Docket No. 50-423
B14745

Attachment 1

Millstone Nuclear Power Station, Unit No. 3

Proposed Revision to Technical Specifications
Response Times for the Reactor Trip System and
Engineered Safety Features Actuation System Instrumentation

Marked-Up Pages of Technical Specifications

April 1994

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LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE. ~~with RESPONSE TIMES as shown in Table 3.3-2~~.

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each Reactor Trip System instrumentation channel and interlock and the automatic trip logic shall be demonstrated OPERABLE by the performance of the Reactor Trip System Instrumentation Surveillance Requirements specified in Table 4.3-1.

4.3.1.2 The REACTOR TRIP SYSTEM RESPONSE TIME of each Reactor trip function shall be demonstrated to be within its limit at least once per 18 months.* Each test shall include at least one train such that both trains are tested at least once per 36 months and one channel (to include input relays to both trains) per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific Reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.

Neutron detectors and speed sensors are exempt from response time testing.

*Except that the surveillance requirement due no later than June 13, 1993, may be deferred until the next refueling outage, but no later than September 30, 1993, whichever is earlier.

TABLE 3.3-2

REACTOR TRIP SYSTEM INSTRUMENTATION RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIME
1. Manual Reactor Trip	N.A.
2. Power Range, Neutron Flux	≤ 0.5 second*
3. Power Range, Neutron Flux, High Positive Rate	N.A.
4. Power Range, Neutron Flux, High Negative Rate	≤ 0.5 second*
5. Intermediate Range, Neutron Flux	N.A.
6. Source Range, Neutron Flux	N.A.
7. Overtemperature ΔT	≤ 7 seconds*
8. Overpower ΔT	≤ 7 seconds*
9. Pressurizer Pressure--Low	≤ 2 seconds
10. Pressurizer Pressure--High	≤ 2 seconds
11. Pressurizer Water Level--High	≤ 2 seconds

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*Neutron detectors are exempt from response time testing. Response time of the neutron flux signal portion of the channel shall be measured from detector output or input of first electronic component in channel.

TABLE 3.3-2 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIME
12. Reactor Coolant Flow--Low	
a. Single Loop (Above P-8)	$\leq$ 1 second
b. Two Loops (Above P-7 and below P-8)	$\leq$ 1 second
13. Steam Generator Water Level--Low-Low	$\leq$ 2 seconds
14. Low Shaft Speed-Reactor Coolant Pumps	$\leq$ 0.6 second**
15. Turbine Trip	
a. Low Fluid Oil Pressure	N.A.
b. Turbine Stop Valve Closure	N.A.
16. Safety Injection Input from ESF	N.A.
17. Reactor Trip System Interlocks	N.A.
18. Reactor Trip Breakers	N.A.
19. Automatic Trip and Interlock Logic	N.A.
20. Three Loop Operation Bypass Circuitry	N.A.

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**Speed sensors are exempt from response time testing. Response time of the speed signal portion of the channel shall be measured from detector output or first electronic component in the channel.

INSTRUMENTATION

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Features Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their Trip Setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4. ~~and with RESPONSE TIMES as shown in Table 3.3-5.~~

APPLICABILITY: As shown in Table 3.3-3.

ACTION:

a. With an ESFAS Instrumentation or Interlock Trip Setpoint trip less conservative than the value shown in the Trip Setpoint column but more conservative than the value shown in the Allowable Value column of Table 3.3-4, adjust the Setpoint consistent with the Trip Setpoint value.

b. With an ESFAS Instrumentation or Interlock Trip Setpoint less conservative than the value shown in the Allowable Value column of Table 3.3-4, either:

   1. Adjust the Setpoint consistent with the Trip Setpoint value of Table 3.3-4, and determine within 12 hours that Equation 2.2-1 was satisfied for the affected channel, or

   2. Declare the channel inoperable and apply the applicable ACTION statement requirements of Table 3.3-3 until the channel is restored to OPERABLE status with its Setpoint adjusted consistent with the Trip Setpoint value.

Equation 2.2-1 $Z + R + S \leq TA$

Where:

Z = The value from Column Z of Table 3.3-4 for the affected channel,

R = The "as measured" value (in percent span) of rack error for the affected channel,

S = Either the "as measured" value (in percent span) of the sensor error, or the value from Column S (Sensor Error) of Table 3.3-4 for the affected channel, and

TA = The value from Column TA (Total Allowance) of Table 3.3-4 for the affected channel.

c. With an ESFAS instrumentation channel or interlock inoperable, take the ACTION shown in Table 3.3-3.

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TABLE 3.3-5

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATION SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
1. Manual Initiation	
a. Safety Injection (ECCS)	N.A.
b. Containment Spray	N.A.
c. Phase "A" Isolation	N.A.
d. Phase "B" Isolation	N.A.
e. Steam Line Isolation	N.A.
f. Feedwater Isolation	N.A.
g. Auxiliary Feedwater	N.A.
h. Service Water	N.A.
i. Control Building Isolation	N.A.
j. Reactor Trip	N.A.
k. Start Diesel Generator	N.A.
2. Containment Pressure--High-1	
a. Safety Injection (ECCS)	≤ 27[9]/12[10]
1) Reactor Trip	≤ 2
2) Feedwater Isolation	≤ 6.8[3]
3) Phase "A" Isolation	≤ 2[2][6]/12[1][6]
4) Auxiliary Feedwater	≤ 60
5) Service Water	≤ 90[1]
6) Start Diesel Generator	≤ 12
b. Control Building Isolation	≤ 5
3. Pressurizer Pressure--Low	
a. Safety Injection (ECCS)	≤ 27[9]/12[10]
1) Reactor Trip	≤ 2
2) Feedwater Isolation	≤ 6.8[3]
3) Phase "A" Isolation	≤ 2[2][6]/12[1][6]
4) Auxiliary Feedwater	≤ 60
5) Service Water	≤ 90[1]
6) Start Diesel Generators	≤ 12

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TABLE 3.3-5 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
4. Steam Line Pressure--Low	
a. Safety Injection (ECCS)	$\leq 27^{(5)}/37^{(4)}$
1) Reactor Trip	≤ 2
2) Feedwater Isolation	$\leq 6.8^{(3)}$
3) Phase "A" Isolation	$\leq 2^{(2)(6)}/12^{(1)(6)}$
4) Auxiliary Feedwater	≤ 60
5) Service Water	$\leq 90^{(1)}$
6) Start Diesel Generators	≤ 12
b. Steam Line Isolation	$\leq 6.8^{(3)}$
5. Containment Pressure--High-3	
a. Quench Spray	$\leq 32^{(2)}/42^{(1)}$
b. Phase "B" Isolation	$\leq 2^{(2)(6)}/12^{(1)(6)}$
c. Motor-Driven Auxiliary Feedwater Pumps	≤ 60
d. Service Water	$\leq 90^{(1)}$
6. Containment Pressure--High-2	
a. Steam Line Isolation	$\leq 6.8^{(3)}$
7. Steam Line Pressure - Negative Rate--High	
a. Steam Line Isolation	$\leq 6.8^{(3)}$
8. Steam Generator Water Level--High-High	
a. Turbine Trip	≤ 2.5
b. Feedwater Isolation	$\leq 6.8^{(3)}$
9. Steam Generator Water Level--Low-Low	
a. Motor-Driven Auxiliary Feedwater Pumps	≤ 60
b. Turbine-Driven Auxiliary Feedwater Pump	≤ 60
10. Loss-of-Offsite Power	
a. Motor-Driven Auxiliary Feedwater Pump	≤ 60

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TABLE 3.3-5 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
11. Loss of Power	
a. 4 kV Bus Undervoltage (Loss of Voltage)	$\leq$ 13
b. 4 kV Emergency Bus Undervoltage (Grid Degraded Voltage)	$\leq 18^{(7)}/310^{(8)}$
12. T_{avg} Low Coincident With Reactor Trip (P-4)	
a. Feedwater Isolation	$\leq 12^{(3)}$
13. Control Building Inlet Ventilation Radiation	
a. Control Building Isolation	$\leq$ 3.7

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TABLE 3.3-5 (Continued)

TABLE NOTATIONS

(1) Diesel generator starting and sequence loading delays included.

(2) Diesel generator starting and sequence loading delay not included. Offsite power available.

(3) Air-operated valves.

(4) Diesel generator starting and sequence loading delays included. Sequential transfer of Charging pump suction from the VCT to the RWST (RWST valves open, then VCT valves close) is included. RHR pumps not included.

(5) Diesel generator starting and sequence loading delays not included. Sequential transfer of Charging pump suction from the VCT to the RWST (RWST valves open, then VCT valves close) is included. RHR pumps not included.

(6) Time required to close valves as indicated in Table 3.6-2.

(7) With an ESF signal present.

(8) Without an ESF signal present.

(9) Diesel generator starting and sequence loading delays included. Sequential transfer of Charging pump suction from the VCT to the RWST (RWST valves open, then VCT valves close) is not included. Response time assures only opening of RWST valves.

(10) Diesel generator starting and sequence loading delays not included. Sequential transfer of charging pump suction from the VCT to the RWST (RWST valves open, then VCT valves close) is not included. RHR pumps not included.

REACTOR TRIP SYSTEM INSTRUMENTATION and ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION (Continued)

the sensor from its calibration point or the value specified in Table 3.3-4, in percent span, from the analysis assumptions. Use of Equation 3.3-1 allows for a sensor drift factor, an increased rack drift factor, and provides a threshold value for REPORTABLE EVENTS.

The methodology to derive the Trip Setpoints is based upon combining all of the uncertainties in the channels. Inherent to the determination of the Trip Setpoints are the magnitudes of these channel uncertainties. Sensor and rack instrumentation utilized in these channels are expected to be capable of operating within the allowances of these uncertainty magnitudes. Rack drift in excess of the Allowable Value exhibits the behavior that the rack has not met its allowance. Being that there is a small statistical chance that this will happen, an infrequent excessive drift is expected. Rack or sensor drift, in excess of the allowance that is more than occasional, may be indicative of more serious problems and should warrant further investigation.

The measurement of response time at the specified frequencies provides assurance that the Reactor trip and the Engineered Safety Features actuation associated with each channel is completed within the time limit assumed in the safety analyses. No credit was taken in the analyses for those channels with response times indicated as not applicable. Response time may be demonstrated by any series of sequential, overlapping, or total channel test measurements provided that such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by either: (1) in place, onsite, or offsite test measurements, or (2) utilizing replacement sensors with certified response time. Detector response times may be measured by the in situ on line noise analysis-response time degradation method described in the Westinghouse Topical Report, "The Use of Process Noise Measurements To Determine Response Characteristics of Protection Sensors in U.S. Plants," August 1983.

The RTS and ESF response times are included in the Operating Procedure OP-3273, "Technical Requirements - Supplemental Technical Specifications." Any changes to the RTS and ESF response times shall be made in accordance with Section 50.59 of 10CFR50 and approved by the Plant Operations Review Committee.

ESF response time specified in Table 3.3-5 which include sequential operation of the RWST and VCT valves are based on values assumed in the non-LOCA safety analyses. For these analyses, injection of borated water from the RWST is credited. Injection of borated water is assumed not to occur until the VCT charging pump suction valves are closed following opening of the RWST charging pump suction valves. When the sequential operation of the RWST and VCT valves is not included in the response time, the values specified are based on the LOCA analyses which credit injection flow regardless of the source. Exceptions to this rule are the response times with table notation 10. These response times do not include sequential operation of the RWST and VCT isolation valves but are derived from the non-LOCA analyses. Theses exceptions insure that safety injection pumps (except RHR) are started within an appropriate time when offsite power is present. Since SI functions are identical regardless of the actuation signal, the individual component verification will assure that the response times specified with and without sequential operation of the VCT and RWST valves are met for LOCA and non-LOCA accidents.

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Attachment 2

Millstone Nuclear Power Station, Unit No. 3

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Response Times for the Reactor Trip System and
Engineered Safety Features Actuation System Instrumentation

Retyped Pages of Technical Specifications

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LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

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3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each Reactor Trip System instrumentation channel and interlock and the automatic trip logic shall be demonstrated OPERABLE by the performance of the Reactor Trip System Instrumentation Surveillance Requirements specified in Table 4.3-1.

4.3.1.2 The REACTOR TRIP SYSTEM RESPONSE TIME of each Reactor trip function shall be demonstrated to be within its limit at least once per 18 months.* Neutron detectors and speed sensors are exempt from response time testing. Each test shall include at least one train such that both trains are tested at least once per 36 months and one channel (to include input relays to both trains) per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific Reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.

*Except that the surveillance requirement due no later than June 13, 1993, may be deferred until the next refueling outage, but no later than September 30, 1993, whichever is earlier.

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3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Features Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their Trip Setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4.

APPLICABILITY: As shown in Table 3.3-3.

ACTION:

a. With an ESFAS Instrumentation or Interlock Trip Setpoint trip less conservative than the value shown in the Trip Setpoint column but more conservative than the value shown in the Allowable Value column of Table 3.3-4, adjust the Setpoint consistent with the Trip Setpoint value.

b. With an ESFAS Instrumentation or Interlock Trip Setpoint less conservative than the value shown in the Allowable Value column of Table 3.3-4, either:

   1. Adjust the Setpoint consistent with the Trip Setpoint value of Table 3.3-4, and determine within 12 hours that Equation 2.2-1 was satisfied for the affected channel, or

   2. Declare the channel inoperable and apply the applicable ACTION statement requirements of Table 3.3-3 until the channel is restored to OPERABLE status with its Setpoint adjusted consistent with the Trip Setpoint value.

Equation 2.2-1 $Z + R + S \leq TA$

Where:

Z = The value from Column Z of Table 3.3-4 for the affected channel,

R = The "as measured" value (in percent span) of rack error for the affected channel,

S = Either the "as measured" value (in percent span) of the sensor error, or the value from Column S (Sensor Error) of Table 3.3-4 for the affected channel, and

TA = The value from Column TA (Total Allowance) of Table 3.3-4 for the affected channel.

c. With an ESFAS instrumentation channel or interlock inoperable, take the ACTION shown in Table 3.3-3.

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REACTOR TRIP SYSTEM INSTRUMENTATION and ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION (Continued)

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The methodology to derive the Trip Setpoints is based upon combining all of the uncertainties in the channels. Inherent to the determination of the Trip Setpoints are the magnitudes of these channel uncertainties. Sensor and rack instrumentation utilized in these channels are expected to be capable of operating within the allowances of these uncertainty magnitudes. Rack drift in excess of the Allowable Value exhibits the behavior that the rack has not met its allowance. Being that there is a small statistical chance that this will happen, an infrequent excessive drift is expected. Rack or sensor drift, in excess of the allowance that is more than occasional, may be indicative of more serious problems and should warrant further investigation.

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