



Serial: RNP-RA/10-0108

NOV 01 2010

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, Maryland 20852

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION REGARDING
CHANGES TO TECHNICAL SPECIFICATION SECTION 3.3.2, ENGINEERED SAFETY
FEATURE ACTUATION SYSTEM INSTRUMENTATION, AND SECTION 3.3.6,
CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION (TAC NO. ME3507)

Ladies and Gentlemen:

By letter dated July 20, 2010, the NRC requested that Carolina Power and Light Company, also known as Progress Energy Carolinas, Inc. (PEC), respond to a request for additional information (RAI) regarding the proposed license amendment request to Technical Specifications Section 3.3.2, Engineered Safety Feature Actuation System Instrumentation, and Section 3.3.6, Containment Ventilation Isolation Instrumentation that was submitted on March 5, 2010.

Attachment I provides an Affirmation in accordance with the provisions of 10 CFR 50.30(b).

Attachment II provides the response to the NRC RAI for this license amendment request.

In accordance with 10 CFR 50.91, a copy of this application is being provided to the State of South Carolina.

If you have any questions concerning this matter, please contact Curt Castell at (843) 857-1626.

Sincerely,

Benjamin C. White
Manager – Support Services – Nuclear

RAC/rac

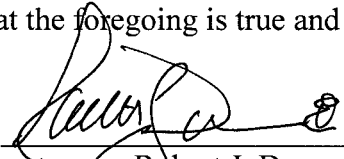
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- Attachments: I. Affirmation
II. Response To NRC Request For Additional Information Regarding Changes To Technical Specification Section 3.3.2, Engineered Safety Feature Actuation System Instrumentation, and Section 3.3.6, Containment Ventilation Isolation Instrumentation
- c: Ms. S. E. Jenkins, Manager, Infectious and Radioactive Waste Management Section (SC)
Mr. A. Gantt, Chief, Bureau of Radiological Health (SC)
Mr. L. A. Reyes, NRC, Region II
Mr. T. Orf, NRC Project Manager, NRR
NRC Resident Inspector, HBRSEP
Attorney General (SC)

AFFIRMATION

The information contained in letter RNP-RA/10-0108 is true and correct to the best of my information, knowledge, and belief; and the sources of my information are officers, employees, contractors, and agents of Carolina Power and Light Company, also known as Progress Energy Carolinas, Inc. I declare under penalty of perjury that the foregoing is true and correct.

Executed On: NOV 01 2010



Robert J. Duncan, II
Vice President, HBRSEP, Unit No. 2

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION REGARDING CHANGES TO TECHNICAL SPECIFICATION SECTION 3.3.2, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION, AND SECTION 3.3.6, CONTAINMENT VENTILATION ISOLATION INSTRUMENTATION

NRC Question 1:

This technical specifications change will effectively increase the allowable channel bypassed time from 6 hours to 12 hours, which increases the probability of a safety function failure. Has this change been factored into the plant's probable risk assessment? If so, then what was the overall impact?

Response:

The Technical Specifications (TS) change is not modeled in the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, plant specific probabilistic safety assessment (PSA). Unavailability in the PSA is based on plant specific data for recurring risk significant maintenance events. The PSA has not modeled the allowed outage time as unavailability. Therefore, the proposed TS revision to allow additional channel bypass time is not evaluated in the PSA.

The Containment Pressure High High signal containment spray actuation function is modeled in the PSA Large Early Release Frequency (LERF) model. The other two safety functions (MSIV closure and Containment Phase B isolation) are not modeled.

A bounding analysis is performed by setting one containment pressure channel as failed in the PSA model (Calculation RNP-F/PSA-0077, Rev. 0) and quantifying the LERF results.

The base LERF value is 3.89E-7/yr and the failed channel LERF value is 3.92E-7/yr. For a 6 hour AOT extension this results in the following change in Large Early Release Probability (LERP), which as shown below is a very small risk increase.

$\Delta \text{LERP} = (3.92\text{E-}7 - 3.89\text{E-}7) * 6\text{hrs} / 8760\text{hrs} = 2\text{E-}12$ per use of the allowed bypass time extension.

NRC Question 2:

In the justification for the proposed change provided, the licensee stated that the added 6-hour allowance is acceptable based on the low probability of an accident or transient occurring during that time period. It also states that there is a high probability that the channels will still perform their actuation function. The staff requests that the licensee provide quantifiable bases for these statements.

Response:

The reliability of the unaffected channels is considered high based upon industry data such as NUREG/CR-6928, "Industry-Average Performance for Components and Initiating Events at US Commercial Nuclear Power Plants," February 2007, which provides recent industry failure rates for these types of components. The HBRSEP, Unit No. 2, plant specific PSA, using industry data, has reliability of better than 99% per channel. The results of an evaluation of the probability of an applicable event during the six hour extended time determined the increase in risk is negligible at approximately 5E-09, as shown below.

The low probability of an event during the requested six hour extended time is determined as follows using a probabilistic approach. The event can be quantified as follows:

$$\Delta Pf(\text{Event}) = P(\text{IE}) \times \Delta Pf(\text{Signal})$$

The variables are described below:

P(IE) - Probability of initiating event:

The initiating events that will actuate the Containment Pressure High High signal are Loss of Coolant Accidents and secondary line breaks inside containment. The respective frequencies of these events are 5E-4 and 1E-3 per year, as taken from NUREG/CR-5750, "Rates of Initiating Events at U.S. Nuclear Power Plants: 1987- 1995."

The probability of these initiating events occurring during the requested extension time is as follows:

$$P(\text{IE}) = (6 \text{ hrs}/8760 \text{ hrs/yr}) \times (1.5\text{E-}3/\text{yr}) = 1\text{E-}6$$

$\Delta Pf(\text{Signal})$ – Increase in probability of signal failure

The Containment Pressure High High signal is based on a 2-of-3 taken twice logic. Bypass of a single channel reduces the logic to 2-of-2 for the affected train. The failure probability used in the PSA of each channel is approximately 2.5E-3 (inclusive of the channel components and power supplies). The resultant increase in failure probability of bypassing a channel for the requested extension time is the difference between the bypass condition failure probability (any one of two channels failing) and the base condition failure probability (three possible combinations of any two channels failing) as follows:

$$\Delta Pf(\text{signal}) = Pf(\text{LCO}) - Pf(\text{base}) = (2 \times 2.5\text{E-}3) - (3 \times (2.5\text{E-}3 \times 2.5\text{E-}3))$$

$$\Delta Pf(\text{signal}) = 5\text{E-}3$$

Common cause that only applies to the base condition is conservatively omitted, as it would only diminish the overall increase in calculated risk.

$\Delta P_f(\text{Event})$ - Increase Probability of signal failure when needed

Combining these two probabilities gives the increase in likelihood of having an initiating event with failure of the Containment Pressure High High actuation signal:

$$\Delta P_f(\text{Event}) = 1E-6 \times 5E-3 = 5E-9$$

NRC Question 3:

The licensee stated that in most cases, 6 hours should provide sufficient time to perform maintenance activities required to return a channel to service. If this is the case, then why is the current 6-hour completion time not sufficient to support the necessary maintenance activities? The affected channel would not be required to be tripped during this initial time period and module replacements could be performed without necessitating the use of the extraordinary measures described in the application.

Response:

It is expected that in the majority of cases, such as pre-planned maintenance, activities can be completed in the current six hour completion time as currently allowed. However, as experienced in the June 29, 2009, event that prompted the need for this license amendment request, emergent conditions can pose a challenge to meeting the six hour criterion. On that date, the time it took for planning, troubleshooting, and obtaining replacement parts took greater than six hours. For other safeguard channels this would not be a problem, as the channel can remain de-energized and in the trip condition while the channel is repaired. However, because of the unique design of the Containment Pressure High High signal (must be energized to trip), it is desired that the channel be de-energized and removed from the trip condition during repair. Six additional hours is considered sufficient time for these repair activities.