



**Duke Power**  
4800 Concord Rd.  
York, SC 29710  
(803) 831-4251 OFFICE  
(803) 831-3221 FAX  
grpeters@duke-energy.com

**Gary R. Peterson**  
Vice President  
Catawba Nuclear Station

January 24, 2002

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555

Subject: Duke Energy Corporation  
Catawba Nuclear Station, Units 1 and 2  
Docket Numbers 50-413 and 50-414  
Proposed Technical Specifications and Bases Amendment  
1.1, Definitions, Response Time  
3.3.1, Reactor Trip System Instrumentation  
3.3.2, Engineered Safety Feature Actuation System  
Instrumentation

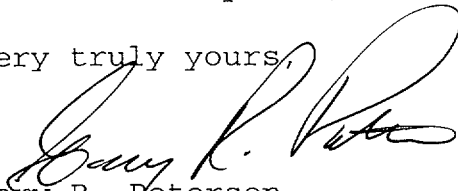
Reference: Letter to NRC, same subject, dated May 25, 2001

On January 7, 2002, a telephone conference call was held between representatives of Duke Energy Corporation and the NRC concerning the subject reference letter. In the conference call, the NRC requested Duke Energy Corporation to provide information concerning specific systems and components for which response time will no longer be measured, the response times that will be used for these components when actual response time is no longer measured, and the basis for these values. The attached pages to this letter contain the requested information.

No regulatory commitments are being made in this letter or the attached pages.

If you have any questions concerning this information, please call L.J. Rudy at (803) 831-3084.

Very truly yours,



Gary R. Peterson

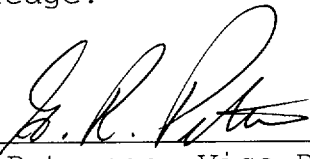
LJR/s

Attachment (8 pages)

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G.R. Peterson affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

  
\_\_\_\_\_  
G.R. Peterson, Vice President

Subscribed and sworn to me: 1-24-2002  
Date

  
\_\_\_\_\_  
Notary Public

My commission expires: 6-26-2002  
Date

SEAL

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xc (with attachment):

L.A. Reyes  
U.S. Nuclear Regulatory Commission  
Regional Administrator, Region II  
Atlanta Federal Center  
61 Forsyth St., SW, Suite 23T85  
Atlanta, GA 30303

D.J. Roberts  
Senior Resident Inspector (CNS)  
U.S. Nuclear Regulatory Commission  
Catawba Nuclear Station

C.P. Patel (addressee only)  
NRC Senior Project Manager (CNS)  
U.S. Nuclear Regulatory Commission  
Mail Stop 08-H12  
Washington, D.C. 20555-0001

R. Wingard, Director  
Division of Radioactive Waste Management  
Bureau of Land and Waste Management  
Department of Health and Environmental Control  
2600 Bull St.  
Columbia, SC 29201

Catawba Nuclear Station (CNS)  
Reactor Protection System (RPS) / Engineered Safety Features  
Actuation System (ESFAS)  
Response Time Verification via Allocation Methodology  
WCAP-13632-P-A R2 and WCAP-14036-P-A R1

This information has been developed and assembled in response to NRC request in support of approval for the license amendment request submittal dated May 25, 2001.

The Reactor Protection System (RPS) and Engineered Safety Features Actuation System (ESFAS) for Catawba Units 1 and 2 consist of the following:

- a) Westinghouse 7300 Process Protection and Control System
- b) Westinghouse Solid State Protection System (SSPS)
- c) Westinghouse Nuclear Instrumentation System (NIS)
- d) Reactor Coolant Pump Monitoring Instrumentation
- e) Turbine Generator and Feedwater Instrumentation

The Failure Modes and Effects Analysis (FMEA) contained in WCAP-14036-P-A Rev. 1, is applicable to the equipment installed at Catawba Units 1 and 2. The analysis is valid for the installed versions of boards and relays.

Where periodic testing for pressure sensors will be replaced by allocated response time, the values to be used will be the most conservative value that is derived via Methods (1, 2, 3) section (9) of WCAP-13632-P-A Rev. 2. Catawba has determined that the most conservative response time values for each specific model of a pressure sensor was yielded by applying Method (1) and rounding up for conservatism.

The established Plant Equipment Database (EDB) revisions (and/or other appropriate administrative controls) will stipulate that pressure sensors (i.e., transmitters and switches) utilizing capillary tubing must be subjected to response time testing after initial installation and following any maintenance or modification activity that could damage the device or capillary system. Currently there are no configurations of this type that are utilized at CNS which will require response time testing.

The established Plant EDB revisions (and/or other appropriate administrative controls) will stipulate that pressure transmitters equipped with variable damping capability, (i.e., as utilized in Reactor Trip System or Engineered Safety Features applications) which require periodic response time testing, must be subjected to testing prior to return to service, following any maintenance or modification activity.

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The established Plant EDB revisions (and/or other appropriate administrative controls) will stipulate that following any maintenance or modification activity that may affect the response time of pressure sensors, other than stated above, which require periodic response time testing, must be subjected to testing prior to return to service.

The verification of acceptable performance for the Reactor Protection and Engineered Safety Features Systems within the required 'Function Total Response Time' will be accomplished by a series of sequential and/or overlapping activities, as allowed by the existing CNS Technical Specifications.

1. Each Reactor Trip Function verification will be documented as follows:

- Pressure sensor allocated time **plus** 7300 allocated time **plus** SSPS allocated time **plus** Rx Trip Breaker measured time **plus** stationary gripper release time **less than or equal to** Allowed Total Response Time
- NIS allocated time **plus** 7300 allocated time **plus** SSPS allocated time **plus** Rx Trip Breaker measured time **plus** stationary gripper release time **less than or equal to** Allowed Total Response Time
- NIS allocated time **plus** SSPS allocated time **plus** Rx Trip Breaker measured time **plus** stationary gripper release time **less than or equal to** Allowed Total Response Time
- Reactor coolant pump Undervoltage/Underfrequency module measured time delay **plus** SSPS allocated time **plus** Rx Trip Breaker measured time **plus** stationary gripper release time **less than or equal to** Allowed Total Response Time

2. Each Engineered Safety Feature Function verification will be documented as follows:

Note: The allocation portion of each function will utilize 1 second of the Allowed Total Response Time. The remaining portion of each function will be measured and verified to be within the Allowed Total Response Time minus 1 second.

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- Pressure sensor allocated time **plus** 7300 allocated time **plus** SSPS allocated time **less than or equal to** 1 second, or
- Pressure sensor allocated time **less than or equal to** 1 second (this case is for the Auxiliary Feedwater Pump Suction Transfer which does not utilize the SSPS)

Tables 1 & 2 depict Catawba protection channel equipment configuration and assignment of response time allocation values.

Catawba Nuclear Station (CNS)  
Reactor Protection System (RPS) / Engineered Safety Features Actuation System (ESFAS)  
Response Time Verification via Allocation Methodology  
WCAP-13632-P-A R2 and WCAP-14036-P-A R1

**Table 1 - Reactor Trip**

Function	Sensor Notes 2 & 3	Sensor Time	7300 / NIS String Note 4	7300 Time Note 11	SSPS Relays Note 5	SSPS Time Note 5	Rx Trip Time Note 6	Total Time	Req'd Time < / =
Pzr Press – Low	ITT Barton 763	0.75 s	NLP + NAL	0.1 s	Input	0.02 s	0.3 s	1.17 s	2.0 s
Pzr Press – High	ITT Barton 763	0.75 s	NLP + NAL	0.1 s	Input	0.02 s	0.3 s	1.17 s	2.0 s
S/G Level – Low Low	ITT Barton 764	0.75 s	NLP + NAL	0.1 s	Input	0.02 s	0.3 s	1.17 s	2.0 s
RCS Flow – Low	Rosemount 1154HP5	0.75 s	NLP + NAL	0.1 s	Input	0.02 s	0.3 s	1.17 s	2.0 s
OPDT (Vary Tavg)	RDF 21232	Note 1	NRA + NSA + NSA + NSA + NSA + NAL	0.4 s	Input	0.02 s	0.3 s	0.72 s	1.5 s
OPDT (Vary DeltaT)	RDF 21232	Note 1	NRA + NSA + NSA + NAL	0.4 s	Input	0.02 s	0.3 s	0.72 s	1.5 s
OPDT (Vary Flux)	Detectors Exempt	Note 1	NIS (1ms) + NSA + NCH + NSA + NAL	0.401 s Note 10	Input	0.02 s	0.3 s	0.721 s	1.5 s
OTDT (Vary Tavg)	RDF 21232	Note 1	NRA + NSA + NSA + NSA + NAL	0.4 s	Input	0.02 s	0.3 s	0.72 s	1.5 s

**RPS Functions Acronyms**

Pzr - Pressurizer	RCS - Reactor Coolant System	OPDT - Overpower $\Delta$ Temperature	SI - Safety Injection
S/G - Steam Generator	RCP - Reactor Coolant Pump	OTDT - Overtemperature $\Delta$ Temperature	NIS - Nuclear Instrumentation System
ESFAS - Engineered Safety Features Actuation System			

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**Table 1 - Reactor Trip (cont.)**

Function	Sensor Notes 2 & 3	Sensor Time	7300 / NIS String Note 4	7300 Time Note 11	SSPS Relays Note 5	SSPS Time Note 5	Rx Trip Time Note 6	Total Time	Req'd Time < / =
OTDT (Vary Delta T)	RDF 21232	Note 1	NRA + NSA + NSA + NAL	0.4 s	Input	0.02 s	0.3 s	0.72 s	1.5 s
OTDT (Vary Press)	ITT Barton 763	0.75 s	NLP + NSA + NSA + NAL	0.4 s	Input	0.02 s	0.3 s	1.47 s	1.5 s
OTDT (Vary Flux)	Detectors Exempt	Note 1	NIS (1ms) + NSA + NCH + NSA + NAL	0.401 s Note 10	Input	0.02 s	0.3 s	0.721 s	1.5 s
RCP Undervoltage	RIS 90634-100	Note 1	N/A	N/A	Input	0.02 s	0.3 s	1.27 s Note 7	1.5 s
RCP Underfrequency	RIS 90634-100A	Note 1	N/A	N/A	Input	0.02 s	0.3 s	0.52 s Note 8	0.6 s
NIS Level – Low	Detectors Exempt	Note 1	NIS FMEA (Note 9)	0.065 s	Input	0.02 s	0.3 s	0.385 s	0.5 s
NIS Level – High	Detectors Exempt	Note 1	NIS FMEA (Note 9)	0.065 s	Input	0.02 s	0.3 s	0.385 s	0.5 s
Containment Pressure ESFAS (SI) Input to Reactor Trip	ITT Barton 386A	0.75 s	NLP + NAL	0.1 s	Input	0.02 s	0.3 s	1.17 s	2.0 s
Pressurizer Pressure ESFAS (SI) Input to Reactor Trip	ITT Barton 763	0.75 s	NLP + NAL	0.1 s	Input	0.02 s	0.3 s	1.17 s	2.0 s

RPS Functions Acronyms

Pzr - Pressurizer      RCS - Reactor Coolant System      OPDT - Overpower Δ Temperature      SI - Safety Injection  
S/G - Steam Generator      RCP - Reactor Coolant Pump      OTDT - Overtemperature Δ Temperature      NIS - Nuclear Instrumentation System  
ESFAS - Engineered Safety Features Actuation System



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**Table 2 - Engineered Safety Features**

Function	Sensor Notes 2 & 3	Sensor Time	7300 / NIS String Note 4	7300 Time Note 11	SSPS Relays Note 5	SSPS Time Note 5	Total Time	Req'd < / = Note 12
Containment Press – High (SI)	ITT Barton 386A	0.75 s	NLP + NAL	0.1 s	Input + Master + Slave + Slave	0.124 s	0.974 s	1.0 s
Containment Press – High High (CS & CIΦB & SLI)	ITT Barton 386A	0.75 s	NLP + NAL	0.1 s	Input + Master + Slave	0.088 s	0.938 s	1.0 s
Steam Pressure – Low (SLI)	Tobar 32PA Veritrak 76PG Rosemount 1153GD9	0.75 s	NLP + NAL	0.1 s	Input + Master + Slave	0.088 s	0.938 s	1.0 s
Steam Pressure – Neg Rate High (SLI)	Tobar 32PA Veritrak 76PG Rosemount 1153GD9	0.75 s	NLP + NAL	0.1 s	Input + Master + Slave	0.088 s	0.938 s	1.0 s
Pzr Pressure – Low (SI)	ITT Barton 763	0.75 s	NLP + NAL	0.1 s	Input + Master + Slave + Slave	0.124 s	0.974 s	1.0 s
RWST Level – Low	Rosemount 1153DB5	0.75 s	NLP + NAL	0.1 s	Input + Master + Slave	0.088 s	0.938 s	1.0 s
S/G Level – Low Low (AFW)	ITT Barton 764	0.75 s	NLP + NAL	0.1 s	Input + Master + Slave	0.088 s	0.938 s	1.0 s
S/G Level – High High (TT & FWI)	ITT Barton 764	0.75 s	NLP + NAL	0.1 s	Input + Master + Slave	0.088 s	0.938 s	1.0 s
AFW Suction Transfer	ITT Barton 580A	0.75 s	N/A	N/A	N/A	N/A	0.75 s	1.0 s

Engineered Safety Features Actuation System (ESFAS) Function Acronyms

SI - Safety Injection  
CS - Containment Spray  
TT - Turbine Trip  
SLI - Steamline Isolation

FWI - Feedwater Isolation  
AFW - Auxiliary Feedwater  
CIΦA - Containment Isolation Phase A  
CIΦB - Containment Isolation Phase B

Catawba Nuclear Station (CNS) Units 1 & 2  
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Actuation System (ESFAS)  
Response Time Verification - Allocation Tables

Table 1 and 2 Notes

1. Sensors for these functions were not evaluated in WCAP-13632-P-A R2. Therefore, allocated sensor response times are not used and sensors will continue to be tested as required. NIS detectors are exempt from RTT per Technical Specifications.
2. Allocated sensor response times for the ITT Barton (model 763 - Pressurizer Pressure, model 764 - Steam Generator Level), Tobar (model 32PA - Steamline Pressure) and Veritrak (model 76PG - Steamline Pressure) pressure sensors specified in Tables 1 and 2 are based on historical records (Method 1) of acceptable RTT obtained from the CNS response time testing program. The historical response time test data for these sensors is documented in various test reports from Analysis & Measurement Services (AMS) produced from on-site in-situ testing performed via noise analysis method. The test reports span a time period from March 1991 through August 2001. These test results are not included but are available for NRC inspection upon request.

Due to equipment obsolescence, the Veritrak and Tobar transmitters used for Steamline Pressure will be replaced with Rosemount model 1153GD9 transmitters through the modification process. These style transmitters are covered by WCAP-13632-P-A R2, and the sensor response time will be measured upon initial installation to verify that they are below the allocated response time for the function. A review of data from AMS in-situ testing performed at the Duke Power McGuire Nuclear Station indicates that this will be acceptable.

3. Allocated sensor response times for the ITT Barton (model 386A - Containment Pressure, model 580A - Auxiliary Feedwater Pump Suction Pressure) and Rosemount (model 1153DB5 - Refueling Water Storage Tank Level, model 1154HP5 - Reactor Coolant System Flow) pressure sensors specified in Tables 1 and 2 are based on historical records (Method 1) of acceptable RTT obtained from the CNS response time testing program. The historical response time test data for these sensors is documented in CNS plant test procedures performed via step input method. The test data span a time period from April 1985 through September 2001. These test results are not included but are available for NRC inspection upon request.
4. 7300 cards installed at CNS were evaluated in Section 4.5 of WCAP-14036-P-A R1 (card types NLP, NSA, NAL, NCH, and NRA). The allocated response times for 7300 are derived from Table

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8-1 of the WCAP. There is a NLL lag card in each of the Delta T and the Tavg 7300 circuits which has a setpoint of zero seconds (e.g., no lag value). These NLL cards have been hard configured to eliminate the lag circuit. All other NLL type time domain cards will have their time domain characteristics verified within calibration procedures. This is consistent with discussion in Section 4.0 of WCAP-14036-P-A R1.

5. Relays evaluated in Section 4.8 of WCAP-14036-P-A R1 and used in the CNS SSPS are as follows:

- Input and Master Relays: G. P. Clare GP1 Series, Midtex/AEMCO 156, or Potter & Brumfield KH Series
- Slave Relays: Westinghouse Type AR and/or Potter & Brumfield MDR series

The following allocated response times for the SSPS relays are in accordance with Section 4.8 of WCAP-14036-P-A R1; logic circuit response time was determined to be insignificant.

- Reactor Trip Functions: 20 msec (input relay)
- ESFAS Functions:  
26 msec + 26 msec + 36 msec = 88 msec (input + master + slave),  
**OR**  
26 msec + 26 msec + 36 msec + 36 msec = 124 msec (input + master + 2 slaves in series)

6. Time includes: Reactor Trip breaker time < / = 150 ms and Stationary Gripper Release Time < / = 150 ms.
7. Time includes: Undervoltage module delay time < / = 0.7 sec and Westinghouse assumed EMF Delay Time 250 ms.
8. Time includes: Underfrequency module delay time < / = 0.2 sec.
9. The Power Range NIS cards installed at CNS were evaluated in Section 4.6 of WCAP-14036-P-A R1 (Detector Current Monitor, Summing and Level Amplifier, Level Trip Bistable, and Isolation Amplifier).
10. Includes allowance for both NIS and 7300.
11. The allocated response times are derived from Table 8-1 of the WCAP.
12. This value is 1 second of the Allowed Total Response Time. The use of the 1 second value is an internal Catawba limit which supports plant overall time verification process.