



Crystal River Nuclear Plant
Docket No. 50-302
Operating License No. DPR-72

July 5, 2011
3F0711-08

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

Subject: Crystal River Unit 3 – Request for Additional Information to Support NRC Acceptance Review of CR-3 Extended Power Uprate LAR

References: 1. CR-3 to NRC letter dated June 15, 2011, "Crystal River Unit 3 – License Amendment Request #309, Revision 0, Extended Power Uprate"
2. Email from S. Lingam (NRC) to D. Westcott (CR-3) dated June 23, 2011, "CR-3 EPU LAR"

Dear Sir:

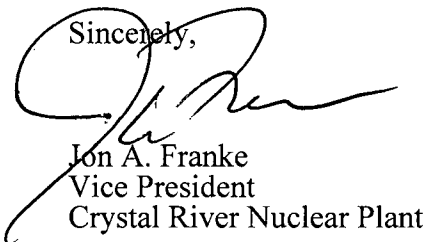
By letter dated June 15, 2011, Florida Power Corporation (FPC), doing business as Progress Energy Florida, Inc., requested a license amendment to increase the rated thermal power level of Crystal River Unit 3 (CR-3) from 2609 megawatts (MWt) to 3014 MWt. The proposed license amendment is considered an Extended Power Uprate (EPU). On June 23, 2011, via electronic mail, the NRC provided a request for additional information (RAI) to support NRC acceptance review of the CR-3 EPU License Amendment Request (LAR).

The Attachment to this submittal, "Response To Request For Additional Information to Support NRC Acceptance Review of CR-3 EPU LAR," provides the CR-3 formal response to the RAI.

This correspondence contains no new regulatory commitments.

If you have any questions regarding this submittal, please contact Mr. Dan Westcott, Superintendent, Licensing and Regulatory Programs at (352) 563-4796.

Sincerely,



Jon A. Franke
Vice President
Crystal River Nuclear Plant

JAF/gwe

Attachment: Response To Request For Additional Information to Support NRC Acceptance Review of CR-3 EPU LAR

Enclosure: Electronic files: ARCON96 and PAVAN meteorological data input files and Selected CR-3 Plant Drawings (CD-ROM)

xc: NRR Project Manager
Regional Administrator, Region II
Senior Resident Inspector
State Contact

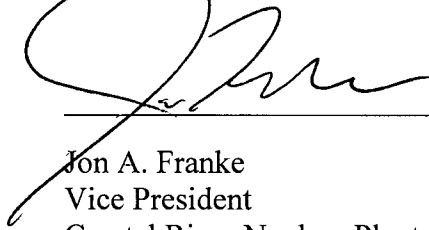
Progress Energy Florida, Inc.
Crystal River Nuclear Plant
15760 W. Powerline Street
Crystal River, FL 34428

4001
NRC

STATE OF FLORIDA

COUNTY OF CITRUS

Jon A. Franke states that he is the Vice President, Crystal River Nuclear Plant for Florida Power Corporation, doing business as Progress Energy Florida, Inc.; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission the information attached hereto; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information, and belief.



Jon A. Franke
Vice President
Crystal River Nuclear Plant

The foregoing document was acknowledged before me this 5th day of JULY, 2011, by Jon A. Franke.



Signature of Notary Public

State of Florida

NOTARY PUBLIC-STATE OF FLORIDA

Sheryl M. McCullough

Commission # EE011293

Expires: JULY 25, 2014

BONDED THRU ATLANTIC BONDING CO., INC.

(Print, type, or stamp Commissioned
Name of Notary Public)

Personally Produced
Known X -OR- Identification _____

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302 /LICENSE NUMBER DPR-72

ATTACHMENT

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
TO SUPPORT NRC ACCEPTANCE REVIEW OF CR-3 EPU LAR**

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION TO SUPPORT NRC ACCEPTANCE REVIEW OF CR-3 EPU LAR

By letter dated June 15, 2011, Florida Power Corporation (FPC), doing business as Progress Energy Florida, Inc., requested a license amendment to increase the rated thermal power level of Crystal River Unit 3 (CR-3) from 2609 megawatts (MWt) to 3014 MWt. The proposed license amendment is considered an Extended Power Uprate (EPU). On June 23, 2011, via electronic mail, the NRC provided a request for additional information to support acceptance review of the CR-3 EPU License Amendment Request (LAR).

NRC Request for Additional Information

The NRC technical reviewer is looking for the following information regarding the CR-3 EPU LAR.

With regard to the atmospheric dispersion factors (X/Q values):

1. a description of assumptions and all inputs associated with the ARCON96 and PAVAN computer code runs,
2. an electronic copy of the ARCON96 and PAVAN meteorological data input files, and
3. for the onsite X/Q values, a scaled aerial-view drawing from which distance and direction inputs can be reasonably approximated for all postulated release and receptor locations. The figure should show true north and the scale of the figure.

If the above information is available in the EPU application, please provide reference section in the application for each of the above items. If not, please provide this information which is required for our acceptance review.

CR-3 Responses:

1. A description of assumptions and all inputs associated with the ARCON96 and PAVAN computer code runs:

A summary description of the CR-3 radiological consequence analyses, including analysis parameters and assumptions, are provided in the CR-3 EPU Technical Report, Section 2.9.2, "Radiological Consequence Analyses," (Reference 1, Attachment 7). For each event analyzed in Section 2.9.2, a comparison is provided of the EPU radiological consequence analyses to those previously reviewed and approved by the NRC in CR-3 License Amendment 199 regarding Alternate Source Term (AST) and Control Room Emergency Ventilation System dated September 17, 2001 (Reference 2).

Atmospheric dispersion factors (χ/Q values) for the Exclusion Area Boundary (EAB), Low Population Zone (LPZ), and main control room (MCR) are presented in the CR-3 EPU Technical Report, Table 2.9.2-5, "CR-3 Atmospheric Dispersion Factors, Breathing Rates & Occupancy," (Reference 1, Attachment 7).

The MCR χ/Q values are the same as previously approved in CR-3 License Amendment 199 (Reference 2). The MCR atmospheric dispersion factors were calculated using CR-3

site specific meteorological data collected at original licensure (1975) using the Murphy/Campe methodology.

The offsite (EAB and LPZ) and Technical Support Center (TSC) χ/Q values have been updated from those previously approved in CR-3 License Amendment 199 (Reference 2) and are based on five years of recent meteorological data. The offsite (EAB and LPZ) χ/Q values were generated using PAVAN and the TSC χ/Q values were generated using ARCON96.

PAVAN Assumptions and Inputs

Assumptions and all inputs to PAVAN are provided in input file CRRVPAVAN.IN1.txt (Enclosure). The following provides additional information regarding the content of the PAVAN input file:

Line 1

Column 8 was set to 1 to distribute the calm array (Line 8), into the first wind speed category.

Line 6

Number of wind speed categories is from the joint frequency table data (Lines 9 through 78) and is set to 11. The number of distances with terrain data for each sector was set to 0 to indicate ground release.

Line 7

Minimum cross sectional area of the CR-3 containment structure; referred herein as reactor building (RB), is set to 1852 m^2 ($\sim 19,934 \text{ ft}^2$). This value represents a smaller cross-section than the actual CR-3 RB structure; approximately 2000 m^2 ($\sim 21,527 \text{ ft}^2$) excluding the dome. In addition, no credit is taken for adjacent structures which surround the lower portion of RB. Height in meters above plant grade of the RB structure set to 50.9 m. ($\sim 167 \text{ ft.}$). Ground release height assumption above plant grade elevation at the release point is set to 10.0 m. ($\sim 33 \text{ ft.}$). Height above ground level that the wind speed is measured is also set to 10.0 m.

Line 8

Number of hours of calm for each stability category.

Lines 9 through 78

These lines provide the joint frequency table data. The sixteen columns constitute the sixteen directions with ten speed categories for each of the seven stability classes (10 speeds times 7 classes equal 70 lines). Stability class goes from A beginning at line 9 through G ending at line 78.

Line 79

Correction factor for speed maximum array. This is set to -1 to indicate wind speed is in meters per second. The following eleven numbers provide the maximum wind speed in each wind speed category.

Line 80

Distance to EAB for each sector set to 1340 m. (~4396 ft.). As indicated in the CR-3 Final Safety Analysis Report (FSAR), Table 2-20, "Crystal River Annual Average X/Q and D/Q Values at the Site Boundary," (Reference 3), this is the closest site boundary location and provides additional conservatism when applied to all sectors. All other site boundary sector locations are at greater distances up to approximately 2990 m. (~9810 ft.). CR-3 FSAR Figure 2-3, "Site Topography Within A 5-Mile Radius," (Reference 3) also shows the site boundary and the nearest point on the site boundary, which is due north.

Line 81

Distance for LPZ for each sector is set to 8047 m. (~5 mi.) in accordance with the CR-3 FSAR, Table 2-18, "Crystal River Cumulative Frequency Distribution of Accident X/Q (sec/m³) Values For All Wind Directions, Based on $\Delta T_{175\text{ft}-33\text{ft}}$ and 33 ft Wind Data," (Reference 3).

ARCON96 Assumptions and Inputs

Assumptions and all inputs to ARCON96 are provided in input file CRRV07GA.RSF (Enclosure). The following provides additional information regarding the content of the ARCON96 input file:

Source (CR-3 RB) Data:

Release height (0.0 m.)

Type of release (ground level)

RB cross sectional area 1851.9 m² (~19,934 ft²). This value is consistent with existing CR-3 calculations and represents a smaller cross-sectional area than the actual CR-3 RB structure; approximately 2000 m² (~21,527 ft²) excluding the dome.

Vertical velocity (0.0 m/sec.)

Stack flow (0.0 m³/sec.)

Stack radius (0.0 m.)

Receptor (TSC) Data:

Distance between source (RB wall) and receptor (TSC ventilation intake) set to 131 m. (~430 ft.) and is consistent with existing CR-3 calculations.

Receptor height (0.0 m.) ground level receptor.

Elevation difference (0.0 m.)

Direction to the source (220 degrees)

Default Parameters:

Sector averaging constant is set to 4.3 and surface roughness is set to 0.2.

2. An electronic copy of the ARCON96 and PAVAN meteorological data input files.

Electronic copies of the following ARCON96 meteorological data input files spanning 2003 through 2007 are provided on CD-ROM (Enclosure):

CRRV2003.mps

CRRV2004.mps

CRRV2005.mps

CRRV2006.mps
CRRV2007.mps

An electronic copy of the PAVAN input file CRRVPAVAN.IN1.txt, which includes a summary of the meteorological data spanning 2003 through 2007 in the form of a joint frequency table, is also provided on CD-ROM (Enclosure).

- 3. For the onsite X/Q values, a scaled aerial-view drawing from which distance and direction inputs can be reasonably approximated for all postulated release and receptor locations. The figure should show true north and the scale of the figure.**

CR-3 Plant Drawing G-744-007, "Site Improvements Access and Service Roads and Railroads Plan," Revision 18 shows the RB (containment) with respect to the TSC onsite receptor location; 1st floor of the Plant Administration Building – PAB/TAB. The plant drawing size is 44 in. X 34 in., the scale is 1 in. = 50 ft., and the drawing shows true North. The Heating, Ventilation, and Air Conditioning intake and dampers are on east end of TSC roof, with air intake/dampers at approximately 117 ft. elevation. The air intakes are approximately flush with the top of the berm (RB grade level) which is at 119 ft. elevation. Buildings such as the Control Complex stand between the base of the RB and the top of the TSC. An electronic copy of CR-3 Plant Drawing G-744-007 is provided on CD-ROM (Enclosure).

Although the MCR χ/Q values are not generated using ARCON96, CR-3 Plant Drawing L-001-023, "Layout Plan above Reactor Auxiliary and Intermediate Buildings Elev. 143'-0"," Revision 26 (CR-3 FSAR Figure 1-8) is provided to show the RB (containment) with respect to the MCR (Control Complex). This plant drawing size is 36 in. X 24 in., the scale is 1 in. = 20 ft., and the drawing shows true North. An electronic copy of CR-3 Plant Drawing L-001-023 is provided on CD-ROM (Enclosure).

For offsite dose receptors, the distance to the EAB is 1340 m. (~4396 ft.) and the distance to the LPZ is 8047 m. (~5 mi.).

References

1. CR-3 to NRC letter dated June 15, 2011, "Crystal River Unit 3 – License Amendment Request #309, Revision 0, Extended Power Uprate"
2. NRC to CR-3 letter dated September 17, 2001, "Crystal River Unit 3 - Issuance of Amendment Regarding Alternative Source Term and Control Room Ventilation System (TAC NO. MB0241)"
3. Final Safety Analysis Report, Progress Energy Florida, Crystal River Unit 3, Revision 32.1