

From: Thomas Alexion
To: Siva Lingam
Date: 1/16/2008 10:59:38 AM
Subject: Fwd: RE: Vogtle Question Info

Siva,

As we just discussed, and for everybody's information, the licensee needs to submit the TRM and TRM Bases pages on the docket (the licensee's proposed TRM and TRM Bases pages look good, it's just that they need to be submitted on the docket). They should also indicate that the TRM is incorporated by reference into the FSAR, such that changes to the TRM and TRM Bases pages are subject to 50.59.

With this letter from the licensee, I believe that ITSB's (i.e., Carl's concerns) are resolved and there is no need for a license condition. I also informed Carl that what he reviewed were TRM and TRM Bases pages, not FSAR pages, and that were not submitted by the licensee on the docket. They were e-mailed to NRC for discussion purposes.

Tom

>>> Carl S Schulten 01/16/2008 9:51 AM >>>

The attached FSAR pages document that the analysis basis for the Uprated power is the Caldon UFM and that operation above the old Thermal Power limit requires calorimetric calibrations using the Caldon equipment. Therefore, I can agree that the 50.59 process will ensure the licensee will reduce thermal power if the Caldon is inop and that more importantly not reducing power with the Caldon inop would require a 50.59 review which would then require a 50.90 license amendment.

Carl Schulten
Senior Reactor Engineer
NRR/Technical Specifications Branch
301-415-1192
Room O12H17

>>> Siva Lingam 01/16/2008 8:10 AM >>>

>>> Diane Jackson 1/8/2008 2:47 PM >>>

Diane Jackson
Reactor Systems Branch
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>>> Robert Martin 12/27/2007 6:52 AM >>>

Does the attached response solve the issue?

CC: Benjamin Parks; Carl S Schulten; Diane Jackson; Gregory Cranston; James O'Driscoll; Martin Murphy; Robert Martin

From: Siva Lingam
To: Carl S Schulten; Thomas Alexion
Date: 1/16/2008 8:10:38 AM
Subject: Fwd: RE: Vogtle Question Info

>>> Diane Jackson 1/8/2008 2:47 PM >>>

Diane Jackson
Reactor Systems Branch
U.S. Nuclear Regulatory Commission
O-9 D19; MS/O-10 B3
301-415-8548; DTJ@nrc.gov

>>> Robert Martin 12/27/2007 6:52 AM >>>
Does the attached response solve the issue?

From: "Walton, Kerry M." <KMWALTON@southernco.com>
To: "Warren Lyon" <WCL@nrc.gov>
Date: 12/20/2007 11:55:33 AM
Subject: RE: Vogtle Question Info

Warren,

In response to Bob Martin's inquiry, the attached draft of the Vogtle TRM should clarify how Vogtle proposes to operate with the Caldon LEFM system out of service.

Regards,

Kerry Walton
Vogtle Support
Power Uprate Project
205-992-5595
kmwalton@southernco.com

-----Original Message-----

From: Diane Jackson [<mailto:DTJ@nrc.gov>]
Sent: Thursday, December 20, 2007 9:03 AM
To: Robert Martin; Warren Lyon
Cc: Siva Lingam
Subject: Re: Vogtle Question Info

Bob -

Will you make sure this is how Vogtle would like to / intends to operate? If not, they need to supplement their submittal to explain and justify their intended operation when the CheckPlus is out of service.

Diane
Diane Jackson
Reactor Systems Branch
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O-9 D19; MS/O-10 B3
301-415-8548; DTJ@nrc.gov

>>> Warren Lyon 12/20/2007 8:38 AM >>>

My present assessment of the way Vogtle proposes to operate if the CheckPlus is inoperable is as follows:

To operate above the presently licensed power of 3565 MWt, the licensee proposes that the CheckPlus cannot have been out-of-service for more than 48 hours and there cannot have been any power changes that exceed 10 percent during that 48 hours. Power during the 48 hours without an operational CheckPlus will be monitored using the existing four venturis that have been recalibrated to agree with CheckPlus before the failure. The licensee justifies this operation on the basis that there is not a significant uncertainty associated with using venturis for 48 hours as long as the plant is essentially operated in a steady state condition and, if a power change in excess of 10 percent should occur during the 48 hours, then the plant thermal power will be reduced to the presently licensed 3565 MWt. The licensee is silent with respect to the venturi calibration that applies after 48 hours.

If the CheckPlus is not operable, the plant should be operated with an actual thermal power that corresponds to the actual thermal power that applied prior to the power uprate. Therefore, the NRC will require that the venturi calibration that applies after 48 hours, or that will apply within the 48 hours if a power change greater than 10 percent occurs, will be the pre-CheckPlus calibration to be consistent with the uncertainty associated with using the venturis to determine thermal power. Further, the actual thermal power must be two percent lower than the value determined by use of the pre-CheckPlus venturi calibration to account for the 2 percent uncertainty that applied prior to the proposed uprate.

CC: "Siva Lingam" <SPL@nrc.gov>, "Stringfellow, N. Jack" <NJSTRING@southernco.com>, "Hill, Lesa P." <LPHILL@southernco.com>, "Robert Martin" <REM@nrc.gov>, "Grissom, Phillip D." <PDGRISSO@southernco.com>

13.3 Instrumentation

TR 13.3.7 Ultrasonic Mode Calorimetric

TR 13.3.7 The Ultrasonic Mode Calorimetric system shall be FUNCTIONAL with

- a. The Caldon LEFM CheckPlus system FUNCTIONAL
- b. The Plant Integrated Plant Computer (IPC) system FUNCTIONAL

APPLICABILITY: MODE 1

reading NI or Delta-T

nuclear instrumentation/
power calorimetric comparison
SR 3.3.1.2

TECHNICAL REQUIREMENT SURVEILLANCES

SURVEILLANCE	FREQUENCY
TRS 13.3.7.1 Record the highest reading PR NI or Delta-T board indication.	Once within 1 hour and once per hour thereafter when the IPC calorimetric calculation (UQ1118) is NON-FUNCTIONAL
TRS 13.3.7.2 Locally check LEFM CheckPlus system functional.	Once within 4 hours and very 4 hours thereafter when LEFM failure annunciator on main control board is on or inoperable.
TRS 13.3.7.3 Perform LEFM CheckPlus electronics and system maintenance in accordance with plant procedures.	Once per 18 months
TRS 13.3.7.4 Perform calibration of instrumentation and IPC computer points to support calorimetric in accordance with plant procedures.	Once per 18 months

Additional Information

The maximum allowable reactor core power levels discussed in this Technical Requirement (TR) are based on the analyzed reactor core power level assumed in the reactor safety analysis of 3636 MWt and the magnitude of the calorimetric power determination uncertainty which is a function of the calorimetric method.

Safety Analysis Reactor Power Level	Calorimetric Uncertainty	Maximum Allowable Indicated Reactor Core Power Level	Allowable Calorimetric Power Determination Mode
3636	0.3%	3625.6 MWt	Ultrasonic Mode
3636	2.0%	3565 MWt	Venturi Mode

Operation at indicated core power levels above 3565 MWt requires a calorimetric power uncertainty determination of less than 2.0%. This is only possible if the Ultrasonic Mode calorimetric is used. The Ultrasonic Mode calorimetric is unique in that it receives feedwater mass flow, feedwater temperature, and feedwater pressure inputs directly from the Caldon LEFM CheckPlus system. The LEFM system measures and transmits this data more accurately than the functionally equivalent instrumentation from the feedwater Venturi Mode calorimetric. This is the basis for the reduced uncertainty that is characteristic of the Ultrasonic Mode calorimetric.

The Ultrasonic Mode calorimetric can be performed using either of two methods; automatically by the Plant IPC or manually using a non-IPC calculation. The IPC method is performed with no operator involvement required. The calculated core power for the IPC Ultrasonic Mode calorimetric is displayed on the control room IPC displays. Also, IPC point UQ1118 will normally display this same value when selected to the Ultrasonic Mode of display (UQ1118 will display the Venturi Mode or normalized Venturi Mode if selected). The manual Ultrasonic Mode calorimetric is performed by operations on a calculating device other than the IPC and is controlled by a Vogtle specific procedure. This calorimetric mode requires input data gathered directly from the LEFM via the local display on the electronics panel as well as supporting process data provided by analog points displayed on the IPC. MCB indicators are not used as the source of input data for the manual Ultrasonic mode calorimetric because the increased uncertainty associated with the use of these indicators has not been included in the Ultrasonic mode calorimetric uncertainty analysis.

Both the IPC and manual methods of performing the Ultrasonic mode calorimetric power determination meet the requirements of the uncertainty analysis supporting operation at power levels greater than 3565 MWt. Whenever possible, the IPC Ultrasonic Mode calorimetric should be used to determine reactor power when operating at power levels greater than 3565 MWt.

LEFM System Operational Status

For this TR, "FUNCTIONAL" is defined as the ability to provide feedwater mass flow, feedwater temperature and pressure at the required uncertainty level to be used as input for either the IPC Ultrasonic mode calorimetric calculation or the manual Ultrasonic mode calorimetric calculation. The LEFM data may be retrieved from the IPC data link application (for the IPC Ultrasonic mode calorimetric) or locally via the display on the LEFM CheckPlus electronics panel (for the manual Ultrasonic Mode calorimetric).

The LEFM electronics package and the IPC/LEFM data link application perform extensive self monitoring and internal diagnostics to ensure proper operation. Conditions which impact the meter status, LEFM/IPC communication status, or electronics cabinet internal temperature will trigger a common MCB annunciator. An available IPC screen may be reviewed to determine what category of failure has caused the alarm. More detailed diagnostic information is available locally at the electronics cabinet display screen.

Alarm Condition	Discussion	LEFM System Status
LEFM/IPC Data communication link has failed	The data from the LEFM cabinet is not communicating properly to the IPC. The IPC Ultrasonic Mode for calorimetric determination is impacted. Alarm condition.	NON-FUNCTIONAL
LEFM meter in non-normal status (Alert or Failure status)	The LEFM system has experienced a failure affecting the uncertainty requirements for the Ultrasonic Mode Calorimetric. Specific cause of the status is available locally at the LEFM electronics display.	NON-FUNCTIONAL
LEFM Electronics cabinet internal temperature is above the high setpoint.	The temperature of the LEFM electronics cabinet is above the high temperature setpoint. The LEFM system can continue to meet the uncertainty requirements for the Ultrasonic Mode Calorimetric. MCB annunciator will be triggered when High temperature limit has been exceeded to allow monitoring and corrective action prior to exceeding the Hi-Hi limit. (Note)	FUNCTIONAL

Note : At the Hi-Hi limit, the cabinet internal temperature is above the setpoint for reliable system operation. The LEFM system shall be declared nonfunctional. The Hi-Hi limit is not alarmed but can be monitored from the IPC screen or locally at the cabinet.

IPC Availability Status

For this TR, "FUNCTIONAL" condition of the IPC is defined as the ability of the IPC to perform either:

1. IPC Ultrasonic mode calorimetric calculation (indicated by functionality of IPC point UQ1118) or to provide the supporting process input data for a manual Ultrasonic mode calorimetric calculation via analog points on the IPC.
2. IPC Normalized Venturi calorimetric calculation if in Action A.1
3. IPC non-normalized Venturi calorimetric calculation if in Action B.1

When the IPC system is non-functional, reactor core power limitations for this TR shall be based on the highest reading Power Range NI channel or Delta-T channel. Operation at 100% power based on the highest reading Power Range NI or Delta-T channel may continue until the next required nuclear instrumentation / power calorimetric comparison (SR 3.3.1.2) , which could be up to 12 hours per procedure. The IPC unavailability will result in reducing the maximum core power to 98% power or less by NI and Delta-T indication, as needed, to support a manual calorimetric power calculation without IPC display of calorimetric input points or input from the LEFM system. The 48-hour time period does not apply in this specific case.

LEFM System Outage Requirements

The allowed outage time for operation at any reactor core power level in excess of 3565 MWt with the Caldon LEFM system nonfunctional is 48 hours, provided steady state conditions persist throughout the 48 hour period. The bases for the proposed outage time are:

- Operations will switch to and operate the plant based on the normalized Venturi Mode calorimetric when the Caldon LEFM system is nonfunctional. This mode uses alternate plant instruments (feedwater venturies and RTDs) and shall be used for up to 48 hours if

the Caldon LEFM system is non-functional. Although the accuracy of alternate instrumentation can degrade over time as a result of venturi fouling or transmitter drift, these effects are expected to be insignificant over the 48-hour time period. The calorimetric mode shall be switched to the non-normalized Venturi Mode for power reduction if the LEFM system can not be repaired within 48 hours.

- The power calorimetric calculations (Ultrasonic Mode and Venturi Modes) are performed independently by the plant IPC. The Venturi Mode calculation uses the venturi based feed flow measurements and RTD based feedwater temperatures. The venturi based thermal power measurement is normalized to the LEFM based power measurement. This methodology ensures the normalized venturi Mode calorimetric is consistent with the Ultrasonic Mode calorimetric at the time the LEFM system is non-functional.
- For the Caldon LEFM nonfunctional condition, the 48-hour “clock” will start at the time of the failure as annunciated on the main control board (with the exception of high cabinet temperature alarm).

Most repairs to the Caldon LEFM system can be made within an eight hour shift. Forty-eight hours will give plant personnel time to plan the work, make repairs, and verify normal operation of the Caldon LEFM system within its original uncertainty bounds at the same power level and indications as before the failure.

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