

## CCNPP3COLA PEmails

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**From:** John Rycyna  
**Sent:** Thursday, June 12, 2008 2:24 PM  
**To:** Price, John; Wrobel, George  
**Cc:** CCNPP3COL Resource  
**Subject:** Draft RAI No 5 RSAC 191.doc  
**Attachments:** Draft RAI No 5 RSAC 191.doc

Gentlemen,

Attached is DRAFT RAI No. 5. You have ten working days to review it and to decide whether you need a conference call to discuss it. After the call or after ten days the RAI will be finalized and sent to you. You then have 30 days to respond.

John Rycyna, PE  
Project Manager  
Division of New Reactor Licensing  
Office of New Reactors  
U.S. Nuclear Regulatory Commission  
301-415-4122

**Hearing Identifier:** CalvertCliffs\_Unit3Cola\_Public\_EX  
**Email Number:** 271

**Mail Envelope Properties** (John.Rycyna@nrc.gov20080612142300)

**Subject:** Draft RAI No 5 RSAC 191.doc  
**Sent Date:** 6/12/2008 2:23:34 PM  
**Received Date:** 6/12/2008 2:23:00 PM  
**From:** John Rycyna

**Created By:** John.Rycyna@nrc.gov

**Recipients:**

"CCNPP3COL Resource" <CCNPP3COL.Resource@nrc.gov>

Tracking Status: None

"Price, John" <John.Price2@unistarnuclear.com>

Tracking Status: None

"Wrobel, George" <George.Wrobel@unistarnuclear.com>

Tracking Status: None

**Post Office:**

| Files                       | Size | Date & Time          |
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**Options**

**Priority:** Standard

**Return Notification:** No

**Reply Requested:** No

**Sensitivity:** Normal

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DRAFT  
Request for Additional Information No. 5

6/12/2008

Calvert Cliffs Unit 3  
UniStar  
Docket No. 52-016  
SRP Section: 02.03.01 - Regional Climatology  
Application Section: 2.3.1  
RSAC

QUESTIONS

02.03.01-1

FSAR Section 2.3.1.2.2.1 stated that about 25% of the total number of tornadoes in Maryland occurs in Southern Maryland and approximately 70% of the tornadoes occur between 2:00 PM and 9:00 PM with most occurring from 3:00 PM to 6:00 PM. Please provide a reference in the SAR to support these statements.

02.03.01-2

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            |

02.03.01-3

FSAR Section 2.3.1.2.2.3 stated that the majority of thunderstorms (75% to 80%) occur in May through August. Based on the references provided, as well as 2006 data from the National Climatic Data Center, the staff was unable to verify the values presented in the FSAR. Please explain how the thunderstorm occurrence frequency from May through August was determined.

02.03.01-4

FSAR Section 2.3.1.2.2.5 stated that annual precipitation deficits of over 16 inches (406.4 millimeters) have occurred during extreme droughts during the 1930s, 1960s, and from 1998 to 2002. This is consistent with the Maryland climate narrative by the Office of the Maryland State Climatologist (OMSC); however, this report is not referenced. Please provide the appropriate reference for this description of past drought conditions in the FSAR.

02.03.01-5

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.

02.03.01-6

Please explain the technical basis for the following statement in FSAR Section 2.3.1.2.2.12. "In order to define the overall ground snow load, it was assumed that 25% of the PMWP combines with the 100-year mean recurrence ground snow load of 30 lb/ft<sup>2</sup> (146 kg/m<sup>2</sup>)."

02.03.01-7

In FSAR Section 2.3.1.2.2.13 a maximum 1-hour dry bulb temperature of 105 °F from Baltimore, MD was presented as part of the ultimate heat sink site characteristics. On August 21, 1983, Colonial Beach, VA reported a high temperature of 109 °F. Baltimore is approximately 52 miles northwest of the proposed CCNPP site. Colonial Beach is approximately 36 mi southwest of the proposed CCNPP site. Please justify using meteorological data from Baltimore instead of Colonial Beach to determine the maximum 1-hour dry bulb temperature. Also, please justify the 100-year return period dry bulb temperature site characteristic of 104.6 °F considering other sites in the vicinity of the proposed CCNPP site, such as Colonial Beach, have recorded higher temperatures.

#### 02.03.01-8

This request for additional information relates to the ultimate heat sink (UHS) site characteristics discussed in FSAR Section 2.3.1.2.2.13. 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. 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.

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.

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.

#### 02.03.01-9

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.,  $\text{SQRT}(1.15) = 1.07$ ). 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.

02.03.01-10

In FSAR Sections 2.3.1.2.2.13 and 2.3.1.2.2.16 meteorological data from Patuxent River Naval Air Station (NAS) was used to determine temperature and humidity site characteristics. Please include a discussion of how representative the data from Patuxent River NAS are at the Calvert Cliffs site.

02.03.01-11

Using the reference provided in FSAR Sections 2.3.1.2.2.13 and 2.3.1.2.2.16 (ASHRE, 2005), the staff was unable to verify the 100-year return period maximum wet bulb temperature coincident with the 100-year return maximum dry bulb of 86.1 °F and the 100-year return period maximum wet bulb temperature (non-coincident) of 94.8 °F. Please explain how these values were determined.

02.03.01-12

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.

02.03.01-13

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.” 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). 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. 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. Please clarify why the 1% exceedance dry bulb and wet bulb temperatures were not listed in FSAR Table 2.0-1. 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.

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

<sup>a</sup> 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.