	8	12	53	86	16	44	86	58	33	34	33	18	0	760	6.8 - 8.9
(1)	4.50	3.40	1.81	.59	.30	.44	1.96	3.17	.59	1.62	3.17	2.14	1.22	1.26	1.22	.66	.00	28.05	
(2)	.20	.15	.08	.03	.01	.02	.09	.14	.03	.07	.14	.10	.05	.06	.05	.03	.00	1.26	
4.1- 5.0	58	18	31	3	1	3	15	31	10	22	42	23	26	27	45	29	0	384	9.0 - 11.2
(1)	2.14	.66	1.14	.11	.04	.11	.55	1.14	.37	.81	1.55	.85	.96	1.00	1.66	1.07	.00	14.17	
(2)	.10	.03	.05	.00	.00	.00	.02	.05	.02	.04	.07	.04	.04	.04	.07	.05	.00	.64	
5.1- 6.0	43	10	17	4	0	1	4	21	3	5	17	4	14	26	44	15	0	228	11.3 - 13.4
(1)	1.59	.37	.63	.15	.00	.04	.15	.78	.11	.18	.63	.15	.52	.96	1.62	.55	.00	8.42	
(2)	.07	.02	.03	.01	.00	.00	.01	.03	.00	.01	.03	.01	.02	.04	.07	.02	.00	.38	
6.1- 8.0	10	2	4	4	0	0	2	12	1	4	6	5	5	38	38	10	0	141	13.5 - 17.9
(1)	.37	.07	.15	.15	.00	.00	.07	.44	.04	.15	.22	.18	.18	1.40	1.40	.37	.00	5.20	
(2)	.02	.00	.01	.01	.00	.00	.00	.02	.00	.01	.01	.01	.01	.06	.06	.02	.00	.23	
8.1-10.0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	7	0	0	10	18.0 - 22.4
(1)	.04	.00	.00	.00	.00	.00	.00	.04	.00	.00	.00	.00	.00	.04	.26	.00	.00	.37	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.02	
10.1-89.5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	22.5 - 200.2
(1)	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
ALL SPEEDS	354	270	206	123	86	73	140	201	87	148	251	184	138	166	188	94	0	2709	
(1)	13.07	9.97	7.60	4.54	3.17	2.69	5.17	7.42	3.21	5.46	9.27	6.79	5.09	6.13	6.94	3.47	.00	100.00	
(2)	.59	.45	.34	.20	.14	.12	.23	.33	.14	.25	.42	.31	.23	.28	.31	.16	.00	4.50	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-138: CCNPP 33' (10-m) 2000-2006 Annual Joint Frequency Distribution Table
Page 3 of 8

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
33.0 FT WIND DATA STABILITY CLASS C CLASS FREQUENCY (PERCENT) = 5.09
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	LT .4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.2- .4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	.4 - .9
(1)	.00	.00	.00	.00	.00	.03	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.5- 1.0	1	1	1	0	3	0	2	1	2	1	3	2	3	1	1	1	0	23	1.0 - 2.2
(1)	.03	.03	.03	.00	.10	.00	.07	.03	.07	.03	.10	.07	.10	.03	.03	.03	.00	.75	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	
1.1- 1.5	5	14	8	13	11	7	6	5	3	8	11	12	8	6	2	4	0	123	2.3 - 3.4
(1)	.16	.46	.26	.42	.36	.23	.20	.16	.10	.26	.36	.39	.26	.20	.07	.13	.00	4.02	
(2)	.01	.02	.01	.02	.02	.01	.01	.01	.00	.01	.02	.02	.01	.01	.00	.01	.00	.20	
1.6- 2.0	18	41	23	30	39	21	19	16	16	11	31	24	16	7	8	4	0	324	3.5 - 4.5
(1)	.59	1.34	.75	.98	1.27	.69	.62	.52	.52	.36	1.01	.78	.52	.23	.26	.13	.00	10.58	
(2)	.03	.07	.04	.05	.06	.03	.03	.03	.03	.02	.05	.04	.03	.01	.01	.01	.00	.54	
2.1- 3.0	132	163	107	79	58	44	56	63	39	60	108	76	48	38	36	25	0	1132	4.6 - 6.7
(1)	4.31	5.32	3.49	2.58	1.89	1.44	1.83	2.06	1.27	1.96	3.53	2.48	1.57	1.24	1.18	.82	.00	36.97	
(2)	.22	.27	.18	.13	.10	.07	.09	.10	.06	.10	.18	.13	.08	.06	.06	.04	.00	1.88	
3.1- 4.0	126	71	76	19	13	8	18	92	26	32	75	56	43	32	47	30	0	764	6.8 - 8.9
(1)	4.11	2.32	2.48	.62	.42	.26	.59	3.00	.85	1.05	2.45	1.83	1.40	1.05	1.53	.98	.00	24.95	
(2)	.21	.12	.13	.03	.02	.01	.03	.15	.04	.05	.12	.09	.07	.05	.08	.05	.00	1.27	
4.1- 5.0	56	22	35	7	3	2	9	44	8	18	35	27	15	33	46	26	0	386	9.0 - 11.2
(1)	1.83	.72	1.14	.23	.10	.07	.29	1.44	.26	.59	1.14	.88	.49	1.08	1.50	.85	.00	12.61	
(2)	.09	.04	.06	.01	.00	.00	.01	.07	.01	.03	.06	.04	.02	.05	.08	.04	.00	.64	
5.1- 6.0	15	10	18	9	0	0	3	15	2	2	19	5	8	24	31	10	0	171	11.3 - 13.4
(1)	.49	.33	.59	.29	.00	.00	.10	.49	.07	.07	.62	.16	.26	.78	1.01	.33	.00	5.58	
(2)	.02	.02	.03	.01	.00	.00	.00	.02	.00	.00	.03	.01	.01	.04	.05	.02	.00	.28	
6.1- 8.0	18	4	7	5	0	0	0	5	0	2	4	0	5	27	41	9	0	127	13.5 - 17.9
(1)	.59	.13	.23	.16	.00	.00	.00	.16	.00	.07	.13	.00	.16	.88	1.34	.29	.00	4.15	
(2)	.03	.01	.01	.01	.00	.00	.00	.01	.00	.00	.01	.00	.01	.04	.07	.01	.00	.21	
8.1-10.0	2	0	2	0	0	0	0	0	0	0	0	0	0	3	3	1	0	11	18.0 - 22.4
(1)	.07	.00	.07	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10	.10	.03	.00	.36	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	
10.1-89.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22.5 - 200.2
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
ALL SPEEDS	373	326	277	162	127	83	113	241	96	134	286	202	146	171	215	110	0	3062	
(1)	12.18	10.65	9.05	5.29	4.15	2.71	3.69	7.87	3.14	4.38	9.34	6.60	4.77	5.58	7.02	3.59	.00	100.00	
(2)	.62	.54	.46	.27	.21	.14	.19	.40	.16	.22	.48	.34	.24	.28	.36	.18	.00	5.09	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-138: CCNPP 33' (10-m) 2000-2006 Annual Joint Frequency Distribution Table

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)

33.0 FT WIND DATA STABILITY CLASS D CLASS FREQUENCY (PERCENT) = 33.91

WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	0	0	0	1	0	0	0	0	2	3	0	0	1	2	1	0	10	LT .4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.00	.00	.00	.01	.00	.00	.05	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	
.2- .4	1	1	0	2	0	0	1	1	2	2	2	2	4	5	0	1	0	24	.4 - .9
(1)	.00	.00	.00	.01	.00	.00	.00	.00	.01	.01	.01	.01	.02	.02	.00	.00	.00	.12	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.00	.00	.00	.04	
.5- 1.0	33	35	41	26	41	46	34	33	36	50	57	35	26	40	23	36	0	592	1.0 - 2.2
(1)	.16	.17	.20	.13	.20	.23	.17	.16	.18	.25	.28	.17	.13	.20	.11	.18	.00	2.90	
(2)	.05	.06	.07	.04	.07	.08	.06	.05	.06	.08	.09	.06	.04	.07	.04	.06	.00	.98	
1.1- 1.5	89	92	88	100	152	101	75	79	72	85	109	69	66	46	51	50	0	1324	2.3 - 3.4
(1)	.44	.45	.43	.49	.75	.50	.37	.39	.35	.42	.53	.34	.32	.23	.25	.25	.00	6.49	
(2)	.15	.15	.15	.17	.25	.17	.12	.13	.12	.14	.18	.11	.11	.08	.08	.08	.00	2.20	
1.6- 2.0	173	244	172	219	225	159	144	137	138	139	158	108	81	64	88	84	0	2333	3.5 - 4.5
(1)	.85	1.20	.84	1.07	1.10	.78	.71	.67	.68	.68	.77	.53	.40	.31	.43	.41	.00	11.44	
(2)	.29	.41	.29	.36	.37	.26	.24	.23	.23	.23	.26	.18	.13	.11	.15	.14	.00	3.88	
2.1- 3.0	487	577	448	573	434	274	304	463	284	242	375	282	184	171	287	303	0	5688	4.6 - 6.7
(1)	2.39	2.83	2.20	2.81	2.13	1.34	1.49	2.27	1.39	1.19	1.84	1.38	.90	.84	1.41	1.49	.00	27.89	
(2)	.81	.96	.74	.95	.72	.46	.51	.77	.47	.40	.62	.47	.31	.28	.48	.50	.00	9.45	
3.1- 4.0	470	352	470	445	186	116	153	406	179	154	294	191	114	150	374	452	0	4506	6.8 - 8.9
(1)	2.30	1.73	2.30	2.18	.91	.57	.75	1.99	.88	.76	1.44	.94	.56	.74	1.83	2.22	.00	22.09	
(2)	.78	.59	.78	.74	.31	.19	.25	.67	.30	.26	.49	.32	.19	.25	.62	.75	.00	7.49	
4.1- 5.0	384	285	403	243	48	19	53	221	80	80	188	80	65	144	334	324	0	2951	9.0 - 11.2
(1)	1.88	1.40	1.98	1.19	.24	.09	.26	1.08	.39	.39	.92	.39	.32	.71	1.64	1.59	.00	14.47	
(2)	.64	.47	.67	.40	.08	.03	.09	.37	.13	.13	.31	.13	.11	.24	.56	.54	.00	4.91	
5.1- 6.0	265	187	267	122	1	4	19	118	22	32	85	23	31	118	267	135	0	1696	11.3 - 13.4
(1)	1.30	.92	1.31	.60	.00	.02	.09	.58	.11	.16	.42	.11	.15	.58	1.31	.66	.00	8.31	
(2)	.44	.31	.44	.20	.00	.01	.03	.20	.04	.05	.14	.04	.05	.20	.44	.22	.00	2.82	
6.1- 8.0	204	110	211	53	3	2	13	62	17	17	15	12	15	133	162	49	0	1078	13.5 - 17.9
(1)	1.00	.54	1.03	.26	.01	.01	.06	.30	.08	.08	.07	.06	.07	.65	.79	.24	.00	5.29	
(2)	.34	.18	.35	.09	.00	.00	.02	.10	.03	.03	.02	.02	.02	.22	.27	.08	.00	1.79	
8.1-10.0	34	11	45	10	1	0	3	9	1	2	1	1	4	22	21	3	0	168	18.0 - 22.4
(1)	.17	.05	.22	.05	.00	.00	.01	.04	.00	.01	.00	.00	.02	.11	.10	.01	.00	.82	
(2)	.06	.02	.07	.02	.00	.00	.00	.01	.00	.00	.00	.00	.01	.04	.03	.00	.00	.28	
10.1-89.5	4	2	13	3	1	0	1	1	0	0	0	0	0	1	1	0	0	27	22.5 - 200.2
(1)	.02	.01	.06	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.13	
(2)	.01	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	
ALL SPEEDS	2144	1896	2158	1796	1093	721	800	1530	831	805	1287	803	590	895	1610	1438	0	20397	
(1)	10.51	9.30	10.58	8.81	5.36	3.53	3.92	7.50	4.07	3.95	6.31	3.94	2.89	4.39	7.89	7.05	.00	100.00	
(2)	3.56	3.15	3.59	2.99	1.82	1.20	1.33	2.54	1.38	1.34	2.14	1.33	.98	1.49	2.68	2.39	.00	33.91	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-138: CCNPP 33' (10-m) 2000-2006 Annual Joint Frequency Distribution Table

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
33.0 FT WIND DATA STABILITY CLASS E CLASS FREQUENCY (PERCENT) = 27.57
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	3	3	0	0	2	1	4	6	7	3	12	8	5	1	2	1	0	58	LT .4
(1)	.02	.02	.00	.00	.01	.01	.02	.04	.04	.02	.07	.05	.03	.01	.01	.01	.00	.35	
(2)	.00	.00	.00	.00	.00	.00	.01	.01	.01	.00	.02	.01	.01	.00	.00	.00	.00	.10	
.2- .4	3	2	7	2	4	7	8	10	17	19	10	13	15	7	8	1	0	133	.4 - .9
(1)	.02	.01	.04	.01	.02	.04	.05	.06	.10	.11	.06	.08	.09	.04	.05	.01	.00	.80	
(2)	.00	.00	.01	.00	.01	.01	.01	.02	.03	.03	.02	.02	.02	.01	.01	.00	.00	.22	
.5- 1.0	54	42	35	40	59	65	67	83	120	132	137	100	81	52	63	63	0	1193	1.0 - 2.2
(1)	.33	.25	.21	.24	.36	.39	.40	.50	.72	.80	.83	.60	.49	.31	.38	.38	.00	7.19	
(2)	.09	.07	.06	.07	.10	.11	.11	.14	.20	.22	.23	.17	.13	.09	.10	.10	.00	1.98	
1.1- 1.5	110	107	75	64	68	81	98	144	235	299	278	165	134	127	152	84	0	2221	2.3 - 3.4
(1)	.66	.65	.45	.39	.41	.49	.59	.87	1.42	1.80	1.68	.99	.81	.77	.92	.51	.00	13.39	
(2)	.18	.18	.12	.11	.11	.13	.16	.24	.39	.50	.46	.27	.22	.21	.25	.14	.00	3.69	
1.6- 2.0	137	141	63	76	99	70	115	184	296	309	319	204	178	214	233	175	0	2813	3.5 - 4.5
(1)	.83	.85	.38	.46	.60	.42	.69	1.11	1.78	1.86	1.92	1.23	1.07	1.29	1.40	1.05	.00	16.96	
(2)	.23	.23	.10	.13	.16	.12	.19	.31	.49	.51	.53	.34	.30	.36	.39	.29	.00	4.68	
2.1- 3.0	244	213	134	101	105	71	102	270	566	630	871	364	281	354	657	365	0	5328	4.6 - 6.7
(1)	1:47	1.28	.81	.61	.63	.43	.61	1.63	3.41	3.80	5.25	2.19	1.69	2.13	3.96	2.20	.00	32.12	
(2)	.41	.35	.22	.17	.17	.12	.17	.45	.94	1.05	1.45	.61	.47	.59	1.09	.61	.00	8.86	
3.1- 4.0	162	100	88	38	16	16	36	157	234	360	775	162	123	182	393	221	0	3063	6.8 - 8.9
(1)	.98	.60	.53	.23	.10	.10	.22	.95	1.41	2.17	4.67	.98	.74	1.10	2.37	1.33	.00	18.47	
(2)	.27	.17	.15	.06	.03	.03	.06	.26	.39	.60	1.29	.27	.20	.30	.65	.37	.00	5.09	
4.1- 5.0	78	36	33	6	8	5	11	78	77	163	292	54	47	110	119	78	0	1195	9.0 - 11.2
(1)	.47	.22	.20	.04	.05	.03	.07	.47	.46	.98	1.76	.33	.28	.66	.72	.47	.00	7.20	
(2)	.13	.06	.05	.01	.01	.01	.02	.13	.13	.27	.49	.09	.08	.18	.20	.13	.00	1.99	
5.1- 6.0	34	15	7	0	2	1	5	30	23	56	94	12	18	48	44	18	0	407	11.3 - 13.4
(1)	.20	.09	.04	.00	.01	.01	.03	.18	.14	.34	.57	.07	.11	.29	.27	.11	.00	2.45	
(2)	.06	.02	.01	.00	.00	.00	.01	.05	.04	.09	.16	.02	.03	.08	.07	.03	.00	.68	
6.1- 8.0	13	1	2	2	0	1	4	25	9	12	16	3	6	22	14	4	0	134	13.5 - 17.9
(1)	.08	.01	.01	.01	.00	.01	.02	.15	.05	.07	.10	.02	.04	.13	.08	.02	.00	.81	
(2)	.02	.00	.00	.00	.00	.00	.01	.04	.01	.02	.03	.00	.01	.04	.02	.01	.00	.22	
8.1-10.0	7	1	0	0	0	0	1	5	0	0	0	2	0	6	2	4	0	28	18.0 - 22.4
(1)	.04	.01	.00	.00	.00	.00	.01	.03	.00	.00	.00	.01	.00	.04	.01	.02	.00	.17	
(2)	.01	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.01	.00	.01	.00	.05	
10.1-89.5	0	0	8	2	0	2	2	0	0	0	0	0	0	1	0	0	0	15	22.5 - 200.2
(1)	.00	.00	.05	.01	.00	.01	.01	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.09	
(2)	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	
ALL SPEEDS	845	661	452	331	363	320	453	992	1584	1983	2804	1087	888	1124	1687	1014	0	16588	
(1)	5.09	3.98	2.72	2.00	2.19	1.93	2.73	5.98	9.55	11:95	16.90	6.55	5.35	6.78	10.17	6.11	.00	100.00	
(2)	1.40	1.10	.75	.55	.60	.53	.75	1.65	2.63	3.30	4.66	1.81	1.48	1.87	2.80	1.69	.00	27.57	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-138: CCNPP 33' (10-m) 2000-2006 Annual Joint Frequency Distribution Table
Page 6 of 8

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
33.0 FT WIND DATA STABILITY CLASS F CLASS FREQUENCY (PERCENT) = 10.52
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	4	2	2	2	2	3	2	8	9	9	9	3	4	4	1	0	64	LT .4
(1)	.00	.06	.03	.03	.03	.03	.05	.03	.13	.14	.14	.14	.05	.06	.06	.02	.00	1.01	
(2)	.00	.01	.00	.00	.00	.00	.00	.00	.01	.01	.01	.01	.00	.01	.01	.00	.00	.11	
.2- .4	0	2	6	2	9	8	8	12	11	19	11	5	7	10	1	6	0	117	.4 - .9
(1)	.00	.03	.09	.03	.14	.13	.13	.19	.17	.30	.17	.08	.11	.16	.02	.09	.00	1.85	
(2)	.00	.00	.01	.00	.01	.01	.01	.02	.02	.03	.02	.01	.01	.02	.00	.01	.00	.19	
.5- 1.0	31	29	41	27	22	41	30	55	104	150	179	110	82	71	28	32	0	1032	1.0 - 2.2
(1)	.49	.46	.65	.43	.35	.65	.47	.87	1.64	2.37	2.83	1.74	1.30	1.12	.44	.51	.00	16.31	
(2)	.05	.05	.07	.04	.04	.07	.05	.09	.17	.25	.30	.18	.14	.12	.05	.05	.00	1.72	
1.1- 1.5	25	27	24	16	15	24	36	83	216	373	342	177	104	127	71	30	0	1690	2.3 - 3.4
(1)	.40	.43	.38	.25	.24	.38	.57	1.31	3.41	5.89	5.40	2.80	1.64	2.01	1.12	.47	.00	26.71	
(2)	.04	.04	.04	.03	.02	.04	.06	.14	.36	.62	.57	.29	.17	.21	.12	.05	.00	2.81	
1.6- 2.0	20	26	13	18	6	6	27	85	187	344	374	190	135	154	107	24	0	1716	3.5 - 4.5
(1)	.32	.41	.21	.28	.09	.09	.43	1.34	2.96	5.44	5.91	3.00	2.13	2.43	1.69	.38	.00	27.12	
(2)	.03	.04	.02	.03	.01	.01	.04	.14	.31	.57	.62	.32	.22	.26	.18	.04	.00	2.85	
2.1- 3.0	23	37	12	9	5	1	15	38	104	229	458	172	92	135	132	11	0	1473	4.6 - 6.7
(1)	.36	.58	.19	.14	.08	.02	.24	.60	1.64	3.62	7.24	2.72	1.45	2.13	2.09	.17	.00	23.28	
(2)	.04	.06	.02	.01	.01	.00	.02	.06	.17	.38	.76	.29	.15	.22	.22	.02	.00	2.45	
3.1- 4.0	2	9	2	2	0	0	0	1	12	25	81	16	6	5	12	1	0	174	6.8 - 8.9
(1)	.03	.14	.03	.03	.00	.00	.00	.02	.19	.40	1.28	.25	.09	.08	.19	.02	.00	2.75	
(2)	.00	.01	.00	.00	.00	.00	.00	.00	.02	.04	.13	.03	.01	.01	.02	.00	.00	.29	
4.1- 5.0	3	4	3	8	2	0	0	0	1	2	11	0	1	0	2	0	0	37	9.0 - 11.2
(1)	.05	.06	.05	.13	.03	.00	.00	.00	.02	.03	.17	.00	.02	.00	.03	.00	.00	.58	
(2)	.00	.01	.00	.01	.00	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.06	
5.1- 6.0	5	1	2	6	2	0	0	0	0	0	2	0	1	0	0	2	0	21	11.3 - 13.4
(1)	.08	.02	.03	.09	.03	.00	.00	.00	.00	.00	.03	.00	.02	.00	.00	.03	.00	.33	
(2)	.01	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03	
6.1- 8.0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	13.5 - 17.9
(1)	.02	.02	.03	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.06	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	
8.1-10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18.0 - 22.4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
10.1-89.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22.5 - 200.2
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
ALL SPEEDS	110	140	107	90	63	82	119	276	643	1151	1467	679	431	506	357	107	0	6328	
(1)	1.74	2.21	1.69	1.42	1.00	1.30	1.88	4.36	10.16	18.19	23.18	10.73	6.81	8.00	5.64	1.69	.00	100.00	
(2)	.18	.23	.18	.15	.10	.14	.20	.46	1.07	1.91	2.44	1.13	.72	.84	.59	.18	.00	10.52	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-138: CCNPP 33' (10-m) 2000-2006 Annual Joint Frequency Distribution Table
Page 7 of 8

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
33.0 FT WIND DATA STABILITY CLASS G CLASS FREQUENCY (PERCENT) = 7.52
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	1	1	2	2	1	2	3	9	5	12	15	3	1	2	2	0	61	LT .4
(1)	.00	.02	.02	.04	.04	.02	.04	.07	.20	.11	.27	.33	.07	.02	.04	.04	.00	1.35	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.02	.02	.00	.00	.00	.00	.00	.10	
.2- .4	2	0	2	3	1	7	3	6	16	23	24	18	18	7	7	3	0	140	.4 - .9
(1)	.04	.00	.04	.07	.02	.15	.07	.13	.35	.51	.53	.40	.40	.15	.15	.07	.00	3.09	
(2)	.00	.00	.00	.00	.00	.01	.00	.01	.03	.04	.04	.03	.03	.01	.01	.00	.00	.23	
.5- 1.0	15	4	9	12	9	12	9	30	64	119	193	196	162	108	21	12	0	975	1.0 - 2.2
(1)	.33	.09	.20	.27	.20	.27	.20	.66	1.41	2.63	4.27	4.33	3.58	2.39	.46	.27	.00	21.55	
(2)	.02	.01	.01	.02	.01	.02	.01	.05	.11	.20	.32	.33	.27	.18	.03	.02	.00	1.62	
1.1- 1.5	6	6	9	8	2	6	7	23	119	393	488	270	167	126	18	3	0	1651	2.3 - 3.4
(1)	.13	.13	.20	.18	.04	.13	.15	.51	2.63	8.69	10.79	5.97	3.69	2.79	.40	.07	.00	36.49	
(2)	.01	.01	.01	.01	.00	.01	.01	.04	.20	.65	.81	.45	.28	.21	.03	.00	.00	2.74	
1.6- 2.0	1	8	2	9	0	8	4	22	82	263	378	138	108	126	26	5	0	1180	3.5 - 4.5
(1)	.02	.18	.04	.20	.00	.18	.09	.49	1.81	5.81	8.36	3.05	2.39	2.79	.57	.11	.00	26.08	
(2)	.00	.01	.00	.01	.00	.01	.01	.04	.14	.44	.63	.23	.18	.21	.04	.01	.00	1.96	
2.1- 3.0	1	4	3	0	0	2	2	7	22	64	160	72	55	51	21	2	0	466	4.6 - 6.7
(1)	.02	.09	.07	.00	.00	.04	.04	.15	.49	1.41	3.54	1.59	1.22	1.13	.46	.04	.00	10.30	
(2)	.00	.01	.00	.00	.00	.00	.00	.01	.04	.11	.27	.12	.09	.08	.03	.00	.00	.77	
3.1- 4.0	0	1	0	0	0	0	0	1	0	3	3	1	3	0	2	0	0	14	6.8 - 8.9
(1)	.00	.02	.00	.00	.00	.00	.00	.02	.00	.07	.07	.02	.07	.00	.04	.00	.00	.31	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	
4.1- 5.0	0	1	2	5	1	0	0	0	0	0	1	0	0	1	5	0	0	16	9.0 - 11.2
(1)	.00	.02	.04	.11	.02	.00	.00	.00	.00	.00	.02	.00	.00	.02	.11	.00	.00	.35	
(2)	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.03	
5.1- 6.0	0	0	3	2	0	0	0	0	0	0	0	0	0	1	1	0	0	7	11.3 - 13.4
(1)	.00	.00	.07	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	.02	.00	.00	.15	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	
6.1- 8.0	0	0	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	9	13.5 - 17.9
(1)	.00	.00	.18	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.20	
(2)	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	
8.1-10.0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	18.0 - 22.4
(1)	.00	.00	.07	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.11	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	
10.1-89.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22.5 - 200.2
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
ALL SPEEDS	25	25	42	44	15	36	27	92	312	870	1259	710	516	421	103	27	0	4524	
(1)	.55	.55	.93	.97	.33	.80	.60	2.03	6.90	19.23	27.83	15.69	11.41	9.31	2.28	.60	.00	100.00	
(2)	.04	.04	.07	.07	.02	.06	.04	.15	.52	1.45	2.09	1.18	.86	.70	.17	.04	.00	7.52	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-138: CCNPP 33' (10-m) 2000-2006 Annual Joint Frequency Distribution Table
Page 8 of 8

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
33.0 FT WIND DATA STABILITY CLASS ALL CLASS FREQUENCY (PERCENT) = 100.00
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	3	8	3	4	7	4	9	11	24	19	36	33	11	7	10	5	0	194	LT .4
(1)	.00	.01	.00	.01	.01	.01	.01	.02	.04	.03	.06	.05	.02	.01	.02	.01	.00	.32	
(2)	.00	.01	.00	.01	.01	.01	.01	.02	.04	.03	.06	.05	.02	.01	.02	.01	.00	.32	
.2- .4	6	5	15	9	14	23	20	29	46	63	47	38	44	29	16	11	0	415	.4 - .9
(1)	.01	.01	.02	.01	.02	.04	.03	.05	.08	.10	.08	.06	.07	.05	.03	.02	.00	.69	
(2)	.01	.01	.02	.01	.02	.04	.03	.05	.08	.10	.08	.06	.07	.05	.03	.02	.00	.69	
.5- 1.0	135	111	128	105	138	164	143	204	327	453	570	443	354	273	136	145	0	3829	1.0 - 2.2
(1)	.22	.18	.21	.17	.23	.27	.24	.34	.54	.75	.95	.74	.59	.45	.23	.24	.00	6.36	
(2)	.22	.18	.21	.17	.23	.27	.24	.34	.54	.75	.95	.74	.59	.45	.23	.24	.00	6.36	
1.1- 1.5	241	253	211	211	261	220	231	338	651	1175	1244	702	491	439	295	172	0	7135	2.3 - 3.4
(1)	.40	.42	.35	.35	.43	.37	.38	.56	1.08	1.95	2.07	1.17	.82	.73	.49	.29	.00	11.86	
(2)	.40	.42	.35	.35	.43	.37	.38	.56	1.08	1.95	2.07	1.17	.82	.73	.49	.29	.00	11.86	
1.6- 2.0	371	501	320	398	396	297	329	460	743	1112	1338	711	542	576	471	305	0	8870	3.5 - 4.5
(1)	.62	.83	.53	.66	.66	.49	.55	.76	1.24	1.85	2.22	1.18	.90	.96	.78	.51	.00	14.74	
(2)	.62	.83	.53	.66	.66	.49	.55	.76	1.24	1.85	2.22	1.18	.90	.96	.78	.51	.00	14.74	
2.1- 3.0	1129	1304	899	903	738	495	599	969	1139	1476	2338	1214	772	818	1179	740	0	16712	4.6 - 6.7
(1)	1.88	2.17	1.49	1.50	1.23	.82	1.00	1.61	1.89	2.45	3.89	2.02	1.28	1.36	1.96	1.23	.00	27.78	
(2)	1.88	2.17	1.49	1.50	1.23	.82	1.00	1.61	1.89	2.45	3.89	2.02	1.28	1.36	1.96	1.23	.00	27.78	
3.1- 4.0	1199	905	805	541	254	191	372	911	540	770	1643	699	421	495	937	782	0	11465	6.8 - 8.9
(1)	1.99	1.50	1.34	.90	.42	.32	.62	1.51	.90	1.28	2.73	1.16	.70	.82	1.56	1.30	.00	19.06	
(2)	1.99	1.50	1.34	.90	.42	.32	.62	1.51	.90	1.28	2.73	1.16	.70	.82	1.56	1.30	.00	19.06	
4.1- 5.0	758	471	556	281	68	39	142	484	212	373	752	268	230	432	687	506	0	6259	9.0 - 11.2
(1)	1.26	.78	.92	.47	.11	.06	.24	.80	.35	.62	1.25	.45	.38	.72	1.14	.84	.00	10.40	
(2)	1.26	.78	.92	.47	.11	.06	.24	.80	.35	.62	1.25	.45	.38	.72	1.14	.84	.00	10.40	
5.1- 6.0	432	247	342	144	5	7	43	237	56	130	289	70	112	337	509	211	0	3171	11.3 - 13.4
(1)	.72	.41	.57	.24	.01	.01	.07	.39	.09	.22	.48	.12	.19	.56	.85	.35	.00	5.27	
(2)	.72	.41	.57	.24	.01	.01	.07	.39	.09	.22	.48	.12	.19	.56	.85	.35	.00	5.27	
6.1- 8.0	262	119	249	68	3	3	19	132	28	44	60	33	48	300	361	88	0	1817	13.5 - 17.9
(1)	.44	.20	.41	.11	.00	.00	.03	.22	.05	.07	.10	.05	.08	.50	.60	.15	.00	3.02	
(2)	.44	.20	.41	.11	.00	.00	.03	.22	.05	.07	.10	.05	.08	.50	.60	.15	.00	3.02	
8.1-10.0	44	12	50	12	1	0	4	15	1	4	1	3	6	45	41	8	0	247	18.0 - 22.4
(1)	.07	.02	.08	.02	.00	.00	.01	.02	.00	.01	.00	.00	.01	.07	.07	.01	.00	.41	
(2)	.07	.02	.08	.02	.00	.00	.01	.02	.00	.01	.00	.00	.01	.07	.07	.01	.00	.41	
10.1-89.5	5	2	22	5	1	2	3	1	0	0	0	0	1	2	1	0	0	45	22.5 - 200.2
(1)	.01	.00	.04	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.07	
(2)	.01	.00	.04	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.07	
ALL SPEEDS	4585	3938	3600	2681	1886	1445	1914	3791	3767	5619	8318	4214	3032	3753	4643	2973	0	60159	
(1)	7.62	6.55	5.98	4.46	3.14	2.40	3.18	6.30	6.26	9.34	13.83	7.00	5.04	6.24	7.72	4.94	.00	100.00	
(2)	7.62	6.55	5.98	4.46	3.14	2.40	3.18	6.30	6.26	9.34	13.83	7.00	5.04	6.24	7.72	4.94	.00	100.00	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-139: CCNPP 197' (60-m) 2000-2006 Annual Joint Frequency Distribution Table

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER) 197.0 FT WIND DATA STABILITY CLASS A CLASS FREQUENCY (PERCENT) = 10.94

WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	LT .4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.2- .4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.4 - .9
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.5- 1.0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1.0 - 2.2
(1)	.00	.00	.02	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
1.1- 1.5	2	3	2	3	4	2	1	1	0	1	0	1	1	1	0	0	0	22	2.3 - 3.4
(1)	.03	.05	.03	.05	.06	.03	.02	.02	.00	.02	.00	.02	.02	.02	.00	.00	.00	.34	
(2)	.00	.01	.00	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	
1.6- 2.0	12	13	9	12	20	1	1	1	2	4	12	11	6	0	1	6	0	111	3.5 - 4.5
(1)	.18	.20	.14	.18	.31	.02	.02	.02	.03	.06	.18	.17	.09	.00	.02	.09	.00	1.70	
(2)	.02	.02	.02	.02	.03	.00	.00	.00	.00	.01	.02	.02	.01	.00	.00	.01	.00	.19	
2.1- 3.0	75	91	58	55	76	48	26	22	29	48	77	33	17	10	10	15	0	690	4.6 - 6.7
(1)	1.15	1.39	.89	.84	1.16	.73	.40	.34	.44	.73	1.18	.51	.26	.15	.15	.23	.00	10.56	
(2)	.13	.15	.10	.09	.13	.08	.04	.04	.05	.08	.13	.06	.03	.02	.02	.03	.00	1.16	
3.1- 4.0	166	181	38	18	30	54	63	91	54	120	157	93	42	27	18	22	0	1174	6.8 - 8.9
(1)	2.54	2.77	.58	.28	.46	.83	.96	1.39	.83	1.84	2.40	1.42	.64	.41	.28	.34	.00	17.97	
(2)	.28	.30	.06	.03	.05	.09	.11	.15	.09	.20	.26	.16	.07	.05	.03	.04	.00	1.97	
4.1- 5.0	246	132	20	6	14	32	79	112	52	150	222	112	64	50	59	42	0	1392	9.0 - 11.2
(1)	3.77	2.02	.31	.09	.21	.49	1.21	1.71	.80	2.30	3.40	1.71	.98	.77	.90	.64	.00	21.31	
(2)	.41	.22	.03	.01	.02	.05	.13	.19	.09	.25	.37	.19	.11	.08	.10	.07	.00	2.33	
5.1- 6.0	154	93	14	1	7	6	55	91	39	108	203	89	62	75	72	56	0	1125	11.3 - 13.4
(1)	2.36	1.42	.21	.02	.11	.09	.84	1.39	.60	1.65	3.11	1.36	.95	1.15	1.10	.86	.00	17.22	
(2)	.26	.16	.02	.00	.01	.01	.09	.15	.07	.18	.34	.15	.10	.13	.12	.09	.00	1.88	
6.1- 8.0	141	78	22	5	6	6	39	89	28	152	244	87	78	180	168	64	0	1387	13.5 - 17.9
(1)	2.16	1.19	.34	.08	.09	.09	.60	1.36	.43	2.33	3.74	1.33	1.19	2.76	2.57	.98	.00	21.23	
(2)	.24	.13	.04	.01	.01	.01	.07	.15	.05	.25	.41	.15	.13	.30	.28	.11	.00	2.32	
8.1-10.0	35	33	11	2	0	0	7	23	3	47	62	19	16	107	110	13	0	488	18.0 - 22.4
(1)	.54	.51	.17	.03	.00	.00	.11	.35	.05	.72	.95	.29	.24	1.64	1.68	.20	.00	7.47	
(2)	.06	.06	.02	.00	.00	.00	.01	.04	.01	.08	.10	.03	.03	.18	.18	.02	.00	.82	
10.1-89.5	4	6	9	1	0	0	0	6	1	12	9	5	10	35	38	5	0	141	22.5 - 200.2
(1)	.06	.09	.14	.02	.00	.00	.00	.09	.02	.18	.14	.08	.15	.54	.58	.08	.00	2.16	
(2)	.01	.01	.02	.00	.00	.00	.00	.01	.00	.02	.02	.01	.02	.06	.06	.01	.00	.24	
ALL SPEEDS	835	630	184	103	158	149	271	436	208	642	986	450	296	485	476	223	0	6532	
(1)	12.78	9.64	2.82	1.58	2.42	2.28	4.15	6.67	3.18	9.83	15.09	6.89	4.53	7.42	7.29	3.41	.00	100.00	
(2)	1.40	1.06	.31	.17	.26	.25	.45	.73	.35	1.08	1.65	.75	.50	.81	.80	.37	.00	10.94	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE (2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-139: CCNPP 197' (60-m) 2000-2006 Annual Joint Frequency Distribution Table

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
197.0 FT WIND DATA STABILITY CLASS B CLASS FREQUENCY (PERCENT) = 4.50
WIND DIRECTION FROM

SPEED mps		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	LT .4
	(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
	(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.2- .4		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.4 - .9
	(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
	(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.5- 1.0		0	1	1	0	1	0	0	1	0	0	0	0	1	0	2	0	0	7	1.0 - 2.2
	(1)	.00	.04	.04	.00	.04	.00	.00	.04	.00	.00	.00	.00	.04	.00	.07	.00	.00	.26	
	(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	
1.1- 1.5		2	4	2	5	3	3	3	1	0	0	4	2	1	0	0	0	0	30	2.3 - 3.4
	(1)	.07	.15	.07	.19	.11	.11	.11	.04	.00	.00	.15	.07	.04	.00	.00	.00	.00	1.12	
	(2)	.00	.01	.00	.01	.01	.01	.01	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.05	
1.6- 2.0		6	10	14	20	10	11	3	1	4	3	7	5	1	1	3	3	0	102	3.5 - 4.5
	(1)	.22	.37	.52	.74	.37	.41	.11	.04	.15	.11	.26	.19	.04	.04	.11	.11	.00	3.79	
	(2)	.01	.02	.02	.03	.02	.02	.01	.00	.01	.01	.01	.01	.00	.00	.01	.01	.00	.17	
2.1- 3.0		66	81	48	38	68	30	22	17	12	26	25	33	14	9	4	13	0	506	4.6 - 6.7
	(1)	2.45	3.01	1.79	1.41	2.53	1.12	.82	.63	.45	.97	.93	1.23	.52	.33	.15	.48	.00	18.82	
	(2)	.11	.14	.08	.06	.11	.05	.04	.03	.02	.04	.04	.06	.02	.02	.01	.02	.00	.85	
3.1- 4.0		94	87	16	12	13	22	37	42	20	26	46	38	29	24	13	17	0	536	6.8 - 8.9
	(1)	3.50	3.24	.60	.45	.48	.82	1.38	1.56	.74	.97	1.71	1.41	1.08	.89	.48	.63	.00	19.93	
	(2)	.16	.15	.03	.02	.02	.04	.06	.07	.03	.04	.08	.06	.05	.04	.02	.03	.00	.90	
4.1- 5.0		78	46	8	4	5	11	30	56	17	33	51	38	22	20	20	20	0	459	9.0 - 11.2
	(1)	2.90	1.71	.30	.15	.19	.41	1.12	2.08	.63	1.23	1.90	1.41	.82	.74	.74	.74	.00	17.07	
	(2)	.13	.08	.01	.01	.01	.02	.05	.09	.03	.06	.09	.06	.04	.03	.03	.03	.00	.77	
5.1- 6.0		49	26	9	1	3	1	25	42	8	37	59	22	20	22	29	21	0	374	11.3 - 13.4
	(1)	1.82	.97	.33	.04	.11	.04	.93	1.56	.30	1.38	2.19	.82	.74	.82	1.08	.78	.00	13.91	
	(2)	.08	.04	.02	.00	.01	.00	.04	.07	.01	.06	.10	.04	.03	.04	.05	.04	.00	.63	
6.1- 8.0		43	18	16	3	2	3	7	28	9	38	53	20	27	42	57	33	0	399	13.5 - 17.9
	(1)	1.60	.67	.60	.11	.07	.11	.26	1.04	.33	1.41	1.97	.74	1.00	1.56	2.12	1.23	.00	14.84	
	(2)	.07	.03	.03	.01	.00	.01	.01	.05	.02	.06	.09	.03	.05	.07	.10	.06	.00	.67	
8.1-10.0		25	12	10	3	0	0	2	19	3	17	13	5	9	39	41	15	0	213	18.0 - 22.4
	(1)	.93	.45	.37	.11	.00	.00	.07	.71	.11	.63	.48	.19	.33	1.45	1.52	.56	.00	7.92	
	(2)	.04	.02	.02	.01	.00	.00	.00	.03	.01	.03	.02	.01	.02	.07	.07	.03	.00	.36	
10.1-89.5		5	7	2	1	0	0	0	3	3	0	3	3	1	13	17	5	0	63	22.5 - 200.2
	(1)	.19	.26	.07	.04	.00	.00	.00	.11	.11	.00	.11	.11	.04	.48	.63	.19	.00	2.34	
	(2)	.01	.01	.00	.00	.00	.00	.00	.01	.01	.00	.01	.01	.00	.02	.03	.01	.00	.11	
ALL SPEEDS		368	292	126	87	105	81	129	210	76	180	261	166	125	170	186	127	0	2689	
	(1)	13.69	10.86	4.69	3.24	3.90	3.01	4.80	7.81	2.83	6.69	9.71	6.17	4.65	6.32	6.92	4.72	.00	100.00	
	(2)	.62	.49	.21	.15	.18	.14	.22	.35	.13	.30	.44	.28	.21	.28	.31	.21	.00	4.50	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-139: CCNPP 197' (60-m) 2000-2006 Annual Joint Frequency Distribution Table

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
197.0 FT WIND DATA STABILITY CLASS C CLASS FREQUENCY (PERCENT) = 5.10
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	LT .4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.2- .4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.4 - .9
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.5- 1.0	1	1	1	0	0	2	1	1	1	1	0	4	0	1	0	0	0	14	1.0 - 2.2
(1)	.03	.03	.03	.00	.00	.07	.03	.03	.03	.03	.00	.13	.00	.03	.00	.00	.00	.46	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.02	
1.1- 1.5	3	7	9	8	8	1	3	1	2	1	4	4	3	1	3	3	0	61	2.3 - 3.4
(1)	.10	.23	.30	.26	.26	.03	.10	.03	.07	.03	.13	.13	.10	.03	.10	.10	.00	2.00	
(2)	.01	.01	.02	.01	.01	.00	.01	.00	.00	.00	.01	.01	.01	.00	.01	.01	.00	.10	
1.6- 2.0	15	33	22	26	27	13	6	6	2	4	16	10	8	5	4	4	0	201	3.5 - 4.5
(1)	.49	1.08	.72	.85	.89	.43	.20	.20	.07	.13	.53	.33	.26	.16	.13	.13	.00	6.61	
(2)	.03	.06	.04	.04	.05	.02	.01	.01	.00	.01	.03	.02	.01	.01	.01	.01	.00	.34	
2.1- 3.0	67	103	54	65	56	40	35	27	21	17	43	29	20	19	6	12	0	614	4.6 - 6.7
(1)	2.20	3.38	1.77	2.14	1.84	1.31	1.15	.89	.69	.56	1.41	.95	.66	.62	.20	.39	.00	20.18	
(2)	.11	.17	.09	.11	.09	.07	.06	.05	.04	.03	.07	.05	.03	.03	.01	.02	.00	1.03	
3.1- 4.0	118	95	32	14	18	24	33	39	26	26	58	47	31	21	30	32	0	644	6.8 - 8.9
(1)	3.88	3.12	1.05	.46	.59	.79	1.08	1.28	.85	.85	1.91	1.54	1.02	.69	.99	1.05	.00	21.16	
(2)	.20	.16	.05	.02	.03	.04	.06	.07	.04	.04	.10	.08	.05	.04	.05	.05	.00	1.08	
4.1- 5.0	72	49	11	3	11	9	20	68	18	38	54	37	24	22	37	35	0	508	9.0 - 11.2
(1)	2.37	1.61	.36	.10	.36	.30	.66	2.23	.59	1.25	1.77	1.22	.79	.72	1.22	1.15	.00	16.69	
(2)	.12	.08	.02	.01	.02	.02	.03	.11	.03	.06	.09	.06	.04	.04	.06	.06	.00	.85	
5.1- 6.0	48	27	8	6	1	2	6	41	10	27	48	31	17	23	26	27	0	348	11.3 - 13.4
(1)	1.58	.89	.26	.20	.03	.07	.20	1.35	.33	.89	1.58	1.02	.56	.76	.85	.89	.00	11.44	
(2)	.08	.05	.01	.01	.00	.00	.01	.07	.02	.05	.08	.05	.03	.04	.04	.05	.00	.58	
6.1- 8.0	36	31	19	5	1	2	9	39	12	38	45	25	21	32	63	30	0	408	13.5 - 17.9
(1)	1.18	1.02	.62	.16	.03	.07	.30	1.28	.39	1.25	1.48	.82	.69	1.05	2.07	.99	.00	13.41	
(2)	.06	.05	.03	.01	.00	.00	.02	.07	.02	.06	.08	.04	.04	.05	.11	.05	.00	.68	
8.1-10.0	13	26	9	3	1	0	2	10	2	8	18	3	5	33	34	7	0	174	18.0 - 22.4
(1)	.43	.85	.30	.10	.03	.00	.07	.33	.07	.26	.59	.10	.16	1.08	1.12	.23	.00	5.72	
(2)	.02	.04	.02	.01	.00	.00	.00	.02	.00	.01	.03	.01	.01	.06	.06	.01	.00	.29	
10.1-89.5	10	8	6	2	0	0	0	0	0	2	3	0	2	12	25	1	0	71	22.5 - 200.2
(1)	.33	.26	.20	.07	.00	.00	.00	.00	.00	.07	.10	.00	.07	.39	.82	.03	.00	2.33	
(2)	.02	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.02	.04	.00	.00	.12	
ALL SPEEDS	383	380	171	132	123	93	115	232	94	162	289	190	131	169	228	151	0	3043	
(1)	12.59	12.49	5.62	4.34	4.04	3.06	3.78	7.62	3.09	5.32	9.50	6.24	4.30	5.55	7.49	4.96	.00	100.00	
(2)	.64	.64	.29	.22	.21	.16	.19	.39	.16	.27	.48	.32	.22	.28	.38	.25	.00	5.10	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-139: CCNPP 197' (60-m) 2000-2006 Annual Joint Frequency Distribution Table

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
197.0 FT WIND DATA STABILITY CLASS D CLASS FREQUENCY (PERCENT) = 33.93
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	LT .4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
.2- .4	0	2	0	0	1	0	0	1	0	0	0	0	1	2	1	1	0	9	.4 - .9
(1)	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.04	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	
.5- 1.0	18	18	26	21	28	13	11	12	11	12	12	9	8	11	8	17	0	235	1.0 - 2.2
(1)	.09	.09	.13	.10	.14	.06	.05	.06	.05	.06	.06	.04	.04	.05	.04	.08	.00	1.16	
(2)	.03	.03	.04	.04	.05	.02	.02	.02	.02	.02	.02	.02	.01	.02	.01	.03	.00	.39	
1.1- 1.5	45	52	47	55	57	41	24	15	16	17	22	22	24	19	20	21	0	497	2.3 - 3.4
(1)	.22	.26	.23	.27	.28	.20	.12	.07	.08	.08	.11	.11	.12	.09	.10	.10	.00	2.45	
(2)	.08	.09	.08	.09	.10	.07	.04	.03	.03	.03	.04	.04	.04	.03	.03	.04	.00	.83	
1.6- 2.0	72	106	77	99	119	59	36	22	32	25	57	36	35	27	29	52	0	883	3.5 - 4.5
(1)	.36	.52	.38	.49	.59	.29	.18	.11	.16	.12	.28	.18	.17	.13	.14	.26	.00	4.36	
(2)	.12	.18	.13	.17	.20	.10	.06	.04	.05	.04	.10	.06	.06	.05	.05	.09	.00	1.48	
2.1- 3.0	306	347	188	256	258	152	164	165	107	112	109	110	83	66	91	106	0	2620	4.6 - 6.7
(1)	1.51	1.71	.93	1.26	1.27	.75	.81	.81	.53	.55	.54	.54	.41	.33	.45	.52	.00	12.93	
(2)	.51	.58	.31	.43	.43	.25	.27	.28	.18	.19	.18	.18	.14	.11	.15	.18	.00	4.39	
3.1- 4.0	279	282	174	287	230	194	198	240	167	144	174	148	109	101	143	206	0	3076	6.8 - 8.9
(1)	1.38	1.39	.86	1.42	1.14	.96	.98	1.18	.82	.71	.86	.73	.54	.50	.71	1.02	.00	15.19	
(2)	.47	.47	.29	.48	.39	.32	.33	.40	.28	.24	.29	.25	.18	.17	.24	.35	.00	5.15	
4.1- 5.0	277	225	243	283	209	122	170	319	153	158	160	134	81	106	188	261	0	3089	9.0 - 11.2
(1)	1.37	1.11	1.20	1.40	1.03	.60	.84	1.57	.76	.78	.79	.66	.40	.52	.93	1.29	.00	15.25	
(2)	.46	.38	.41	.47	.35	.20	.28	.53	.26	.26	.27	.22	.14	.18	.31	.44	.00	5.17	
5.1- 6.0	258	227	254	224	95	72	117	295	99	131	175	123	68	124	279	324	0	2865	11.3 - 13.4
(1)	1.27	1.12	1.25	1.11	.47	.36	.58	1.46	.49	.65	.86	.61	.34	.61	1.38	1.60	.00	14.14	
(2)	.43	.38	.43	.38	.16	.12	.20	.49	.17	.22	.29	.21	.11	.21	.47	.54	.00	4.80	
6.1- 8.0	443	480	411	211	63	46	92	333	126	180	303	126	81	218	502	479	0	4094	13.5 - 17.9
(1)	2.19	2.37	2.03	1.04	.31	.23	.45	1.64	.62	.89	1.50	.62	.40	1.08	2.48	2.36	.00	20.21	
(2)	.74	.80	.69	.35	.11	.08	.15	.56	.21	.30	.51	.21	.14	.37	.84	.80	.00	6.86	
8.1-10.0	301	328	240	47	4	4	35	117	38	89	127	18	27	162	259	181	0	1977	18.0 - 22.4
(1)	1.49	1.62	1.18	.23	.02	.02	.17	.58	.19	.44	.63	.09	.13	.80	1.28	.89	.00	9.76	
(2)	.50	.55	.40	.08	.01	.01	.06	.20	.06	.15	.21	.03	.05	.27	.43	.30	.00	3.31	
10.1-89.5	173	238	131	21	2	2	12	35	11	23	15	9	12	86	91	48	0	909	22.5 - 200.2
(1)	.85	1.17	.65	.10	.01	.01	.06	.17	.05	.11	.07	.04	.06	.42	.45	.24	.00	4.49	
(2)	.29	.40	.22	.04	.00	.00	.02	.06	.02	.04	.03	.02	.02	.14	.15	.08	.00	1.52	
ALL SPEEDS	2172	2306	1791	1504	1066	706	859	1554	760	891	1154	735	529	922	1611	1696	0	20256	
(1)	10.72	11.38	8.84	7.42	5.26	3.49	4.24	7.67	3.75	4.40	5.70	3.63	2.61	4.55	7.95	8.37	.00	100.00	
(2)	3.64	3.86	3.00	2.52	1.79	1.18	1.44	2.60	1.27	1.49	1.93	1.23	.89	1.54	2.70	2.84	.00	33.93	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-139: CCNPP 197' (60-m) 2000-2006 Annual Joint Frequency Distribution Table

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
197.0 FT WIND DATA STABILITY CLASS E CLASS FREQUENCY (PERCENT) = 27.60
WIND DIRECTION FROM

SPEED mps		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2		0	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	4	LT .4
	(1)	.00	.00	.01	.00	.01	.00	.00	.00	.00	.01	.00	.00	.01	.00	.00	.00	.00	.02	
	(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	
.2- .4		2	0	2	1	1	0	1	1	2	0	0	0	1	0	1	0	0	12	.4 - .9
	(1)	.01	.00	.01	.01	.01	.00	.01	.01	.01	.00	.00	.00	.01	.00	.01	.00	.00	.07	
	(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	
.5- 1.0		12	8	21	13	25	18	13	21	7	14	7	8	8	8	12	11	0	206	1.0 - 2.2
	(1)	.07	.05	.13	.08	.15	.11	.08	.13	.04	.08	.04	.05	.05	.05	.07	.07	.00	1.25	
	(2)	.02	.01	.04	.02	.04	.03	.02	.04	.01	.02	.01	.01	.01	.01	.02	.02	.00	.35	
1.1- 1.5		19	21	19	21	18	14	22	17	15	14	13	8	9	13	13	13	0	249	2.3 - 3.4
	(1)	.12	.13	.12	.13	.11	.08	.13	.10	.09	.08	.08	.05	.05	.08	.08	.08	.00	1.51	
	(2)	.03	.04	.03	.04	.03	.02	.04	.03	.03	.02	.02	.01	.02	.02	.02	.02	.00	.42	
1.6- 2.0		25	41	36	35	51	26	20	29	29	21	21	19	12	20	14	15	0	414	3.5 - 4.5
	(1)	.15	.25	.22	.21	.31	.16	.12	.18	.18	.13	.13	.12	.07	.12	.08	.09	.00	2.51	
	(2)	.04	.07	.06	.06	.09	.04	.03	.05	.05	.04	.04	.03	.02	.03	.02	.03	.00	.69	
2.1- 3.0		92	89	91	98	116	80	79	86	84	62	95	60	67	78	88	94	0	1359	4.6 - 6.7
	(1)	.56	.54	.55	.59	.70	.49	.48	.52	.51	.38	.58	.36	.41	.47	.53	.57	.00	8.25	
	(2)	.15	.15	.15	.16	.19	.13	.13	.14	.14	.10	.16	.10	.11	.13	.15	.16	.00	2.28	
3.1- 4.0		175	113	101	82	126	102	97	175	162	139	158	133	121	172	176	206	0	2238	6.8 - 8.9
	(1)	1.06	.69	.61	.50	.76	.62	.59	1.06	.98	.84	.96	.81	.73	1.04	1.07	1.25	.00	13.59	
	(2)	.29	.19	.17	.14	.21	.17	.16	.29	.27	.23	.26	.22	.20	.29	.29	.35	.00	3.75	
4.1- 5.0		192	125	96	50	44	103	142	305	325	231	219	193	161	298	401	377	0	3262	9.0 - 11.2
	(1)	1.17	.76	.58	.30	.27	.63	.86	1.85	1.97	1.40	1.33	1.17	.98	1.81	2.43	2.29	.00	19.80	
	(2)	.32	.21	.16	.08	.07	.17	.24	.51	.54	.39	.37	.32	.27	.50	.67	.63	.00	5.46	
5.1- 6.0		164	99	49	18	26	26	68	334	423	371	329	224	151	302	447	391	0	3422	11.3 - 13.4
	(1)	1.00	.60	.30	.11	.16	.16	.41	2.03	2.57	2.25	2.00	1.36	.92	1.83	2.71	2.37	.00	20.77	
	(2)	.27	.17	.08	.03	.04	.04	.11	.56	.71	.62	.55	.38	.25	.51	.75	.66	.00	5.73	
6.1- 8.0		128	131	32	7	7	19	41	251	453	930	865	191	118	272	351	302	0	4098	13.5 - 17.9
	(1)	.78	.80	.19	.04	.04	.12	.25	1.52	2.75	5.65	5.25	1.16	.72	1.65	2.13	1.83	.00	24.88	
	(2)	.21	.22	.05	.01	.01	.03	.07	.42	.76	1.56	1.45	.32	.20	.46	.59	.51	.00	6.87	
8.1-10.0		56	27	8	2	3	4	7	65	84	274	273	28	20	70	47	37	0	1005	18.0 - 22.4
	(1)	.34	.16	.05	.01	.02	.02	.04	.39	.51	1.66	1.66	.17	.12	.42	.29	.22	.00	6.10	
	(2)	.09	.05	.01	.00	.01	.01	.01	.11	.14	.46	.46	.05	.03	.12	.08	.06	.00	1.68	
10.1-89.5		18	17	12	2	1	4	8	27	10	44	27	3	4	15	6	7	0	205	22.5 - 200.2
	(1)	.11	.10	.07	.01	.01	.02	.05	.16	.06	.27	.16	.02	.02	.09	.04	.04	.00	1.24	
	(2)	.03	.03	.02	.00	.00	.01	.01	.05	.02	.07	.05	.01	.01	.03	.01	.01	.00	.34	
ALL SPEEDS		883	671	468	329	419	396	498	1311	1594	2101	2007	867	673	1248	1556	1453	0	16474	
	(1)	5.36	4.07	2.84	2.00	2.54	2.40	3.02	7.96	9.68	12.75	12.18	5.26	4.09	7.58	9.45	8.82	.00	100.00	
	(2)	1.48	1.12	.78	.55	.70	.66	.83	2.20	2.67	3.52	3.36	1.45	1.13	2.09	2.61	2.43	.00	27.60	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-139: CCNPP 197' (60-m) 2000-2006 Annual Joint Frequency Distribution Table

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
197.0 FT WIND DATA STABILITY CLASS F CLASS FREQUENCY (PERCENT) = 10.44
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	3	LT .4
(1)	.00	.00	.00	.02	.00	.02	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.05	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	
.2- .4	2	1	0	0	0	1	1	2	1	0	1	1	0	0	0	0	0	10	.4 - .9
(1)	.03	.02	.00	.00	.00	.02	.02	.03	.02	.00	.02	.02	.00	.00	.00	.00	.00	.16	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	
.5- 1.0	6	5	7	10	12	13	7	8	6	12	10	5	6	5	7	6	0	125	1.0 - 2.2
(1)	.10	.08	.11	.16	.19	.21	.11	.13	.10	.19	.16	.08	.10	.08	.11	.10	.00	2.01	
(2)	.01	.01	.01	.02	.02	.02	.01	.01	.01	.02	.02	.01	.01	.01	.01	.01	.00	.21	
1.1- 1.5	8	10	9	8	18	7	9	12	11	7	7	4	9	9	9	8	0	145	2.3 - 3.4
(1)	.13	.16	.14	.13	.29	.11	.14	.19	.18	.11	.11	.06	.14	.14	.14	.13	.00	2.33	
(2)	.01	.02	.02	.01	.03	.01	.02	.02	.02	.01	.01	.01	.02	.02	.02	.01	.00	.24	
1.6- 2.0	11	7	13	20	17	16	17	11	13	15	14	11	11	10	12	11	0	209	3.5 - 4.5
(1)	.18	.11	.21	.32	.27	.26	.27	.18	.21	.24	.22	.18	.18	.16	.19	.18	.00	3.35	
(2)	.02	.01	.02	.03	.03	.03	.03	.02	.02	.03	.02	.02	.02	.02	.02	.02	.00	.35	
2.1- 3.0	48	41	29	26	36	29	30	36	45	45	44	39	34	50	29	40	0	601	4.6 - 6.7
(1)	.77	.66	.47	.42	.58	.47	.48	.58	.72	.72	.71	.63	.55	.80	.47	.64	.00	9.64	
(2)	.08	.07	.05	.04	.06	.05	.05	.06	.08	.08	.07	.07	.06	.08	.05	.07	.00	1.01	
3.1- 4.0	43	24	28	19	20	31	57	64	105	92	89	81	60	62	55	61	0	891	6.8 - 8.9
(1)	.69	.38	.45	.30	.32	.50	.91	1.03	1.68	1.48	1.43	1.30	.96	.99	.88	.98	.00	14.29	
(2)	.07	.04	.05	.03	.03	.05	.10	.11	.18	.15	.15	.14	.10	.10	.09	.10	.00	1.49	
4.1- 5.0	42	22	11	6	4	13	46	100	155	165	142	118	102	104	97	97	0	1224	9.0 - 11.2
(1)	.67	.35	.18	.10	.06	.21	.74	1.60	2.49	2.65	2.28	1.89	1.64	1.67	1.56	1.56	.00	19.63	
(2)	.07	.04	.02	.01	.01	.02	.08	.17	.26	.28	.24	.20	.17	.17	.16	.16	.00	2.05	
5.1- 6.0	18	13	8	4	0	5	32	108	306	277	191	129	112	110	130	76	0	1519	11.3 - 13.4
(1)	.29	.21	.13	.06	.00	.08	.51	1.73	4.91	4.44	3.06	2.07	1.80	1.76	2.09	1.22	.00	24.37	
(2)	.03	.02	.01	.01	.00	.01	.05	.18	.51	.46	.32	.22	.19	.18	.22	.13	.00	2.54	
6.1- 8.0	10	14	11	8	3	1	8	72	241	377	286	121	53	59	137	18	0	1419	13.5 - 17.9
(1)	.16	.22	.18	.13	.05	.02	.13	1.15	3.87	6.05	4.59	1.94	.85	.95	2.20	.29	.00	22.76	
(2)	.02	.02	.02	.01	.01	.00	.01	.12	.40	.63	.48	.20	.09	.10	.23	.03	.00	2.38	
8.1-10.0	5	2	1	3	0	0	0	0	6	24	32	2	1	1	1	0	0	78	18.0 - 22.4
(1)	.08	.03	.02	.05	.00	.00	.00	.00	.10	.38	.51	.03	.02	.02	.02	.00	.00	1.25	
(2)	.01	.00	.00	.01	.00	.00	.00	.00	.01	.04	.05	.00	.00	.00	.00	.00	.00	.13	
10.1-89.5	4	3	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	10	22.5 - 200.2
(1)	.06	.05	.02	.00	.00	.00	.00	.00	.00	.02	.02	.00	.00	.00	.00	.00	.00	.16	
(2)	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	
ALL SPEEDS	197	142	118	105	110	117	207	413	889	1015	817	512	388	410	477	317	0	6234	
(1)	3.16	2.28	1.89	1.68	1.76	1.88	3.32	6.62	14.26	16.28	13.11	8.21	6.22	6.58	7.65	5.09	.00	100.00	
(2)	.33	.24	.20	.18	.18	.20	.35	.69	1.49	1.70	1.37	.86	.65	.69	.80	.53	.00	10.44	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

Table 2.3-139: CCNPP 197' (60-m) 2000-2006 Annual Joint Frequency Distribution Table

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
197.0 FT WIND DATA STABILITY CLASS G CLASS FREQUENCY (PERCENT) = 7.48
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	0	0	0	1	0	0	0	0	0	2	1	3	0	2	0	0	9	LT .4
(1)	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.04	.02	.07	.00	.04	.00	.00	.20	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.02	
.2- .4	2	1	1	0	2	1	3	0	1	2	0	1	2	0	1	1	0	18	.4 - .9
(1)	.04	.02	.02	.00	.04	.02	.07	.00	.02	.04	.00	.02	.04	.00	.02	.02	.00	.40	
(2)	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03	
.5- 1.0	11	9	10	5	15	9	12	13	4	11	12	11	6	10	13	12	0	163	1.0 - 2.2
(1)	.25	.20	.22	.11	.34	.20	.27	.29	.09	.25	.27	.25	.13	.22	.29	.27	.00	3.65	
(2)	.02	.02	.02	.01	.03	.02	.02	.02	.01	.02	.02	.02	.01	.02	.02	.02	.00	.27	
1.1- 1.5	19	11	20	11	22	13	15	15	13	10	15	20	12	10	12	10	0	228	2.3 - 3.4
(1)	.43	.25	.45	.25	.49	.29	.34	.34	.29	.22	.34	.45	.27	.22	.27	.22	.00	5.11	
(2)	.03	.02	.03	.02	.04	.02	.03	.03	.02	.02	.03	.03	.02	.02	.02	.02	.00	.38	
1.6- 2.0	17	16	12	16	18	8	25	16	29	26	19	17	19	9	14	14	0	275	3.5 - 4.5
(1)	.38	.36	.27	.36	.40	.18	.56	.36	.65	.58	.43	.38	.43	.20	.31	.31	.00	6.16	
(2)	.03	.03	.02	.03	.03	.01	.04	.03	.05	.04	.03	.03	.03	.02	.02	.02	.00	.46	
2.1- 3.0	41	35	18	24	22	26	26	35	48	66	41	54	54	39	40	34	0	603	4.6 - 6.7
(1)	.92	.78	.40	.54	.49	.58	.58	.78	1.08	1.48	.92	1.21	1.21	.87	.90	.76	.00	13.51	
(2)	.07	.06	.03	.04	.04	.04	.04	.06	.08	.11	.07	.09	.09	.07	.07	.06	.00	1.01	
3.1- 4.0	34	13	4	3	7	8	33	49	71	78	92	95	64	62	41	62	0	716	6.8 - 8.9
(1)	.76	.29	.09	.07	.16	.18	.74	1.10	1.59	1.75	2.06	2.13	1.43	1.39	.92	1.39	.00	16.04	
(2)	.06	.02	.01	.01	.01	.01	.06	.08	.12	.13	.15	.16	.11	.10	.07	.10	.00	1.20	
4.1- 5.0	11	1	2	2	1	6	12	51	113	154	164	125	72	68	61	64	0	907	9.0 - 11.2
(1)	.25	.02	.04	.04	.02	.13	.27	1.14	2.53	3.45	3.67	2.80	1.61	1.52	1.37	1.43	.00	20.31	
(2)	.02	.00	.00	.00	.00	.01	.02	.09	.19	.26	.27	.21	.12	.11	.10	.11	.00	1.52	
5.1- 6.0	3	3	1	1	0	5	7	32	138	171	145	85	67	50	57	41	0	806	11.3 - 13.4
(1)	.07	.07	.02	.02	.00	.11	.16	.72	3.09	3.83	3.25	1.90	1.50	1.12	1.28	.92	.00	18.05	
(2)	.01	.01	.00	.00	.00	.01	.01	.05	.23	.29	.24	.14	.11	.08	.10	.07	.00	1.35	
6.1- 8.0	2	4	7	2	0	4	3	39	128	151	96	65	62	50	67	4	0	684	13.5 - 17.9
(1)	.04	.09	.16	.04	.00	.09	.07	.87	2.87	3.38	2.15	1.46	1.39	1.12	1.50	.09	.00	15.32	
(2)	.00	.01	.01	.00	.00	.01	.01	.07	.21	.25	.16	.11	.10	.08	.11	.01	.00	1.15	
8.1-10.0	0	0	2	2	0	0	0	1	2	8	4	11	3	5	3	0	0	41	18.0 - 22.4
(1)	.00	.00	.04	.04	.00	.00	.00	.02	.04	.18	.09	.25	.07	.11	.07	.00	.00	.92	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.02	.01	.01	.01	.00	.00	.07	
10.1-89.5	0	3	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	22.5 - 200.2
(1)	.00	.07	.27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.34	
(2)	.00	.01	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03	
ALL SPEEDS	140	96	89	66	88	80	136	251	547	677	590	485	364	303	311	242	0	4465	
(1)	3.14	2.15	1.99	1.48	1.97	1.79	3.05	5.62	12.25	15.16	13.21	10.86	8.15	6.79	6.97	5.42	.00	100.00	
(2)	.23	.16	.15	.11	.15	.13	.23	.42	.92	1.13	.99	.81	.61	.51	.52	.41	.00	7.48	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
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Table 2.3-139: CCNPP 197' (60-m) 2000-2006 Annual Joint Frequency Distribution Table

CC JAN00-DEC06 MET DATA JOINT FREQUENCY DISTRIBUTION (60-METER TOWER)
197.0 FT WIND DATA STABILITY CLASS ALL CLASS FREQUENCY (PERCENT) = 100.00
WIND DIRECTION FROM

SPEED mps	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	VRBL	TOTAL	SPEED MPH
LT .2	0	1	1	1	2	2	0	0	0	1	2	2	4	0	2	0	0	18	LT .4
(1)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.03	
(2)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.03	
.2- .4	6	4	3	1	4	2	5	4	4	2	1	2	4	2	3	2	0	49	.4 - .9
(1)	.01	.01	.01	.00	.01	.00	.01	.01	.01	.00	.00	.00	.01	.00	.01	.00	.00	.08	
(2)	.01	.01	.01	.00	.01	.00	.01	.01	.01	.00	.00	.00	.01	.00	.01	.00	.00	.08	
.5- 1.0	48	42	67	49	82	55	44	56	29	50	41	37	29	35	42	46	0	752	1.0 - 2.2
(1)	.08	.07	.11	.08	.14	.09	.07	.09	.05	.08	.07	.06	.05	.06	.07	.08	.00	1.26	
(2)	.08	.07	.11	.08	.14	.09	.07	.09	.05	.08	.07	.06	.05	.06	.07	.08	.00	1.26	
1.1- 1.5	98	108	108	111	130	81	77	62	57	50	65	61	59	53	57	55	0	1232	2.3 - 3.4
(1)	.16	.18	.18	.19	.22	.14	.13	.10	.10	.08	.11	.10	.10	.09	.10	.09	.00	2.06	
(2)	.16	.18	.18	.19	.22	.14	.13	.10	.10	.08	.11	.10	.10	.09	.10	.09	.00	2.06	
1.6- 2.0	158	226	183	228	262	134	108	86	111	98	146	109	92	72	77	105	0	2195	3.5 - 4.5
(1)	.26	.38	.31	.38	.44	.22	.18	.14	.19	.16	.24	.18	.15	.12	.13	.18	.00	3.68	
(2)	.26	.38	.31	.38	.44	.22	.18	.14	.19	.16	.24	.18	.15	.12	.13	.18	.00	3.68	
2.1- 3.0	695	787	486	562	632	405	382	388	346	376	434	358	289	271	268	314	0	6993	4.6 - 6.7
(1)	1.16	1.32	.81	.94	1.06	.68	.64	.65	.58	.63	.73	.60	.48	.45	.45	.53	.00	11.71	
(2)	1.16	1.32	.81	.94	1.06	.68	.64	.65	.58	.63	.73	.60	.48	.45	.45	.53	.00	11.71	
3.1- 4.0	909	795	393	435	444	435	518	700	605	625	774	635	456	469	476	606	0	9275	6.8 - 8.9
(1)	1.52	1.33	.66	.73	.74	.73	.87	1.17	1.01	1.05	1.30	1.06	.76	.79	.80	1.02	.00	15.54	
(2)	1.52	1.33	.66	.73	.74	.73	.87	1.17	1.01	1.05	1.30	1.06	.76	.79	.80	1.02	.00	15.54	
4.1- 5.0	918	600	391	354	288	296	499	1011	833	929	1012	757	526	668	863	896	0	10841	9.0 - 11.2
(1)	1.54	1.01	.66	.59	.48	.50	.84	1.69	1.40	1.56	1.70	1.27	.88	1.12	1.45	1.50	.00	18.16	
(2)	1.54	1.01	.66	.59	.48	.50	.84	1.69	1.40	1.56	1.70	1.27	.88	1.12	1.45	1.50	.00	18.16	
5.1- 6.0	694	488	343	255	132	117	310	943	1023	1122	1150	703	497	706	1040	936	0	10459	11.3 - 13.4
(1)	1.16	.82	.57	.43	.22	.20	.52	1.58	1.71	1.88	1.93	1.18	.83	1.18	1.74	1.57	.00	17.52	
(2)	1.16	.82	.57	.43	.22	.20	.52	1.58	1.71	1.88	1.93	1.18	.83	1.18	1.74	1.57	.00	17.52	
6.1- 8.0	803	756	518	241	82	81	199	851	997	1866	1892	635	440	853	1345	930	0	12489	13.5 - 17.9
(1)	1.35	1.27	.87	.40	.14	.14	.33	1.43	1.67	3.13	3.17	1.06	.74	1.43	2.25	1.56	.00	20.92	
(2)	1.35	1.27	.87	.40	.14	.14	.33	1.43	1.67	3.13	3.17	1.06	.74	1.43	2.25	1.56	.00	20.92	
8.1-10.0	435	428	281	62	8	8	53	235	138	467	529	86	81	417	495	253	0	3976	18.0 - 22.4
(1)	.73	.72	.47	.10	.01	.01	.09	.39	.23	.78	.89	.14	.14	.70	.83	.42	.00	6.66	
(2)	.73	.72	.47	.10	.01	.01	.09	.39	.23	.78	.89	.14	.14	.70	.83	.42	.00	6.66	
10.1-89.5	214	282	173	27	3	6	20	71	25	82	58	20	29	161	177	66	0	1414	22.5 - 200.2
(1)	.36	.47	.29	.05	.01	.01	.03	.12	.04	.14	.10	.03	.05	.27	.30	.11	.00	2.37	
(2)	.36	.47	.29	.05	.01	.01	.03	.12	.04	.14	.10	.03	.05	.27	.30	.11	.00	2.37	
ALL SPEEDS	4978	4517	2947	2326	2069	1622	2215	4407	4168	5668	6104	3405	2506	3707	4845	4209	0	59693	
(1)	8.34	7.57	4.94	3.90	3.47	2.72	3.71	7.38	6.98	9.50	10.23	5.70	4.20	6.21	8.12	7.05	.00	100.00	
(2)	8.34	7.57	4.94	3.90	3.47	2.72	3.71	7.38	6.98	9.50	10.23	5.70	4.20	6.21	8.12	7.05	.00	100.00	

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE
(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

RAI No. 2.3.4-2

Please clarify why control room χ/Q values for unfiltered inleakage, as listed in U.S. EPR FSAR Table 2.3-2, were not provided in FSAR Section 2.3.4.2.3.

Response:

The control room X/Q values were demonstrated as bounded by the US EPR FSAR control room X/Q values. Since the same meteorological data are used in the evaluations, then the unfiltered X/Q are also bounded by the US EPR FSAR unfiltered X/Q values and were not specifically calculated. FSAR Section 2.3.4 will be revised to include a statement to that effect.

FSAR Impact:

FSAR Section 2.3.4.2.3, fourth paragraph will be updated as follows:

> Conservative site-specific estimates of atmospheric dispersion for the CCNPP Unit 3 control room are presented in Table 2.3-110 through Table 2.3-114. The values for the control room presented in Table 2.3-110 through 2.3-114 are bounded by those in Table 2.3-1 within the U.S. EPR FSAR. The same meteorological data are used to calculate unfiltered χ/Q values. Since the site-specific control room χ/Q values were demonstrated to be bounded by the U.S. EPR χ/Q values, the calculation of site-specific atmospheric dispersion factors for unfiltered inleakage was not necessary. CCNPP Unit 3 incorporates by reference the doses for the main control room presented in the U.S. EPR FSAR.

RAI No. 2.3.4-3

Meteorological data from 2000 through 2006 was used determine both the short-term atmospheric dispersion estimates for accident releases and the long-term atmospheric dispersion estimates for routine releases. The staff was only provided data from 2000 through 2005. Please provide the additional year of onsite meteorological data.

Response:

The 2006 meteorological data are provided on the enclosed electronic media.
The following input was used to produce the JFD tables.

Parameter	Value(s)
Anemometer starting speed	0.5 miles per hour
Temperature sensor separation	50 meters
Wind instrument height	10 meters and 60 meters
Meteorological channel units of measure	Wind speed – mph; Wind direction – degrees from True North; Delta-Temperature – degrees Fahrenheit per sensor separation
Order of data channels	Wind speed, wind direction, wind range, delta temperature, precipitation

Meteorological joint frequency data are provided in electronic ASCII files on the enclosed CD as follows:

File Name	File Description
cc1970006.jfd	197' 2000-2006 JFD tables in XOQDOQ format
cc330006.jfd	33' 2000-2006 JFD tables in XOQDOQ format
1970006.jfd	JFD excerpt from AREVA METROSE code for 197' wind level, 2000-2006 data
330006.jfd	JFD excerpt from AREVA METROSE code for 33' wind level, 2000-2006 data
cc197.out	AREVA METROSE code complete output for 197' wind level, 2000-2006 data
cc33.out	AREVA METROSE code complete output for 33' wind level, 2000-2006 data
cc19706.out	AREVA METROSE code complete output for 197' wind level, 2006 data
cc3306.out	AREVA METROSE code complete output for 33' wind level, 2006 data
jfd_translation_with_2006.mht	33' and 197' JFD tables in RG 1.23 format

The hourly meteorological data used as input to the code are provided in electronic ASCII files on the enclosed CD as follows:

File Name	File Description
cc2006.ref	CCNPP 2006 met data in RG 1.23 format
cc2006.met	CCNPP 2006 met data as used by AREVA

FSAR Impact:

The FSAR will not be updated.

RAI No. 2.3.2-1

In FSAR Section 2.3.2.1.1 onsite measurements of wind speed and wind direction were compared against data from Baltimore, Richmond and Norfolk. Please explain why onsite wind speed and direction estimates in FSAR Section 2.3.2.1.1 were not compared against data from the nearby Patuxent Naval Air Station (NAS).

Response:

A comparison of wind data measured at CCNPP and Patuxent River NAS has been performed. FSAR Section 2.3.2.1.1 will be revised with the comparison as follows:

> Figure 2.3-223 and Figure 2.3-40 through Figure 2.3-42 present multi-year average annual wind rose plots for National Weather Service (NWS) stations around CCNPS (Patuxent River NAS, Maryland, Baltimore/Washington International (BWI) Airport, Norfolk International Airport, Virginia, and Richmond International Airport, Virginia). Meteorological data used to create the plots were received from the National Climatic Data Center for Patuxent River NAS (NCDC 2008), and from the U.S. Environmental Protection Agency Support Center for Regulatory Air Models (EPA, 2007a) and were measured at approximately 33 ft (10 m) above ground level. For Patuxent River NAS, the meteorological data were from 2000 through 2005. For Norfolk and Richmond International Airports, the meteorological data were from 1984 through 1992. For BWI, the meteorological data were from 1984 through 1992, with the exception of 1989.
>
> The annual .... east-southeast. [No changes to paragraph 4]
>
> A comparison of the CCNPP 33 ft (10 m) annual wind rose with the Patuxent River NAS annual wind rose was made over the period 2000 through 2005. The annual prevailing wind direction (the direction from which the wind blows most often) at the CCNPP site at the 33 ft (10 m) level is from the southwest, approximately 14% of the time. The annual prevailing wind direction at Patuxent River NAS is from the north, approximately 10% of the time. Winds from the southwest through west sectors occur approximately 26% of the time at CCNPP. Conversely, winds from the northeast through east sectors occur approximately 14% of the time at CCNPP. Winds from the southwest through west sectors occur approximately 23% of the time at Patuxent River NAS. Conversely, winds from the northeast through east sectors occur approximately 17% of the time at Patuxent River NAS. At both sites, winds occur most infrequently from the east-southeast (approximately 2.5% at CCNPP and approximately 1.5% at Patuxent River NAS). The mismatch in prevailing wind direction may be due to the differences in the location of the sites with respect to the Chesapeake Bay (CCNPP has the Bay to the east; Patuxent River NAS has the Bay to the north).
>
> The annual ..... 21% of the time. [No changes to paragraphs 5-8]
>
> Figure 2.3-224 presents the wind speed class frequency distribution for Patuxent River Naval Air Station (NAS), Maryland, for the years 2000 through 2005. The most prevalent wind speed class at Patuxent River NAS is 6.7-8.9 mph (3.0-4.0 mps). The average wind speed at BWI is 8.8 mph (3.92 mps) and there have

been observations of wind speeds greater than 25 MPH (11 mps). At Norfolk International Airport, Virginia, the average wind speed is 11.0 mph (4.92 mps) and there have been observations of wind speeds greater than 25 MPH (11 mps). At Richmond International Airport, Virginia, the average wind speed is 8.3 mph (3.70 mps) and there have been observations of wind speeds up to 25 MPH (11 mps).

Note that the most prevalent wind speed class on an annual basis for the 33 ft (10 m) level at CCNPP (4-7 mph (1.8-3.1 mps)) is lower than the most prevalent wind speed class at Patuxent River NAS (6.7-8.9 mph (3.0-4.0 mps)). That value is lower than the average annual wind speeds at the same measurement height presented for BWI, Norfolk, and Richmond; this would lead to more conservative atmospheric dispersion estimates using the CCNPP meteorological data.

2.3.2.4 References

NCDC 2008. U.S. Department of Commerce, National Oceanographic and Atmospheric Administration, National Climatic Data Center, Integrated Surface Hourly Observations Dataset, Patuxent River Naval Air Station, Maryland, 1978-2007, purchased 2008.

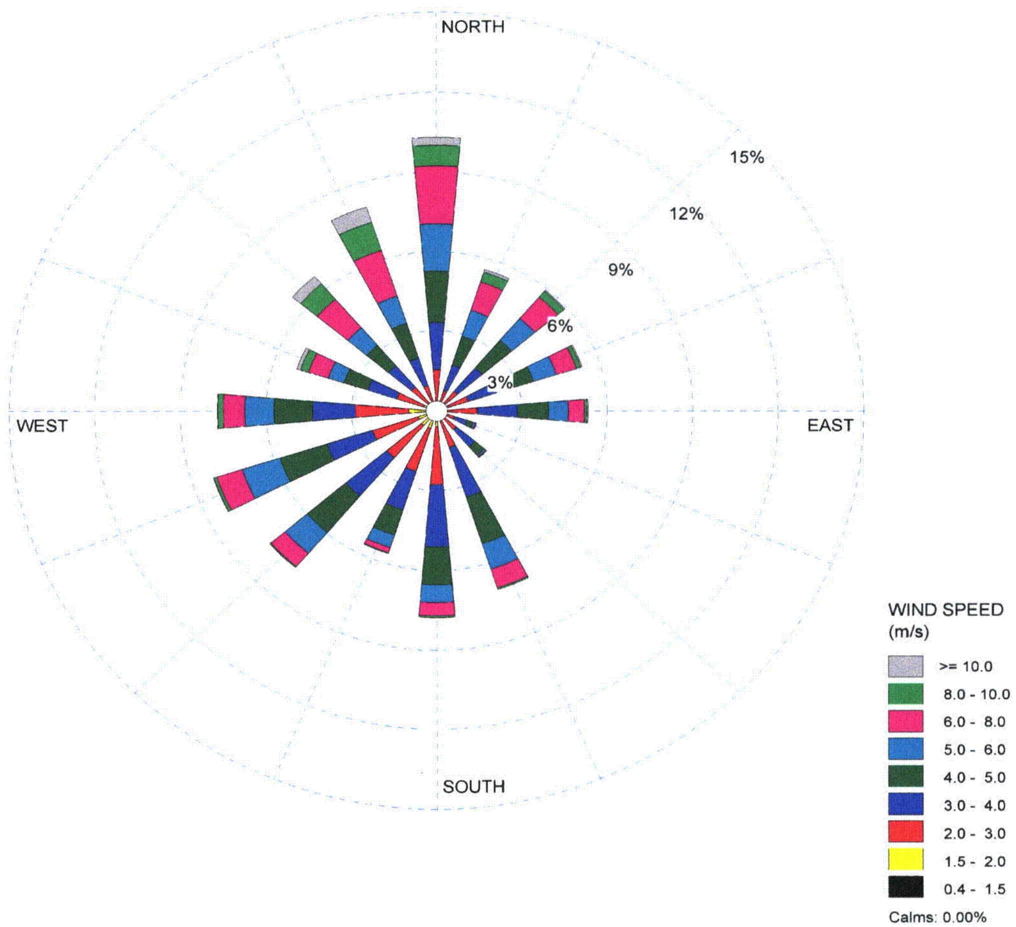
FSAR Impact:

FSAR Section 2.3.2.1.1, paragraphs 3, 9, and 10 will be updated as described above. A new reference with be added to FSAR Section 2.3.2.4 as described above. New figures 2.3-223 and 2.3-224 will also be included as follows:

Figure 2.3-223: Patuxent River NAS Annual Wind Rose (2000 through 2005)

WIND ROSE PLOT:
Patuxent River NAS, MD

DISPLAY:
Wind Speed
Direction (blowing from)



DATA PERIOD:
2000 2001 2002 2003 2004
2005
Jan 1 - Dec 31
00:00 - 23:00

CALM WINDS:
0.00%

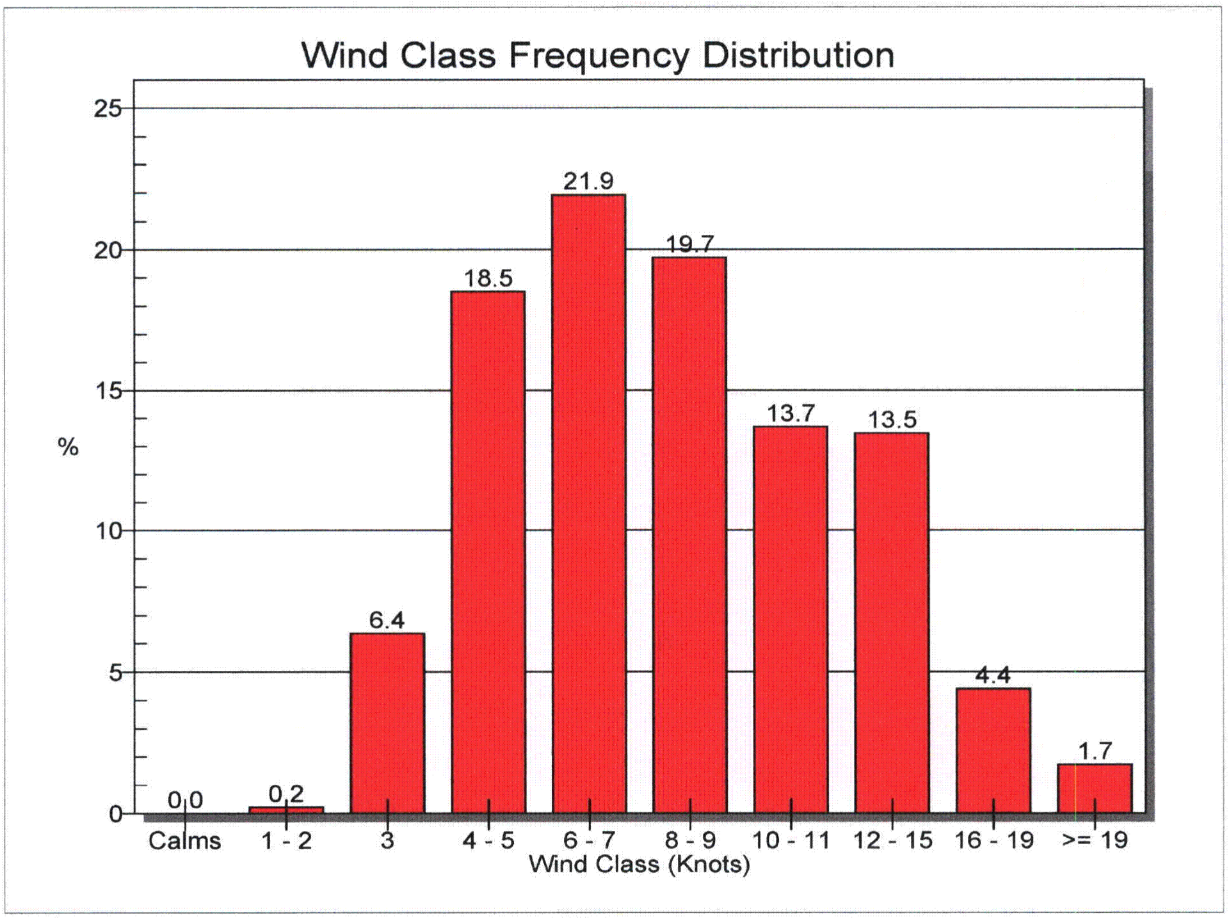
TOTAL COUNT:
40292 hrs.

AVG. WIND SPEED:
4.36 m/s

WRPLOT View - Lakes Environmental Software

Figure 2.3-224: Patuxent River NAS Wind Speed Class Frequency Distribution

(2000 through 2006)



WRPLOT View - Lakes Environmental Software

RAI No. 2.3.2-3

This request for additional information relates to FSAR Tables 2.3-56 through 2.3-63. Please provide a definition for "mean extreme" maximum and minimum temperature and clarify how the temperatures in FSAR Tables 2.3-57 and 2.3-58 were determined. Please check the accuracy of the December and annual temperatures for the monthly mean daily maximum and minimum temperatures in FSAR Tables 2.3-59 and 2.3-60. The staff was unable to verify the values presented in the FSAR. Please check the accuracy of the December temperature for the maximum hourly temperature in FSAR Table 2.3-61. The staff was unable to verify the value presented in the FSAR. Please check the accuracy of the May temperature for the minimum hourly temperature in FSAR Table 2.3-62. The staff was unable to verify the value presented in the FSAR.

Response:

The monthly mean extreme maximum temperature is defined as the highest of the monthly average values for each month over the data period. The monthly mean extreme minimum temperature is defined as the lowest of the monthly average values for each month over the data period. These values are determined by calculating the monthly average temperature for each month of each year and then identifying the maximum and minimum monthly average temperature value for each month over the data period.

In Tables 2.3-59 and 2.3-60, the value in the Annual column is the highest/lowest of the monthly values, as can be verified by inspection. The December maximum and minimum values in Tables 2.3-59 and 2.3-60 are 43.6°F and 31.5°F, respectively.

Errors were found in the Tables 2.3-61 and 2.3-62. The corrected December temperature for the maximum hourly temperature in FSAR Table 2.3-61 is 72.9°F (22.7°C). The corrected May temperature for the minimum hourly temperature in FSAR Table 2.3-62 is 39.9°F (4.4°C).

A comparison of the monthly average temperature values at CCNPP and the Patuxent River Naval Air Station was performed since Patuxent River NAS and CCNPP are located within 11 miles of each other and are both located in climate division MD-03, Lower Southern, as designated by the U.S. National Climatic Data Center. This comparison of the monthly average temperature values at CCNPP and the Patuxent River Naval Air Station was performed by determining the percent difference between the corresponding monthly values and incorporated into FSAR Section 2.3.2.1.2, attached below. Also included is a comparison of the monthly average precipitation values at CCNPP and the Patuxent River Naval Air Station that was performed by determining the percent difference between the corresponding monthly values and incorporated into FSAR Section 2.3.2.1.3, attached below.

FSAR Impact:

FSAR Section 2.3.2.1.2 paragraph 1 will be revised and two new paragraphs 2 and 5 will be added as noted below. Tables 2.3-61 and 2.3-62 will be revised to correct table values, and a new table 2.3-131 will be added to include the Calvert Cliffs Nuclear Power Station Monthly Mean Temperatures (1987-2006). FSAR Section 2.3.2.1.3 paragraph 1 will be revised and one new paragraph 3 will be added as noted below. A new Table 2.3-132 will be added to include Calvert Cliffs Monthly and Annual Precipitation values (1992 – 2006):

2.3.2.1.2 Temperature and Humidity

Monthly and annual temperature summaries from the CCNPP on-site meteorological monitoring program are presented in Table 2.3-56 through Table 2.3-63 for the period from January 2000 through December 2005. Table 2.3-131 presents monthly and annual temperature summaries from the CCNPP on-site meteorological monitoring program for the period from January 1987 through December 2006.

The monthly mean extreme maximum temperature is defined as the highest of the monthly average values for each month over the data period. The monthly mean extreme minimum temperature is defined as the lowest of the monthly average values for each month over the data period. These values are determined by calculating the monthly average temperature for each month of each year and then identifiying the maximum and minimum monthly average temperature value for each month over the data period.

The monthly mean temperature at CCNPP ranges from 34.3°F …… measured at CCNPP fall within the range of values reported by the surrounding stations. [no changes to existing paragraphs 2 and 3]

A comparison of the monthly average temperature values at CCNPP (Table 2.3-131) and the Patuxent River Naval Air Station (Table 2.3-64) was performed by determining the percent difference between the corresponding monthly values. The percent difference was defined as the absolute value of the difference between the monthly values times 100 and divided by the average of the monthly values. The comparison showed that the percent differences between the monthly average temperatures are within 3% of each other for all months, within 1.74% on average, and range from 0.26% to 2.65%. This shows good agreement between the two sites.

[no changes to the last paragraph]

Precipitation and Fog

The monthly and annual precipitation summary from the CCNPP on-site meteorological monitoring program is presented in Table 2.3-77 through Table 2.3-80 for the period from 2000 through 2005. Table 2.3-132 presents the monthly and annual precipitation summary from the CCNPP on-site meteorological monitoring program for the period from January 1992 through December 2006. The rainfall rate distribution is provided in Table 2.3-79. Precipitation statistics from NWS sites around CCNPP are presented in Table 2.3-81 for the period from 1971-2000 and in Table 2.3-82 and Table 2.3-83 for the period from 1961-1990. Monthly and annual summaries of heavy fog (visibility less than one-quarter mile) are presented in Table 2.3-84 for sites around the CCNPP site. Monthly average precipitation …. records (6 years for CCNPP versus 30 for the NWS sites). [no change to paragraph 2]

A comparison of the monthly average precipitation values at CCNPP (Table 2.3-132) and the Patuxent River Naval Air Station (Table 2.3-81) was performed by determining the percent difference between the corresponding monthly values. The percent difference was defined as the absolute value of the difference between the monthly values times 100 and divided by the average of the monthly values. The comparison showed that the percent differences between the monthly average temperatures are within 33% on average, and range from 8.73% to 68.91%. This shows poor agreement between the two sites. This may be due to the localized nature of convective precipitation events which are characterized by limited areal distribution, the suddenness with which they start and stop, and by rapid changes in intensity. Another potential factor to consider, in light of the fact that the CCNPP monthly average values are all lower than the Patuxent River NAS values, is that CCNPP does not employ a wind screen. Wind screens are used in open, exposed areas, which are subject to strong gusty winds to minimize the wind-caused loss of precipitation falling into the rain gauge.
[no changes to last three paragraphs]

Table 2.3-61: Calvert Cliffs Nuclear Power Plant Maximum Hourly Temperatures (2000-2005)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
°F	77.2	75.6	84.0	90.7	89.8	91.4	96.3	93.9	87.6	86.0	78.6	72.9	96.3
°C	25.1	24.2	28.9	32.6	32.1	33.0	35.7	34.4	30.9	30.0	25.9	22.7	35.7

Table 2.3-62: Calvert Cliffs Nuclear Power Plant Minimum Hourly Temperatures (2000-2005)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
°F	9.2	15.0	16.2	29.4	39.9	51.8	55.6	55.0	43.3	32.7	22.0	8.5	8.5
°C	-12.7	-9.4	-8.8	-1.4	4.4	11.0	13.1	12.8	6.3	0.4	-5.6	-13.1	-13.1

Table 2.3-131: Calvert Cliffs Nuclear Power Station Monthly Mean Temperatures (1987-2006)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
°F	36.5	38.3	44.7	54.8	63.2	71.7	76.5	75.3	68.9	58.2	50.2	39.9	56.5
°C	2.5	3.5	7.1	12.7	17.3	22.1	24.7	24.1	20.5	14.6	10.1	4.4	13.6

Table 2.3-132: Calvert Cliffs Nuclear Power Station Monthly and Annual Precipitation (1992-2006)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
in	2.11	2.16	3.58	2.90	2.87	2.82	3.04	1.95	2.80	2.42	2.74	2.20	31.58
mm	53.59	54.86	90.93	73.66	72.90	71.63	77.22	49.53	71.12	61.47	69.60	55.88	802.13

RAI No. 2.3.2-7

In accordance with Regulatory Guide 1.206, please provide monthly and annual summaries (ex., occurrence frequency) of atmospheric stability in FSAR Section 2.3.2.1.4.

Response:

Table 2.3-133 will be added that summarizes monthly atmospheric stability. FSAR Section 2.3.2.1.4 already includes discussions of annual atmospheric stability.

FSAR Impact:

FSAR Section 2.3.2.1.4 will be updated and Table 2.3-133 added as follows:

Depending on the amount of incoming solar radiation and other factors, the atmosphere may be more or less turbulent at any given time. Meteorologists have defined atmospheric stability classes, each representing a different degree of turbulence in the atmosphere. When moderate to strong incoming solar radiation heats air near the ground, causing it to rise and generate large eddies, the atmosphere is considered unstable, or relatively turbulent. Unstable conditions are associated with atmospheric stability classes A and B. When solar radiation is relatively weak or absent, air near the surface has a reduced tendency to rise, and less turbulence develops. In this case, the atmosphere is considered stable, or less turbulent, and the stability class would be E, F, or G. Stability classes D and C represent conditions of more neutral stability, or moderate turbulence. Neutral conditions are associated with relatively strong wind speeds and moderate solar radiation.

Atmospheric stability is determined by the delta temperature ….. events lasting for greater than 24 hours occur nine times per year on the average. [no changes to paragraphs 2-4]

Table 2.3-133 presents the monthly atmospheric stability summary. It was generated using six years of on-site meteorological data (2000 – 2005).

Table 2.3-133 Monthly Atmospheric Stability Summary (2000 through 2005)

Stability Class	Frequency of Occurrence by Percent											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
A	8.04	10.15	12.30	12.22	13.37	13.90	12.47	11.99	11.82	12.81	13.17	8.36
B	3.36	4.31	3.42	4.13	5.12	5.54	5.87	5.84	5.49	3.98	3.59	4.22
C	4.20	3.94	4.18	5.36	5.50	6.02	6.74	6.13	5.78	4.36	3.68	4.36
D	40.68	34.95	37.34	39.95	35.50	30.58	30.65	28.67	34.31	34.00	30.30	35.54
E	31.35	32.25	29.22	25.84	23.34	22.12	23.30	27.43	22.42	20.20	28.56	36.05
F	8.88	10.57	9.79	7.77	10.54	12.74	11.20	11.97	10.02	10.39	11.67	8.73
G	3.50	3.84	3.76	4.74	6.63	9.10	9.77	7.97	10.16	14.26	9.03	2.74

Stability Class	Frequency of Occurrence by Number of Hours											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
A	345	410	533	497	595	600	540	530	499	567	569	360
B	144	174	148	168	228	239	254	258	232	176	155	182
C	180	159	181	218	245	260	292	271	244	193	159	188
D	1745	1412	1618	1625	1580	1320	1327	1267	1449	1505	1309	1531
E	1345	1303	1266	1051	1039	955	1009	1212	947	894	1234	1553
F	381	427	424	316	469	550	485	529	423	460	504	376
G	150	155	163	193	295	393	423	352	429	631	390	118

RAI No. 2.3.1-2

This request for additional information relates to the discussion in FSAR Section 2.3.1.2.2.2 on the number of tropical cyclones that have passed within 100 nautical miles (185 kilometers) of Calvert County from 1851 through 2005. The values presented in the FSAR are listed in Attachment 1. The staff was unable to verify the number of tropical cyclones presented in the FSAR. The staff used the same data source, the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center (CSC), discussed in the FSAR. Please provide additional details on how the values were determined. The staff cautions that the NOAA CSC database reports the same storm multiple times if it falls within the 100 nautical mile radius on multiple days. Please provide the number of sub-tropical storms that have passed within 100 nautical miles of Calvert County from 1851 through 2005 in FSAR Section 2.3.1.2.2.2. Precipitation estimates from the remnants of Tropical Storm Ernesto, Bill, and Allison were presented in FSAR Section 2.3.1.2.2.2. The staff was unable to verify these estimates based on the stated reference. Please provide additional references or a more detailed discussion regarding the basis of these estimates. Please clarify why the remnants of Tropical Storms Ernesto, Bill, and Allison were used to describe precipitation from tropical systems in Calvert County, but other more severe storms, such as the remnants of Hurricane Floyd, were not.

Attachment 1
Tropical cyclones that have passed within 100 nautical miles of Calvert Cliffs from 1851 - 2005

CLASSIFICATION	NUMBER OF OCCURRENCES
Category 5 Hurricanes	0
Category 4 Hurricanes	0
Category 3 Hurricanes	1
Category 2 Hurricanes	2
Category 1 Hurricanes	8
Tropical Storms	85
Tropical Depressions	33
Sub-tropical Storms	Not Provided
Sub-tropical Depressions	4

Response:

With regard to tropical storms, UniStar could not duplicate the NRC-provided number of tropical storm occurrences.

The Attached Tables 1-3 is a listing of storms derived from NOAA (NOAA, 2007c). These lists provide the starting point for the discussion in FSAR Section 2.3.1.2.2.2 on the number of tropical storms and hurricanes that have passed within 100 statute miles (161 kilometers) of Calvert Country from 1851 through 2006. (Note that the web site was limited to 100 records returned per query so three queries were performed over different time periods.)

For this reevaluation, if a storm was listed as both a hurricane and a tropical storm, it was counted only as a hurricane. Additionally, the revised count uses statute miles instead of nautical miles and the multiple-counting of storms was removed. Sub-tropical storms were also not counted. A listing of the sub-tropical storms is not required by either the Standard Review Plan (NUREG-0800) or by Regulatory Guide 1.206 and therefore was not provided. The reevaluation resulted in a reduced count of tropical storms and hurricanes from 96 to 42.

Section 2.3.1.2.2.2, third paragraph, will be updated as follows (note that the last sentence was removed):

The National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center reports that there were 42 tropical storms and hurricanes that passed within 100 statute miles (161 km) of Calvert County, Maryland, during the period from 1851 through 2006. Of these 42 events, three were Category 1 hurricanes, one was a Category 2 hurricane, and one was a Category 3 hurricane (NOAA, 2007c). The hurricanes occurred in the months of August, September, and October. The tropical storms occurred in the months of May, July, August, September, and October.

Precipitation estimates from the remnants of Tropical Storm Ernesto, Bill, and Allison were presented in FSAR Section 2.3.1.2.2.2. These data were obtained from the National Climatic Data Center Storm Events database (NOAA, 2007a), under precipitation events in Calvert County for dates June 15, 2001 (Allison), July 3, 2003 (Bill), and September 1, 2006 (Ernesto).

Rainfall amounts for Calvert County, Maryland, were not included in the National Climatic Data Center Storm Events database for the remnants of Hurricane Floyd and were therefore unavailable for inclusion in the FSAR.

FSAR Impact:

FSAR Section 2.3.1.2.2.2 will be updated with response listed above.

Table 1

Output for tropical storms and hurricanes that have passed within 100 statute miles (161 kilometers) of Calvert Country from 1851 through 1899 (NOAA, 2007c)

Rec	YEAR	MONTH	DAY	STORM NAME	WIND SPEED(KTS)	PRESSURE(MB)	CATEGORY
1	1856	8	19	NOTNAMED	50	0	TS
2	1856	8	20	NOTNAMED	50	0	TS
3	1856	8	20	NOTNAMED	50	0	TS
4	1859	9	17	NOTNAMED	50	0	TS
5	1861	9	27	NOTNAMED	60	0	TS
6	1861	9	28	NOTNAMED	60	0	TS
7	1863	9	18	NOTNAMED	50	0	TS
8	1863	9	19	NOTNAMED	50	0	TS
9	1872	10	25	NOTNAMED	40	0	TS
10	1872	10	26	NOTNAMED	40	0	TS
11	1872	10	26	NOTNAMED	40	0	TS
12	1874	9	29	NOTNAMED	50	0	TS
13	1874	9	29	NOTNAMED	50	0	TS
14	1876	9	17	NOTNAMED	70	985	H1
15	1876	9	18	NOTNAMED	60	987	TS
16	1877	10	4	NOTNAMED	50	0	E
17	1878	10	23	NOTNAMED	90	0	H2
18	1878	10	23	NOTNAMED	80	975	H1
19	1879	8	18	NOTNAMED	100	971	H3
20	1879	8	18	NOTNAMED	90	979	H2
21	1881	9	10	NOTNAMED	50	0	TS
22	1881	9	10	NOTNAMED	50	0	TS
23	1882	9	11	NOTNAMED	40	0	TS
24	1882	9	23	NOTNAMED	40	1005	TS
25	1882	9	23	NOTNAMED	40	0	TS
26	1882	9	23	NOTNAMED	40	0	TS
27	1883	9	12	NOTNAMED	40	0	TS
28	1883	9	13	NOTNAMED	30	0	TD
29	1885	10	13	NOTNAMED	40	0	E
30	1885	10	13	NOTNAMED	40	0	E
31	1886	6	23	NOTNAMED	30	0	TD
32	1886	6	23	NOTNAMED	30	0	TD
33	1886	6	23	NOTNAMED	30	0	TD
34	1886	7	2	NOTNAMED	35	0	TS
35	1886	7	2	NOTNAMED	35	0	TS
36	1888	9	11	NOTNAMED	35	0	TS
37	1888	9	11	NOTNAMED	35	0	TS
38	1888	9	11	NOTNAMED	35	0	E
39	1889	9	24	NOTNAMED	40	0	TS
40	1889	9	25	NOTNAMED	40	0	TS

Table 1

Output for tropical storms and hurricanes that have passed within 100 statute miles (161 kilometers) of Calvert Country from 1851 through 1899 (NOAA, 2007c)

41	1889	9	25	NOTNAMED	40	0	TS
42	1893	8	29	NOTNAMED	55	0	TS
43	1893	10	13	NOTNAMED	80	0	H1
44	1893	10	14	NOTNAMED	65	0	H1
45	1893	10	23	NOTNAMED	45	0	TS
46	1893	10	23	NOTNAMED	40	0	TS
47	1894	10	10	NOTNAMED	60	0	TS
48	1894	10	10	NOTNAMED	65	0	H1
49	1899	10	31	NOTNAMED	55	0	TS
50	1899	11	1	NOTNAMED	50	0	E

Table 2

Output for tropical storms and hurricanes that have passed within 100 statute miles (161 kilometers) of Calvert Country from 1902 through 1949 (NOAA, 2007c)

Rec	YEAR	MONTH	DAY	STORM NAME	WIND SPEED(KTS)	PRESSURE(MB)	CATEGORY
1	1902	6	16	NOTNAMED	40	0	E
2	1902	10	12	NOTNAMED	35	0	E
3	1904	9	15	NOTNAMED	55	0	TS
4	1905	10	11	NOTNAMED	25	0	E
5	1915	8	4	NOTNAMED	40	0	TS
6	1915	8	4	NOTNAMED	40	0	TS
7	1916	5	16	NOTNAMED	35	0	TS
8	1916	5	17	NOTNAMED	40	0	E
9	1923	10	23	NOTNAMED	55	0	E
10	1923	10	24	NOTNAMED	50	0	E
11	1923	10	24	NOTNAMED	45	0	E
12	1924	9	30	NOTNAMED	35	0	E
13	1927	10	4	NOTNAMED	30	0	TD
14	1928	8	12	NOTNAMED	30	0	E
15	1928	8	12	NOTNAMED	30	0	E
16	1928	9	19	NOTNAMED	40	989	TS
17	1928	9	19	NOTNAMED	40	0	TS
18	1928	9	20	NOTNAMED	40	1002	TS
19	1929	10	2	NOTNAMED	35	0	E
20	1929	10	2	NOTNAMED	35	0	E
21	1929	10	3	NOTNAMED	35	0	E
22	1933	8	23	NOTNAMED	60	971	TS
23	1933	8	23	NOTNAMED	50	0	TS
24	1933	8	24	NOTNAMED	45	0	TS
25	1934	6	19	NOTNAMED	40	0	E
26	1934	6	19	NOTNAMED	40	0	E
27	1939	8	19	NOTNAMED	25	0	TD
28	1939	8	19	NOTNAMED	25	0	TD
29	1939	8	19	NOTNAMED	25	0	TD
30	1939	8	20	NOTNAMED	25	0	TD
31	1943	10	1	NOTNAMED	35	0	TS
32	1943	10	1	NOTNAMED	30	0	TD
33	1944	8	2	NOTNAMED	45	0	TS
34	1944	8	2	NOTNAMED	40	0	TS
35	1944	8	3	NOTNAMED	35	0	TS
36	1944	10	20	NOTNAMED	35	996	TS
37	1944	10	21	NOTNAMED	35	998	E
38	1944	10	21	NOTNAMED	40	997	E
39	1945	9	18	NOTNAMED	35	1012	TS
40	1945	9	18	NOTNAMED	30	0	E
41	1949	8	29	NOTNAMED	40	1000	TS

Table 3

Output for tropical storms and hurricanes that have passed within 100 statute miles (161 kilometers) of Calvert Country from 1952 through 2006 (NOAA, 2007c)

Rec	YEAR	MONTH	DAY	STORM NAME	WIND SPEED(KTS)	PRESSURE(MB)	CATEGORY
1	1952	9	1	ABLE	35	0	TS
2	1952	9	1	ABLE	35	0	TS
3	1955	8	13	CONNIE	60	969	TS
4	1955	8	13	CONNIE	50	974	TS
5	1955	8	13	CONNIE	45	982	TS
6	1955	8	18	DIANE	50	1001	TS
7	1955	8	18	DIANE	45	1004	TS
8	1960	7	30	BRENDA	45	0	TS
9	1961	9	14	NOTNAMED	35	0	TS
10	1961	9	15	NOTNAMED	35	0	TS
11	1971	8	28	DORIA	55	0	TS
12	1971	10	2	GINGER	30	0	TD
13	1971	10	3	GINGER	30	0	TD
14	1979	7	14	BOB	20	1010	TD
15	1979	7	15	BOB	20	1011	TD
16	1981	7	1	BRET	50	1000	TS
17	1981	7	1	BRET	30	1006	TD
18	1983	9	30	DEAN	55	1009	TS
19	1983	9	30	DEAN	40	1010	TS
20	1988	8	29	CHRIS	20	1009	TD
21	1988	8	29	CHRIS	20	1010	TD
22	1992	9	25	DANIELLE	55	1007	TS
23	1992	9	26	DANIELLE	40	1008	TS
24	1996	7	13	BERTHA	60	993	TS
25	1996	7	13	BERTHA	60	994	TS
26	2000	9	19	GORDON	20	1010	E
27	2000	9	19	GORDON	25	1008	E
28	2004	8	31	GASTON	35	1001	TS
29	2004	9	18	IVAN	15	998	TD
30	2004	9	18	IVAN	15	1000	TD
31	2004	9	18	IVAN	25	1002	E
32	2004	9	28	JEANNE	25	999	TD
33	2004	9	29	JEANNE	25	999	E
34	2005	7	8	CINDY	20	1010	E
35	2005	7	8	CINDY	25	1009	E

Table 3

Output for tropical storms and hurricanes that have passed within 100 statute miles (161 kilometers) of Calvert Country from 1952 through 2006 (NOAA, 2007c)

36	2006	9	2	ERNESTO	40	1002	E
37	2006	9	2	ERNESTO	40	1005	E
38	2006	9	2	ERNESTO	40	1007	E
39	2006	9	2	ERNESTO	40	1010	E

Key:

Hx	Hurricane, Category x (1,2,3, 4, 5)
TS	Tropical Storm
TD	Tropical Depression
E	Extra-tropical storm

RAI No. 2.3.1-5

In FSAR Section 2.3.1.2.2.12 the 48-hour Probable Maximum Winter Precipitation (PMWP) was determined from Hydrometeorological Report (HMR) Number 33, dated 1956. NUREG-0800, Section 2.3.1, states that the weight of the 48-hour PMWP should be determined in accordance with HMR Number 53, dated 1980. Please update the snow load discussion in FSAR Section 2.3.1.2.2.12 using HMR Number 53.

Response:

The 48-hour PMWP can be determined from Hydrometeorological Report (HMR) Number 53 by plotting (using a smooth curve) the probable maximum 6-hour, 24-hour, and 72-hour precipitation during the winter months of December through February. The 10-square mile (mi^2), 48-hour PMWP is selected for the site from the plot using the December data since it is more conservative; the value of the 48-hour PMWP is 22.5 inches (571.5 mm).

FSAR Impact:

FSAR Section 2.3.1.2.2.12, paragraphs 2-5, and table 2.3-8 will be revised and figure 2.3-222 will be added as follows:

> As indicated in the NRC Branch Position for Winter Precipitation Loads (NRC, 1975) it is acceptable to determine the 100 year snow pack and snowfall utilizing information in American National Standards Institute (ANSI) A58.1, "Minimum Design Loads for Buildings and Other Structures" (ANSI, 1972) with an adjustment of 30 years or more of regional data and maximization of water content for snow depth. Based on more recent information (ASCE, 2006) issued 33 years since ANSI A58.1 (ANSI, 1972), the 50-year mean recurrence ground snow load in the CCNPP Unit 3 region is 25 pounds per square foot (psf) (122 kg/m^2). The ANSI importance factor described in ASCE/SEI 7-05, "Minimum Design Loads for Buildings and Other Structures", (ASCE, 2006) can be used to adjust the 50-year recurrence ground snow load to a 100-year recurrence. Using an importance factor of 1.2, the 100-year mean recurrence ground snow load is 30 psf (146 kg/m^2).
>
> The 48-hour PMWP can be determined from Hydrometeorological Report (HMR) Number 53 (USWB,1980) by plotting (using a smooth curve) the probable maximum 6-hour, 24-hour, and 72-hour precipitation during the winter months of December through February. The 6-hour, 24-hour, and 72-hour PMWP values are provided in Table 2.3-8.
>
> The plot of the probable maximum 6-hour, 24-hour, and 72-hour precipitation is presented in Figure 2.3-222. The 10-square mile (mi^2), 48-hour PMWP is selected for the site from the plot using the December data since it is more conservative; the value of the 48-hour PMWP is 22.5 inches (571.5 mm).
>
> Note that the average total precipitation for December is 2.61 in (66.3 mm) in the CCNPP site area. Considering that hourly temperature values measured at CCNPP during the six-year period from 2000-2005 were below 32°F (0°C) about

10% of the time, most of this PMWP would occur as rain. In order to define the overall ground snow load, it was assumed that 25 percent of the PMWP combines with the 100-year mean recurrence ground snow load of 30 psf (146 kg/m^2). Therefore, the PMWP component is (where 62.4 psf (305 kg/m^2) is the density of water):

PMWP Load = [(22.5 inches)(62.4 psf)/(12 inches)](0.25) = 29 psf (141 kg/m^2)]

Combining the 100-year mean recurrence ground snow load of 30 psf (146 kg/m^2) with the PMWP load of 29 psf (141 kg/m^2) yields an overall design ground snow load of 59 psf (288 kg/m^2) for use in the design of roofs. This site-specific overall design ground snow load is bounded by the U.S. EPR design value.

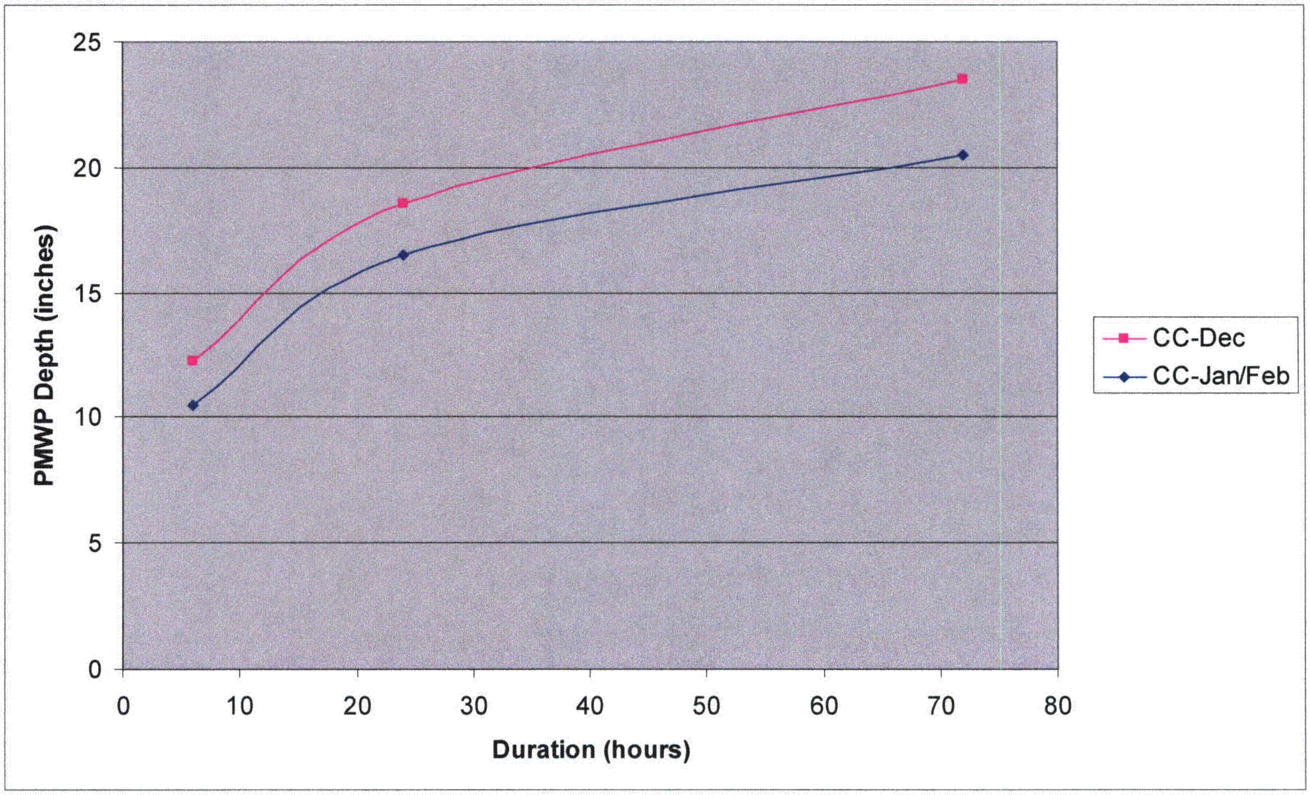
2.3.1 References

USWB, 1980. Hydrometeorological Report No. 53, Seasonal Variation of 10-Square-Mile Probable Maximum Precipitation Estimates, United States East of the 105th Meridian," April 1980.

Table 2.3-8: Probable Maximum Winter Precipitation (PMWP) Values

Duration (hours)	Jan-Feb PMP Depth (inches)	Dec PMP Depth (inches)
6	10.5	12.25
24	16.5	18.5
72	20.5	23.5

Figure 2.3-222: PMWP Values for CCNPP from HMR 53



RAI No. 2.3.1-8 (completion)

This request for additional information relates to the ultimate heat sink (UHS) site characteristics discussed in FSAR Section 2.3.1.2.2.13. **1)** FSAR Section 2.3.1.2.2.13 stated that monthly design wet bulb and mean coincident dry bulb temperatures were determined using 20 years of meteorological data from Patuxent River Naval Air Station (NAS) because 30 years of data was not available. However, in FSAR Section 9.2.1.1 the CCNPP Unit 3 site-specific wet and dry bulb temperatures were determined using 30 years of climatology data (1976-2006). Please explain this apparent discrepancy. **2)** U.S. EPR FSAR Table 2.1-3 listed 72 hours of temperature data used as design values for calculating the maximum evaporation and drift loss of water from the UHS. Both FSAR Table 2.0-1 and FSAR Section 9.2.1.1 stated that the "design values are enveloped." Please provide a description of how the site-specific temperatures were calculated. Also, please provide a table showing a comparison between the U.S. EPR design parameters and CCNPP site characteristics for calculating the maximum evaporation and drift loss of water from the UHS.

3) U.S. EPR FSAR Table 2.1-4 listed 24 hours of temperature data used as design values for calculating the minimum water cooling in the UHS. Both FSAR Table 2.0-1 and FSAR Section 9.2.1.1 stated that the "design values are enveloped." Please provide a description of how the site-specific temperatures were calculated. Also, please provide a table showing a comparison between the U.S. EPR design parameters and CCNPP site characteristics for calculating the minimum water cooling in the UHS.

4) U.S. EPR SAR Section 2.3.1.2 stated that a COL applicant shall describe the means for providing UHS makeup sufficient to meet the maximum evaporative and drift water loss after 72 hours through the remainder of a 30 day period, consistent with RG 1.27. Please describe the site-specific temperatures that were considered for this evaluation.

Response:

1) UniStar has reevaluated the dry bulb and wet bulb temperature values discussed in FSAR Section 2.3.1.2.2.13 using the most recent 30 years of data (1978-2007) recorded at Patuxent River NAS and will incorporate the revised information into an update to the FSAR. Note that although FSAR Section 9.2.1.1 used 30 years of data recorded at Patuxent River NAS from 1976 – 2006 (most recent data available at the time of that analysis), the results of the two analyses were consistent. An examination of the data indicates that the maximum 0% exceedance dry bulb and coincident wet bulb temperature values occurred on 8/20/83. The maximum 0% exceedance non-coincident wet bulb temperature value occurred on 7/15/1995. The minimum 0% exceedance dry bulb temperature value occurred on 1/17/82. The maximum and minimum values occurred within the 30 year range used by both evaluations.

The discussion of the 2% and 0.4% exceedance values are not applicable to the UHS design and will be removed from FSAR Section 2.3.1.2.2.13. Additionally, the discussion of the 100 year return values will also be removed from FSAR Section 2.3.1.2.2.13. As stated in Section 2.3.1.1 of the U.S. EPR FSAR, these values are not used in the design of the UHS, rather the 0% exceedance values are used for the reasons stated. The 0% exceedance values will be added to FSAR Section 2.3.1.2.2.13.

FSAR Impact:

1) FSAR Section 2.3.1.2.2.13 and 2.3.1.2.3 will be revised as shown below. Table 2.0-1 will be revised and Tables 2.0-3 and 2.0-4 will be added to include site-specific parameters.

2.3.1.2.2.13 Conditions for Maximum Evaporation and Potential Water Freezing in the Ultimate Heat Sink

In accordance with Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Power Plants," (NRC, 1976), the meteorological conditions resulting in maximum evaporation and drift loss should be the worst 30-day average combination of controlling parameters (wet bulb and dry bulb temperatures). The design of the UHS, as stated in the U.S. EPR FSAR Section 2.3.1.2, is based on meteorological conditions that exist for 72 hours, consistent with the sizing of the UHS cooling tower basin. For CCNPP3, the worst meteorological conditions resulting in maximum evaporation and drift loss of water for the UHS over a 72 hour period are shown in Table 2.0-3.

A software routine used in the Ultimate Heat Sink analysis calculation evaluated 30 years of meteorological data (Reference 1) for Patuxent River Naval Air Station (11 miles away from the CCNPP site) and determined the worst 72 hour period from the perspective of maximum evaporation (highest evaporation potential, based on the combined effect of the dry bulb temperature and its coincident wet bulb temperature). These ambient temperature conditions are imposed on the cooling tower model for the first 72 hours of the design basis accident (DBA).

The table below provides a comparison of the Table 2.1-3 values in the US EPR FSAR and the CCNPP site-specific values used for maximum evaporation from the UHS.

	US EPR FSAR Table 2.1-3 Value		Calvert Cliffs Site-Specific Value	
Time (hr)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)
1	69.87	84	69.87	84
2	68.69	82	68.69	82
3	66.82	78	66.82	78
4	67.02	77	67.02	77
5	69.04	78	69.04	78
6	68.48	78	68.48	78
7	68.14	77	68.14	77
8	67.10	74	67.10	74
9	67.10	74	67.10	74

	US EPR FSAR Table 2.1-3 Value		Calvert Cliffs Site-Specific Value	
Time (hr)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)
10	67.80	76	67.80	76
11	67.23	76	67.23	76
12	69.79	82	69.79	82
13	70.98	84	70.98	84
14	72.71	86	72.71	86
15	74.15	89	74.15	89
16	74.71	93	74.71	93
17	74.98	94	74.98	94
18	75.92	93	75.92	93
19	74.98	98	74.98	98
20	74.20	97	74.20	97
21	74.19	97	74.19	97
22	74.16	95	74.16	95
23	74.15	93	74.15	93
24	72.22	90	72.22	90
25	70.49	86	70.49	86
26	71.03	86	71.03	86
27	71.03	86	71.03	86
28	71.03	86	71.03	86
29	71.03	86	71.03	86
30	70.02	81	70.02	81
31	68.24	79	68.24	79
32	68.25	79	68.25	79
33	68.13	77	68.13	77
34	68.13	77	68.13	77
35	69.70	80	69.70	80
36	71.79	83	71.79	83
37	72.98	85	72.98	85
38	75.02	88	75.02	88
39	76.71	92	76.71	92
40	77.49	95	77.49	95
41	78.24	98	78.24	98
42	78.72	100	78.72	100
43	78.48	99	78.48	99
44	77.91	99	77.91	99
45	77.91	99	77.91	99
46	77.10	98	77.10	98
47	76.85	97	76.85	97
48	75.24	93	75.24	93
49	74.14	91	74.14	91
50	72.99	87	72.99	87
51	70.96	84	70.96	84
52	69.33	84	69.33	84
53	68.90	81	68.90	81
54	69.46	81	69.46	81

	US EPR FSAR Table 2.1-3 Value		Calvert Cliffs Site-Specific Value	
Time (hr)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)
55	69.13	80	69.13	80
56	69.69	80	69.69	80
57	67.70	79	67.70	79
58	67.70	79	67.70	79
59	68.58	80	68.58	80
60	71.53	84	71.53	84
61	72.40	85	72.40	85
62	73	87	73	87
63	73.29	88	73.29	88
64	73.58	89	73.58	89
65	73.58	89	73.58	89
66	73.33	92	73.33	92
67	73.08	93	73.08	93
68	73.36	94	73.36	94
69	74.42	94	74.42	94
70	74.14	93	74.14	93
71	74.68	93	74.68	93
72	73.28	88	73.28	88

The Ultimate Heat Sink analysis calculation uses 3-day meteorological data that maximizes inventory loss. The temperatures used in this evaluation are provided in the response to Sub question 2b above.

Review of the Ultimate Heat Sink sizing criteria calculation indicates the design basis accident heat load decreases during the period t=72 hours through t=720 hours with no anticipated increases during that period. As heat load decreases, the cooling tower range decreases. Lower range values yield lower evaporation rates for a given ambient wet bulb temperature. The 72nd hour of the DBA scenario represents the peak anticipated evaporation loss during the last 27 days of the DBA.

Drift loss is a fixed percentage of the cooling water flowrate and is provided by the cooling tower vendor based on the drift eliminator configuration used. Seepage loss is an estimated value that is assumed to remain constant throughout the 30-day DBA scenario. Blowdown is secured during the DBA.

Makeup flow to the UHS towers under DBA conditions is the sum of the evaporation loss, drift loss, and seepage loss. The makeup flowrate to the cooling tower, when based on the inventory loss at the end of the initial 72-hour period, is sufficient to replenish losses through the end of the 30-day DBA scenario.

Drift loss is a percentage of the cooling water flowrate and is provided by the cooling tower vendor based on the drift eliminator configuration used. This drift loss value is independent of ambient environmental conditions.

The U.S. EPR FSAR also states that the design of the UHS is based on a consideration of air temperature data listed in U.S. EPR FSAR Table 2.1-1. Site-specific values for these parameters were determined using 30 years (1978-2007) of meteorological data from Patuxent River Naval Air Station (NAS), Maryland, a nearby representative site (**NCDC, 2008**). The 0% exceedance maximum dry bulb and coincident wet bulb temperature values are 102°F (39°C) and 80°F (27° C), respectively. The 0% exceedance non-coincident maximum wet bulb temperature value is 85°F (29° C). The highest monthly (July) 1% design values are 80°F (27°C) and 89.5°F (31.9°C) for the wet and mean coincident dry bulb temperatures, respectively. The U.S. EPR FSAR design values listed in Table 2.1-1 bound the calculated values for CCNPP3 listed above except for the 0% exceedance non-coincident wet bulb temperature value. This comparison is shown in Table 2.0-1. The acceptability of the 0% exceedance non-coincident wet bulb temperature design value is described in FSAR Section 9.2.1.1.

Since a closed loop hybrid cooling tower will act as the normal heat sink for CCNPP Unit 3, another meteorological condition to consider is the maximum one-hour dry bulb temperatures. The maximum one-hour dry bulb temperature determined for Baltimore, Maryland, in Local Climatological Data, 2002 Annual Summary with Comparative Data, (NOAA, 2002a) is 105°F (40.6°C). This value was determined over a 52-year period of record (1951-2002). The maximum one-hour dry bulb temperature determined for Patuxent River NAS, Maryland, is 103°F (39.4°C) over the period 1978 through 2007.

The meteorological conditions resulting in minimum cooling due to evaporation of water are presented in Table 2.0-4.

A software routine used in the Ultimate Heat Sink analysis calculation evaluated 30 years of meteorological data (Reference 1) for Patuxent River Naval Air Station (11 miles away from the CCNPP site) and determined the worst 24 hour period from the perspective of minimum cooling. These ambient temperature conditions are imposed on the cooling tower model for the first 24 hours of the DBA.

The table below provides a comparison of the Table 2.1-4 values in the US EPR FSAR and the CCNPP site-specific values used for minimum cooling from the UHS.

	US EPR FSAR Table 2.1-4 Value		Calvert Cliffs Site-Specific Value	
Time (hr)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)
1	75.8	82	75.8	82
2	76.1	83	76.1	83
3	76.1	83	76.1	83

	US EPR FSAR Table 2.1-4 Value		Calvert Cliffs Site-Specific Value	
Time (hr)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)	Wet Bulb Temp (°F)	Dry Bulb Temp (°F)
4	77.3	85	77.3	85
5	79.7	89	79.7	89
6	80.8	91	80.8	91
7	82	93	82	93
8	84.6	99	84.6	99
9	85.3	99	85.3	99
10	85.3	99	85.3	99
11	84.2	100	84.2	100
12	84.2	100	84.2	100
13	84.6	99	84.6	99
14	83.9	99	83.9	99
15	83.9	99	83.9	99
16	82.6	96	82.6	96
17	82.6	93	82.6	93
18	82.1	91	82.1	91
19	82.1	91	82.1	91
20	81.9	90	81.9	90
21	80.7	88	80.7	88
22	80.7	88	80.7	88
23	79.5	86	79.5	86
24	79.5	86	79.5	86

The meteorological conditions resulting in the potential for water freezing in the ultimate heat sink water storage facility should be below dry bulb temperature values and associated wind speeds. Using 30 years of meteorological data from Patuxent River NAS, Maryland, the coldest month (December) wind speed and mean coincident dry bulb temperature that are exceeded only 1% of the time are 24 mph (10.7 mps) and 32.3°F (0.2°C). The 0% exceedance minimum dry bulb temperature value is 0°F (-18° C).

The UHS makeup water system consists of four independent safety-related trains which provide makeup water from the Chesapeake Bay to the ESW System to meet the maximum evaporative and drift water losses for the period from 72 hours post-accident up to 30 days post-accident. The maximum drift loss (percent of water flow) for a single cooling tower will not exceed 0.005% as described in U.S. EPR FSAR Table 9.2.5-2. Figure 9.2-3 provides the interface between the ESW and the UHS makeup water system. U.S. EPR FSAR Section 9.2 provides a detailed discussion of the ESW system, including a simplified flow arrangement for the ESW system.

Section 9.2.5.1 provides the design bases for the UHS Makeup Water System; Sections 9.2.5.2 and 9.2.5.3 provide a general description of the system and its components; and Section 9.2.5.1 provides the safety evaluation for the system.

A marine weather dataset from the International Comprehensive Ocean Atmosphere Data Set (ICOADS) maintained by the National Center for Atmospheric Research (NCAR) Computational & Information Systems

Laboratory (CISL) for the period 1940 through 2005 was reviewed for a region extending from 33° latitude to 41° latitude and from 277° longitude to 288° longitude to determine the historical maximum sea surface temperature experienced in the region nearest the plant (NCAR, 2006). This area encompasses a rectangle of approximately 480 miles by 600 miles, centered on the CCNPP Unit 3 site. This review indicates a maximum surface temperature of the water in Chesapeake Bay of 93° F which is less than the maximum allowable ESW inlet temperature of 95° F as described in U.S. EPR FSAR Section 9.2.1. Therefore, UHS makeup water flow to the cooling tower will not increase the cooling tower basin water temperature beyond 95° F, and therefore, will not adversely impact ESW system safety function.

Additional information on the UHS is provided in Section 9.2.5.

2.3.1.2.3 References

NCDC 2008. U.S. Department of Commerce, National Oceanographic and Atmospheric Administration, National Climatic Data Center, Integrated Surface Hourly Observations Dataset, Patuxent River Naval Air Station, Maryland, 1978-2007, purchased 2008

PAXNAS Hourly Surface Observations, **1976 – 2005**, obtained from the National Climatic Data Center

Table 2.0-1: U.S. EPR Site Design Envelope Comparison

This Table will be revised and submitted with Revision 4 to Calvert Cliffs 3 Combined License Application.

Table 2.0-3: Design Values for Maximum Evaporation and Drift Loss of Water from the UHS

This Table is incorporated from the U.S. EPR DCD by Reference and with no supplements or departures.

Table 2.0-4: Design Values for Minimum Water Cooling in the UHS

This Table is incorporated from the U.S. EPR DCD by Reference and with no supplements or departures.

RAI No. 2.3.1-9

American Society of Civil Engineers (ASCE) Standard No. 7-05 Section C.6.5.5 states that the importance factors given in Table 6-1 (e.g., 1.15) adjust the velocity pressure to different annual probabilities of being exceeded. In contrast, Table C6-7 provides conversion factors to adjust the design basis wind speed to different annual probabilities. Since velocity pressure is a function of the wind speed squared, an importance factor of 1.15 is approximately equivalent to a wind speed conversion factor of 1.07 (i.e., SQRT(1.15) = 1.07). One of the site characteristics listed in FSAR Table 2.0-1 is an "importance factor" of 1.07. Please review if this site characteristic should instead be listed as 1.15 so the resultant wind speed conversion factor is equal to 1.07, and provide the correct value.

Response:

The question refers to a value in Table 2.0-1 in the CCNPP Unit 3 FSAR. The value is referred to as an "importance factor" and is listed as 1.07. UniStar agrees the value should be 1.15 consistent with ASCE Standard 7-05. A conversion factor of 1.07 is used to multiply the 50-year return period three-second wind gust value to obtain the 100-year return period three-second wind gust value. That 1.07 value is not an importance factor used to adjust wind velocity pressure as defined by ASCE Standard 7-05, rather it is a conversion factor to adjust the design basis wind speed to different annual probabilities.

FSAR Impact:

The Importance Factor value for CCNPP Unit 3 in Table 2.0-1 will be changed from 1.07 to 1.15 and the revised Table will be updated in Revision 4 of Calvert Cliffs 3 Combined License Application.

RAI No. 2.3.1-12

NUREG-0800, Section 2.3.1, states that historical data used to characterize a site should extend over a significant time interval to capture cyclical extremes. In FSAR Sections 2.3.1.2.2.13 and 2.3.1.2.2.16 twenty years of data from Patuxent River NAS was used to determine temperature and humidity site characteristics for heating, ventilation, and air conditioning. Please justify why and/or how this is a long enough period to capture cyclical extremes and potential climatic changes at the proposed Calvert Cliffs site.

Response:

As described in the response to RAI 2.3.1-8, UniStar has reanalyzed the dry bulb and wet bulb temperature values for the CCNPP3 site using 30 years of data (1978-2007) recorded at Patuxent River NAS.

The use of a 30 year data set is considered to represent a sufficient period of data to capture cyclical extremes based on established NRC guidance. NUREG-0800, Section 2.3.1, SRP Acceptance Criteria 5, indicates that "suitable information should be compiled from at least 30 years of meteorological data found in databases for nearby representative locations." This guidance is also reflected in RG 1.27, "Ultimate Heat Sink for Nuclear Power Plants," position C.1.b, which defines climatological as "a recent period of record at least 30 years in length" as being acceptable for determining the controlling meteorological conditions used for design.

FSAR Impact:

FSAR Section 2.3.1.2.2.13 will be revised to reflect the use of the most recent 30 years of data as described in the response to RAI No. 2.3.1-8.

FSAR Section 2.3.1.2.2.16 will be revised to reflect the use of the most recent 30 years of data as shown below. Information related to the 2% exceedence values will be removed and replaced with the 0% and 1% exceedance values used in the design of HVAC consistent with the U.S. EPR FSAR Section 2.3.1.1. Tables 2.3-10, 2.3-11, 2.3-13, 2.3-14, 2.3-15 will be removed.

2.3.1.2.2.16 Temperature and Humidity for Heating, Ventilation and Air Conditioning

U.S. EPR FSAR Section 2.3.1.1 indicates that the U.S. EPR design is based on the 0% and 1% exceedance dry-bulb and coincident wet-bulb temperatures listed in U.S. EPR FSAR Table 2.1-1. Site-specific values for these parameters were determined using 30 years (1978-2007) of meteorological data from Patuxent River Naval Air Station (NAS), Maryland, a nearby representative site (NCDC, 2008).

The 1% exceedance maximum dry bulb and coincident wet bulb temperature values are 95 °F (35°C) and 77.5°F (25.3° C) for the hottest month (July). The 1% exceedance minimum dry bulb temperature value is 32.3°F (0.2° C) for the coldest month (December). The 0% exceedance maximum dry bulb and coincident wet bulb temperature values are 102°F (39°C) and 80°F (27° C), respectively. The U.S. EPR FSAR design values listed in Table 2.1-1 bound the calculated values for CCNPP3 listed above.

The 100 year return temperature values have been calculated based on SRP 2.3.1 requesting the information. The calculated 100-year return period values of maximum and minimum dry bulb temperature are 104.6°F (40.33°C) and -9.1°F (-22.8°C), respectively. The 100-year return period value of maximum wet bulb temperature coincident with the 100-year return period value of maximum dry bulb temperature is 86.1°F (30.36°C). The 100-year return period value of maximum wet bulb temperature (non-coincident) is 94.8°F (34.9°C). These values were determined using the 20 years of meteorological data provided by ASHRAE and the following equation (ASHRAE,2005):

$$Tn = M + I * F * s$$

where Tn is the n-year return period value of extreme dry bulb temperature (in this case the 50-year values of 103.4°F and -5.9°F), M is the mean of the annual extreme maximum or minimum dry bulb temperatures, s is the standard deviation of the annual extreme maximum or minimum dry bulb, I is 1 if maximum dry bulb temperatures are being considered or -1 if minimum dry bulb temperatures are being considered, and F is given by:

$$F = -\sqrt{6} / \Pi(0.5772 + \ln(\ln(100/99)))$$

Although these calculated 100-year return temperature values are higher than the 0% exceedance values described above, the 100-year return values are not used in the design of HVAC systems at CCNPP3. Reliable, sequential hourly meteorological data does not exist for the duration of 100 years. As a result, the use of extrapolated maximum/minimum 100 year return period temperature values would be overly conservative and exceed any recorded values in the available 30-year Pax River NAS data set. In contrast, the site-specific maximum and minimum 0% exceedance dry-bulb and wet-bulb temperature values are conservatively calculated using the maximum and minimum observed temperatures at each 1° F temperature increments recorded at Pax River NAS for the most recent 30 years.

RAI No. 2.3.1-13 (completion)

This request for additional information relates to the CCNPP 0% and 1% exceedance dry bulb and wet bulb temperatures presented in FSAR Table 2.0-1, "U.S. EPR Site Design Envelope Comparison." **1a)** Please provide a discussion in FSAR Section 2.3.1 on how the site-specific temperatures presented in FSAR Table 2.0-1 were determined. FSAR Section 9.2.1 stated that the CCNPP site-specific temperatures were determined using the guidance of RG 1.27 and 30 years of climatology data from Patuxent River Naval Air Station (NAS). **1b)** Please provide a more detailed description of how the maximum 0% exceedance dry bulb temperature of 115 °F and coincident wet bulb temperature of 80 °F were determined. In FSAR Table 2.0-1 the 0% exceedance wet bulb temperature was listed as 81 °F; however, FSAR Section 9.2.1.1 stated the 0% exceedance wet bulb temperature was 85 °F. Please explain this apparent discrepancy.

10 CFR 52.79(a)(1)(iii) states that meteorological site characteristics should be determined with consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and time in which the historical data have been accumulated. NUREG-0800, Section 2.3.1, further states that historical data used to characterize a site should extend over a significant time interval to capture cyclical extremes. Attachment 1 shows a comparison between the site-specific 0% exceedance temperatures listed in FSAR Table 2.0-1 and the 100-year return period temperatures described in FSAR Section 2.3.1.2.2.16. **2)** Please explain why 30 years of climatology data is sufficient to determine the 0% exceedance dry bulb and wet bulb temperatures compared to the more conservative 100-year return period temperatures.

The 1% exceedance temperatures for Patuxent River NAS were presented in FSAR Section 2.3.1.2.2.16. Instead of listing the site-specific temperatures, Table 2.0-1 stated that the "0% exceedance values bound 1% exceedance values," which, by definition, must be true. **3a)** Please clarify why the 1% exceedance dry bulb and wet bulb temperatures were not listed in FSAR Table 2.0-1. **3b** Also, please list any structures, systems, or components and the corresponding FSAR section(s) that rely on the 1% exceedance temperature information.

Attachment 1
Comparison between the zero percent exceedance temperatures listed in SAR Table 2.0-1 and the 100-year return period temperatures described in SAR Section 2.3.1.2.2.16.

0% Exceedance Temperatures	SAR Table 2.0-1	SAR Section 2.3.1.2.2.16
Dry Bulb / Coincident Wet Bulb	115 ° F / 80 °F	104.6 °F [a] / 86.1 °F
Non-Coincident Wet Bulb	81 °F	94.8 °F
Minimum Dry Bulb	31.8 °F	-9.1 °F

[a] Note - Colonial Beach, VA recorded a dry bulb temperature of 109 °F on August 21, 1983. Therefore, a 0% dry bulb of 104.6 °F is not the conservative estimate for the site and surrounding area.

Response:

1a) The site-specific 0% and 1% exceedance dry and wet bulb temperature values were determined using 30 years of meteorological data from (1978-2007) recorded at Patuxent River NAS, Maryland as described in the responses to RAI 2.3.1-8 and 2.3.1-12.

The 0% exceedance temperatures presented in Table 2.0-1 were not the site-specific calculated values but rather the values to be used for design. The design values in Table 2.0-1 have been replaced with the calculated values as part of the response to RAI 2.3.1-8.

1b) The 0% exceedance temperatures were calculated as described in the response to RAI 2.3.1-8.

2) The response to RAI 2.3.1-12 provides an explanation regarding the appropriateness of the use of the recorded 30-year data set versus the use of an extrapolated 100-year return period temperature.

Regarding the notes under the table provided by NRC in Attachment 1 to the RAI, Colonial Beach, VA, is not located on the Chesapeake Bay, as are CCNPP, Baltimore, and Patuxent River NAS. Colonial Beach is located on the Potomac River, which is a much smaller body of water than Chesapeake Bay. The Potomac River has a much smaller cooling effect than the Chesapeake Bay, therefore Colonial Beach will measure higher temperature values. As such, Colonial Beach, VA, is not considered to be representative of the CCNPP site.

3a) Table 2.0-1 has been revised in response to RAI 2.3.1-8 to include the site-specific calculated temperature values.

The 0% exceedance values for the Ultimate Heat Sink (115°F DBT coincident with 80°F WBT) were used for cooling tower design by the tower vendor. The conceptual design tower's thermal performance was then evaluated with application of design basis accident (DBA) heat load with site-specific worst-case meteorological conditions imposed (85°F WBT is the highest WBT on record for the period 1976 through 2005 at PAXNAS). The conceptual design was found to perform its safety function under worst-case ambient conditions while maintaining required cooling tower cold water return temperature less than the 95°F maximum value.

3b) The following structures, systems, or components and the corresponding FSAR section(s) that rely on the 1% exceedance temperature information.

Circulating water system (CWS) cooling tower conceptual design is based on 1% exceedance conditions of 100°F DBT coincident with 77°F WBT (78°F inlet air WBT). FSAR section 10.4.5 addresses the CWS.

BOP HVAC systems will also be based on 1% exceedance conditions. FSAR section 9.4.4 addresses the Turbine Building Area Ventilation System. FSAR section 9.4.12 addresses the Circulating Water Pump Building Ventilation System.

FSAR Impact:

The FSAR will not be updated in response to this RAI.