REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following Reactor Coolant System leakage detection systems shall be OPERABLE:

a. One of the containment atmosphere particulate radioactivity monitoring channels (ERS-1301 or ERS-1401),

b. The containment sump flow monitoring system, and

c. Either the containment humidity monitor or one of the containment atmosphere gaseous radioactivity monitoring channels (ERS-1305 or ERS-1405).

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only two of the above required leakage detection systems OPERABLE, operation may continue for up to 30 days provided grab samples of the containment atmosphere are obtained and analyzed at least once per 24 hours when the required gaseous and/or particulate radioactivity monitoring channels are inoperable; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The leakage detection systems shall be demonstrated OPERABLE by:

a. Containment atmosphere particulate and gaseous (if being used) monitoring system-performance of CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST at the frequencies specified in Table 4.3-3,

b. Containment sump flow monitoring system-performance of CHANNEL CALIBRATION at least once per 18 months,

c. Containment humidity monitor (if being used) - performance of CHANNEL CALIBRATION at least once per 18 months.

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SPECIAL REPORTS

6.9.2 Special reports shall be submitted to the Regional Administrator within the time period specified for each report. These reports shall be submitted covering the activities identified below pursuant to the requirements of the applicable reference Specifications:

a. Inservice Inspection Program Review, Specification 4.4.10.

b. ECCS Actuation, Specifications 3.5.2 and 3.5.3.

c. Inoperable Seismic Monitoring Instrumentation, Specification 3.3.3.3.

d. Inoperable Meteorological Monitoring Instrumentation, Specification 3.3.3.4.

e. Seismic event analysis, Specification 4.3.3.3.2.

f. Sealed Source leakage in excess of limits, Specification 4.7.7.1.3.

g. Fire Detection Instrumentation, Specification 3.3.3.7.

h. Fire Suppression Systems, Specifications 3.7.9.1, 3.7.9.2, 3.7.9.3 and 3.7.9.4.

i. Containment Sump Level instrumentation, Table 3.3-11.

3/4.3.3.7 FIRE DETECTION INSTRUMENTATION

OPERABILITY of the fire detection instrumentation ensures that adequate warning capability is available for the prompt detection of fires. This capability is required in order to detect and locate fires in their early stages. Prompt detection of fires will reduce the potential for damage to safety related equipment and is an integral element in the overall facility fire protection program.

In the event that a portion of the fire detection instrumentation is inoperable, the establishment of frequent fire patrols in the affected areas is required to provide detection capability until the inoperable instrumentation is restored to OPERABILITY. Use of containment temperature monitoring is allowed once per hour if containment fire detection is inoperable.

3/4.3.3.8 POST-ACCIDENT INSTRUMENTATION

The OPERABILITY of the post-accident instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess these variables during and following an accident.

The containment water level CHANNEL CHECK is a visual inspection of parallel channels which should indicate within acceptable instrument drift that the water level is below the range of the containment water level instrumentation. Acceptable instrument drift for containment water level instrumentation is presently considered 25% of full scale.

The containment sump level channels should indicate the same level on both channels within acceptable instrument drift, which is presently considered a 25% of full scale difference between the two parallel channels. If the channels do not indicate the same level, the containment sump pump actuation and shut-off can be used to indicate if either channel is correct.

The drift for both instrumentation systems is attributed to air accumulation in the capillaries. Provided that the drift is less than 25%, it should not prevent the instrument from tracking changes in level. Equipment changes may change the acceptable drift. Such a change will not constitute violation of this T/S, provided appropriate evidence exists to justify the change.

INSTRUMENTATION

POST-ACCIDENT INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3.8 The post-accident monitoring instrumentation channels shown in Table 3.3-11 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With the number of OPERABLE post-accident monitoring channels less than required by Table 3.3-11, either restore the inoperable channel to OPERABLE status within 30 days, or be in HOT SHUTDOWN within the next 12 hours except where noted in Table 3.3-11.

b. The provisions of Specifications 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.3.8 Each post-accident monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.3-7.

TABLE 3.3-11
POST-ACCIDENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE
1. Containment Pressure	2
2. Reactor Coolant Outlet Temperature - T_{HOT} (Wide Range)	2
3. Reactor Coolant Inlet Temperature - T_{COLD} (Wide Range)	2
4. Reactor Coolant Pressure - Wide Range	2
5. Pressurizer Water Level	2
6. Steam Line Pressure	2/Steam Generator
7. Steam Generator Water Level - Narrow Range	1/Steam Generator
8. Refueling Water Storage Tank Water Level	2
9. Boric Acid Tank Solution Level	1
10. Auxiliary Feedwater Flow Rate	1/Steam Generator*
11. Reactor Coolant System Subcooling Margin Monitor	1**
12. PORV Position Indicator - Limit Switches***	1/Valve
13. PORV Block Valve Position Indicator - Limit Switches	1/Valve
14. Safety Valve Position Indicator - Acoustic Monitor	1/Valve
15. Containment Sump Level	1#
16. Containment Water Level	2

* Steam Generator Water Level Channels can be used as a substitute for the corresponding auxiliary feedwater flow rate channel instrument.

** PRODAC 250 subcooling margin readout can be used as a substitute for the subcooling monitor instrument.

*** Acoustic monitoring of PORV position (1 channel per three valves - headered discharge) can be used as a substitute for the PORV Position Indicator - Limit Switches instruments.

\# With less than the minimum number of channels OPERABLE restore the system to OPERABLE status within 30 days or prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within the next 14 days outlining available backup equipment, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

TABLE 4.3-7

POST-ACCIDENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION
1. Containment Pressure	M	R
2. Reactor Coolant Outlet Temperature - T_{HOT} (Wide Range)	M	R
3. Reactor Coolant Inlet Temperature - T_{COLD} (Wide Range)	M	R
4. Reactor Coolant Pressure - Wide Range	M	R
5. Pressurizer Water Level	M	R
6. Steam Line Pressure	M	R
7. Steam Generator Water Level - Narrow Range	M	R
8. RWST Water Level	M	R
9. Boric Acid Tank Solution Level	M	R
10. Auxiliary Feedwater Flow Rate	M	R
11. Reactor Coolant System Subcooling Margin Monitor	M	R
12. PORV Position Indicator - Limit Switches	M	R
13. PORV Block Valve Position Indicator - Limit Switches	M	R
14. Safety Valve Position Indicator - Acoustic Monitor	M	R
15. Containment Sump Level	M	R
16. Containment Water Level	M	R

INSTRUMENTATION

POST-ACCIDENT INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3.6 The post-accident monitoring instrumentation channels shown in Table 3.3-10 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With the number of OPERABLE post-accident monitoring channels less than required by Table 3.3-10, either restore the inoperable channel to OPERABLE status within 30 days, or be in HOT SHUTDOWN within the next 12 hours except where noted in Table 3.3-10.

b. The provisions of Specifications 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.3.6 Each post-accident monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.3-10.

TABLE 3.3-10

POST-ACCIDENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE
1. Containment Pressure	2
2. Reactor Coolant Outlet Temperature - T_{HOT} (Wide Range)	2
3. Reactor Coolant Inlet Temperature - T_{COLD} (Wide Range)	2
4. Reactor Coolant Pressure - Wide Range	2
5. Pressurizer Water Level	2
6. Steam Line Pressure	2/Steam Generator
7. Steam Generator Water Level - Narrow Range	1/Steam Generator
8. Refueling Water Storage Tank Water Level	2
9. Boric Acid Tank Solution Level	1
10. Auxiliary Feedwater Flow Rate	1/Steam Generator*
11. Reactor Coolant System Subcooling Margin Monitor	1**
12. PORV Position Indicator - Limit Switches***	1/Valve
13. PORV Block Valve Position Indicator - Limit Switches	1/Valve
14. Safety Valve Position Indicator - Acoustic Monitor	1/Valve
15. Containment Sump Level	1#
16. Containment Water Level	2

* Steam Generator Water Level Channels can be used as a substitute for the corresponding auxiliary feedwater flow rate channel instrument.

** PRODAC 250 subcooling margin readout can be used as a substitute for the subcooling monitor instrument.

*** Acoustic monitoring of PORV position (1 channel per three valves - headered discharge) can be used as a substitute for the PORV Position Indicator - Limit Switches instruments.

\# With less than the minimum number of channels OPERABLE restore the system to OPERABLE status within 30 days or prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within the next 14 days outlining available backup equipment, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

TABLE 4.3-10

POST-ACCIDENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION
1. Containment Pressure	M	R
2. Reactor Coolant Outlet Temperature - T_{HOT} (Wide Range)	M	R
3. Reactor Coolant Inlet Temperature - T_{COLD} (Wide Range)	M	R
4. Reactor Coolant Pressure - Wide Range	M	R
5. Pressurizer Water Level	M	R
6. Steam Line Pressure	M	R
7. Steam Generator Water Level - Narrow Range	M	R
8. RWST Water Level	M	R
9. Boric Acid Tank Solution Level	M	R
10. Auxiliary Feedwater Flow Rate	M	R
11. Reactor Coolant System Subcooling Margin Monitor	M	R
12. PORV Position Indicator - Limit Switches	M	R
13. PORV Block Valve Position Indicator - Limit Switches*	M	R
14. Safety Valve Position Indicator - Acoustic Monitor	M	R
15. Containment Sump Level	M	R
16. Containment Water Level	M	R

*The provisions of Specification 4.0.6 are applicable.

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following Reactor Coolant System leakage detection systems shall be OPERABLE:

a. One of the containment atmosphere particulate radioactivity monitoring channels (ERS-2301 or ERS-2401),

b. The containment sump flow monitoring system, and

c. Either the containment humidity monitor or one of the containment atmosphere gaseous radioactivity monitoring channels (ERS-2305 or ERS-2405).

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only two of the above required leakage detection systems OPERABLE, operation may continue for up to 30 days provided grab samples of the containment atmosphere are obtained and analyzed at least once per 24 hours when the required gaseous and/or particulate radioactivity monitoring channels are inoperable; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The leakage detection systems shall be demonstrated OPERABLE by:

a. Containment atmosphere particulate and gaseous (if being used) monitoring system-performance of CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST at the frequencies specified in Table 4.3-3,

b. Containment sump flow monitoring system-performance of CHANNEL CALIBRATION at least once per 18 months,*

c. Containment humidity monitor (if being used) - performance of CHANNEL CALIBRATION at least once per 18 months.

*The provisions of Specification 4.0.6 are applicable.

SPECIAL REPORTS

6.9.2 Special reports shall be submitted to the Regional Administrator within the time period specified for each report. These reports shall be submitted covering the activities identified below pursuant to the requirements of the applicable reference specification:

a. ECCS Actuation, Specifications 3.5.2 and 3.5.3.

b. Inoperable Seismic Monitoring Instrumentation, Unit No. 1, Specification 3.3.3.3.

c. Inoperable Meteorological Monitoring Instrumentation, Unit No. 1, Specification 3.3.3.4.

d. Fire Detection Instrumentation, Specification 3.3.3.8.

e. Fire Suppression Systems, Specifications, 3.7.9.1, 3.7.9.2, 3.7.9.3 and 3.7.9.4.

f. Seismic Event Analysis, Specification 4.3.3.3.2.

g. Sealed Source leakage in excess of limits, Specification 4.7.8.1.3.

h. Containment Sump Level instrumentation, Table 3.3-10.

3/4.3.3.2 MOVABLE INCORE DETECTORS

The OPERABILITY of the movable incore detectors with the specified minimum complement of equipment ensures that the measurements obtained for use of this system accurately represent the spatial neutron flux distribution of the reactor core. The OPERABILITY of this system is demonstrated by irradiating each detector used and normalizing its respective output.

3/4.3.3.3 SEISMIC INSTRUMENTATION

The OPERABILITY of the seismic instrumentation ensures that sufficient capability is available to promptly determine the magnitude of a seismic event and evaluate the response of those features important to safety. This capability is required to permit comparison of the measured response to that used in the design basis for the facility.

3/4.3.3.4 METEOROLOGICAL INSTRUMENTATION

The OPERABILITY of the meteorological instrumentation ensures that sufficient meteorological data is available for estimating potential radiation doses to the public as a result of routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the need for initiating protective measures to protect the health and safety of the public.

3/4.3.3.5 REMOTE SHUTDOWN INSTRUMENTATION

The OPERABILITY of the remote shutdown instrumentation ensures that sufficient capability is available to permit shutdown and maintenance of HOT STANDBY of the facility from locations outside of the control room. This capability is required in the event control room habitability is lost and is consistent with General Design Criteria 19 of 10 CFR 50.

3/4.3.3.6 POST-ACCIDENT INSTRUMENTATION

The OPERABILITY of the post-accident instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess these variables during and following an accident.

The containment water level CHANNEL CHECK is a visual inspection of parallel channels which should indicate within acceptable instrument drift that the water level is below the range of the containment water level instrumentation. Acceptable instrument drift for containment water level instrumentation is presently considered 25% of full scale.

The containment sump level channels should indicate the same level on both channels within acceptable instrument drift, which is presently considered a 25% of full scale difference between the two parallel channels. If the channels do not indicate the same level, the containment sump pump actuation and shut-off can be used to indicate if either channel is correct.

The drift for both instrumentation systems is attributed to air accumulation in the capillaries. Provided that the drift is less than 25%, it should not prevent the instrument from tracking changes in level. Equipment changes may change the acceptable drift. Such a change will not constitute a violation of this T/S, provided appropriate evidence exists to justify the change.

3/4.3.3.7 AXIAL POWER DISTRIBUTION MONITORING SYSTEM (APDMS)

OPERABILITY of the APDMS ensures that sufficient capability is available for the measurement of the neutron flux spatial distribution within the reactor core. This capability is required to 1) monitor the core flux patterns that are representative of the peak core power density and 2) limit the core average axial power profile such that the total power peaking factor F_Q is maintained within acceptable limits.

3/4.3.3.8 FIRE DETECTION INSTRUMENTATION

OPERABILITY of the fire detection instrumentation ensures that adequate warning capability is available for the prompt detection of fires. This capability is required in order to detect and locate fires in their early stages. Prompt detection of fires will reduce the potential for damage to safety-related equipment and is an integral element in the overall facility fire protection program.

In the event that a portion of the fire detection instrumentation is inoperable, the establishment of frequent fire patrols in the affected areas is required to provide detection capability until the inoperable instrumentation is restored to OPERABILITY. Use of containment temperature monitoring is allowed once per hour if containment fire detection is inoperable.

3/4.3.3.9 RADIOACTIVE LIQUID EFFLUENT INSTRUMENTATION

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases. The alarm/trip setpoints for these instruments shall be calculated in accordance with NRC approved methods in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria specified in Section 11.3 of the Final Safety Analysis Report for the Donald C. Cook Nuclear Plant.

3/4.3.3.10 RADIOACTIVE GASEOUS EFFLUENT INSTRUMENTATION

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases. The alarm/trip setpoints for these instruments shall be calculated in accordance with NRC approved methods in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. This instrumentation also includes provisions for monitoring the concentrations of potentially explosive gas mixtures in the waste gas holdup system. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria specified in Section 11.3 of the Final Safety Analysis Report for the Donald C. Cook Nuclear Plant.

3/4.3.4 TURBINE OVERSPEED PROTECTION

This specification is provided to ensure that the turbine overspeed protection instrumentation and the turbine speed control valves are OPERABLE and will protect the turbine from excessive overspeed. Protection from turbine excessive overspeed is required since excessive overspeed of the turbine could generate potentially damaging missiles which could impact and damage safety related components, equipment or structures.

American Electric Power System

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EXPLANATION OF DEDUCTIONS
CD — CASH DISCOUNT
TR — TRANSPORTATION
RT — RETAINED
TX — TAX WITHHELD
PR — PRIOR PAYMENT
AJ — ADJUSTMENT

Attachment 3 to AEP:NRC:0856T

Regulatory Guide 1.97, Rev. 3,
Pertinent Sections

U.S. NUCLEAR REGULATORY COMMISSION

Revision 3
May 1983

REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

MAY 27 1983

REGULATORY GUIDE 1.97

INSTRUMENTATION FOR LIGHT-WATER-COOLED NUCLEAR POWER PLANTS TO ASSESS PLANT AND ENVIRONS CONDITIONS DURING AND FOLLOWING AN ACCIDENT

A. INTRODUCTION

Criterion 13, "Instrumentation and Control," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," includes a requirement that instrumentation be provided to monitor variables and systems over their anticipated ranges for accident conditions as appropriate to ensure adequate safety.

Criterion 19, "Control Room," of Appendix A to 10 CFR Part 50 includes a requirement that a control room be provided from which actions can be taken to maintain the nuclear power unit in a safe condition under accident conditions, including loss-of-coolant accidents, and that equipment, including the necessary instrumentation, at appropriate locations outside the control room be provided with a design capability for prompt hot shutdown of the reactor.

Criterion 64, "Monitoring Radioactivity Releases," of Appendix A to 10 CFR Part 50 includes a requirement that means be provided for monitoring the reactor containment atmosphere, spaces containing components for recirculation of loss-of-coolant accident fluid, effluent discharge paths, and the plant environs for radioactivity that may be released from postulated accidents.

This guide describes a method acceptable to the NRC staff for complying with the Commission's regulations to provide instrumentation to monitor plant variables and systems during and following an accident in a light-water-cooled nuclear power plant. The Advisory Committee on Reactor Safeguards has been consulted concerning this guide and has concurred in the regulatory position.

Any guidance in this document related to information collection activities has been cleared under OMB Clearance No. 3150-0011.

B. DISCUSSION

Indications of plant variables are required by the control room operating personnel during accident situations to (1) provide information required to permit the operator to take preplanned manual actions to accomplish safe plant shutdown; (2) determine whether the reactor trip, engineered-safety-feature systems, and manually initiated safety systems and other systems important to safety are performing their intended functions (i.e., reactivity control, core cooling, maintaining reactor coolant system integrity, and maintaining containment integrity); and (3) provide information to the operators that will enable them to determine the potential for causing a gross breach of the barriers to radioactivity release (i.e., fuel cladding, reactor coolant pressure boundary, and containment) and to determine if a gross breach of a barrier has occurred. In addition to the above, indications of plant variables that provide information on operation of plant safety systems and other systems important to safety are required by the control room operating personnel during an accident to (1) furnish data regarding the operation of plant systems in order that the operator can make appropriate decisions as to their use and (2) provide information regarding the release of radioactive materials to allow for early indication of the need to initiate action necessary to protect the public and for an estimate of the magnitude of any impending threat.

At the start of an accident, it may be difficult for the operator to determine immediately what accident has occurred or is occurring and therefore to determine the appropriate response. For this reason, reactor trip and certain other safety actions (e.g., emergency core cooling actuation, containment isolation, or depressurization) have been designed to be performed automatically during the initial stages of an accident. Instrumentation is also provided to indicate information about plant variables required to enable the operation of manually initiated safety systems and other appropriate operator actions involving systems important to safety.

[illegible]

TABLE 1

DESIGN AND QUALIFICATION CRITERIA FOR INSTRUMENTATION

Category 1	Category 2	Category 3
1. Equipment Qualification	**1. Equipment Qualification**	**1. Equipment Qualification**
The instrumentation should be qualified in accordance with Regulatory Guide 1.89, "Qualification of Class 1E Equipment for Nuclear Power Plants," and the methodology described in NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment."[4]	Same as Category 1	No specific provision
Instrumentation whose ranges are required to extend beyond those ranges calculated in the most severe design basis accident event for a given variable should be qualified using the guidance provided in paragraph 6.3.6 of ANS-4.5.	Same as Category 1	No specific provision
Qualification applies to the complete instrumentation channel from sensor to display where the display is a direct-indicating meter or recording device. If the instrumentation channel signal is to be used in a computer-based display, recording, or diagnostic program, qualification applies from the sensor up to and including the channel isolation device.	Same as Category 1	No specific provision
The seismic portion of qualification should be in accordance with Regulatory Guide 1.100, "Seismic Qualification of Electric Equipment for Nuclear Power Plants." Instrumentation should continue to read within the required accuracy following, but not necessarily during, a safe shutdown earthquake.	No specific provision	No specific provision
2. Redundancy	**2. Redundancy**	**2. Redundancy**
No single failure within either the accident-monitoring instrumentation, its auxiliary supporting features, or its power sources concurrent with the failures that are	No specific provision	No specific provision

[4]Copies are available from the NRC/GPO Sales Program, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

TABLE 1 (Continued)

Category 1	Category 2	Category 3
2. (Continued) a condition or result of a specific accident should prevent the operators from being presented the information necessary for them to determine the safety status of the plant and to bring the plant to and maintain it in a safe condition following that accident. Where failure of one accident-monitoring channel results in information ambiguity (that is, the redundant displays disagree) that could lead operators to defeat or fail to accomplish a required safety function, additional information should be provided to allow the operators to deduce the actual conditions in the plant. This may be accomplished by providing additional independent channels of information of the same variable (addition of an identical channel) or by providing an independent channel to monitor a different variable that bears a known relationship to the multiple channels (addition of a diverse channel). Redundant or diverse channels should be electrically independent and physically separated from each other and from equipment not classified important to safety in accordance with Regulatory Guide 1.75, "Physical Independence of Electric Systems," up to and including any isolation device. Within each redundant division of a safety system, redundant monitoring channels are not needed except for steam generator level instrumentation in two-loop plants.		
3. Power Source The instrumentation should be energized from station standby power sources as provided in Regulatory Guide 1.32, "Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants," and should be backed up by batteries where momentary interruption is not tolerable.	**3. Power Source** The instrumentation should be energized from a high-reliability power source, not necessarily standby power, and should be backed up by batteries where momentary interruption is not tolerable.	**3. Power Source** No specific provision

TABLE 1 (Continued)

Category 1	Category 2	Category 3
4. Channel Availability	**4. Channel Availability**	**4. Channel Availability**
The instrumentation channel should be available prior to an accident except as provided in paragraph 4.11, "Exception," as defined in IEEE Std 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations,"[2] or as specified in the technical specifications.	The out-of-service interval should be based on normal technical specification requirements on out of service for the system it serves where applicable or where specified by other requirements.	No specific provision
5. Quality Assurance	**5. Quality Assurance**	**5. Quality Assurance**
The recommendations of the following regulatory guides pertaining to quality assurance should be followed: Regulatory Guide 1.28 "Quality Assurance Program Requirements (Design and Construction)" Regulatory Guide 1.30 (Safety Guide 30) "Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment" Regulatory Guide 1.38 "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants" Regulatory Guide 1.58 "Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel" Regulatory Guide 1.64 "Quality Assurance Requirements for the Design of Nuclear Power Plants" Regulatory Guide 1.74 "Quality Assurance Terms and Definitions"	Same as Category 1 as modified by the following: Since some instrumentation is less important to safety than other instrumentation, it may not be necessary to apply the same quality assurance measures to all instrumentation. The quality assurance requirements that are implemented should provide control over activities affecting quality to an extent consistent with the importance to safety of the instrumentation. These requirements should be determined and documented by personnel knowledgeable in the end use of the instrumentation.	The instrumentation should be of high-quality commercial grade and should be selected to withstand the specified service environment.

TABLE 1 (Continued)

Category 1	Category 2	Category 3
5. (Continued) Regulatory Guide 1.88 "Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records" Regulatory Guide 1.123 "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants" Regulatory Guide 1.144 "Auditing of Quality Assurance Programs for Nuclear Power Plants" Regulatory Guide 1.146 "Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants" Reference to the above regulatory guides (except Regulatory Guides 1.30 and 1.38) is being made pending issuance of a revision to Regulatory Guide 1.28 that is under development (Task RS 002-5) and that will endorse ANSI/ASME NQA-1-1979, "Quality Assurance Program Requirements for Nuclear Power Plants."[5]		
6. Display and Recording Continuous real-time display should be provided. The indication may be on a dial, digital display, CRT, or stripchart recorder. Recording of instrumentation readout information should be provided for at least one redundant channel.	6. Display and Recording The instrumentation signal may be displayed on an individual instrument or it may be processed for display on demand. Signals from effluent radioactivity monitors and area monitors should be recorded.	6. Display and Recording Same as Category 2 Signals from effluent radioactivity monitors, area monitors, and meteorology monitors should be recorded.

[5] Copies may be obtained from the American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017.

TABLE 1 (Continued)

Category 1	Category 2	Category 3
6. (Continued)		
If direct and immediate trend or transient information is essential for operator information or action, the recording should be continuously available on redundant dedicated recorders. Otherwise, it may be continuously updated, stored in computer memory, and displayed on demand. Intermittent displays such as data loggers and scanning recorders may be used if no significant transient response information is likely to be lost by such devices.	Same as Category 1	Same as Category 1
7. Range	**7. Range**	**7. Range**
If two or more instruments are needed to cover a particular range, overlapping of instrument span should be provided. If the required range of monitoring instrumentation results in a loss of instrumentation sensitivity in the normal operating range, separate instruments should be used.	Same as Category 1	Same as Category 1
8. Equipment Identification	**8. Equipment Identification**	**8. Equipment Identification**
Types A, B, and C instruments designated as Categories 1 and 2 should be specifically identified with a common designation on the control panels so that the operator can easily discern that they are intended for use under accident conditions.	Same as Category 1	No specific provision
9. Interfaces	**9. Interfaces**	**9. Interfaces**
The transmission of signals for other use should be through isolation devices that are designated as part of the monitoring instrumentation and that meet the provisions of this document.	Same as Category 1	No specific provision
10. Servicing, Testing, and Calibration	**10. Servicing, Testing, and Calibration**	**10. Servicing, Testing, and Calibration**
Servicing, testing, and calibration programs should be specified to maintain the capability of the monitoring instrumentation. If the required interval between	Same as Category 1	Same as Category 1

TABLE 1 (Continued)

Category 1	Category 2	Category 3
10. (Continued)		
testing is less than the normal time interval between plant shutdowns, a capability for testing during power operation should be provided.		
Whenever means for removing channels from service are included in the design, the design should facilitate administrative control of the access to such removal means.	Same as Category 1	Same as Category 1
The design should facilitate administrative control of the access to all setpoint adjustments, module calibration adjustments, and test points.	Same as Category 1	Same as Category 1
Periodic checking, testing, calibration, and calibration verification should be in accordance with the applicable portions of Regulatory Guide 1.118, "Periodic Testing of Electric Power and Protection Systems," pertaining to testing of instrument channels. (Note: Response time testing not usually needed.)	Same as Category 1	Same as Category 1
The location of the isolation device should be such that it would be accessible for maintenance during accident conditions.	Same as Category 1	No specific provision
11. Human Factors	**11. Human Factors**	**11. Human Factors**
The instrumentation should be designed to facilitate the recognition, location, replacement, repair, or adjustment of malfunctioning components or modules.	Same as Category 1	Same as Category 1
The monitoring instrumentation design should minimize the development of conditions that would cause meters, annunciators, recorders, alarms, etc., to give anomalous indications potentially confusing to the operator. Human factors analysis should be used in determining type and location of displays.	Same as Category 1	Same as Category 1

TABLE 1 (Continued)

Category 1	Category 2	Category 3
11. (Continued)		
To the extent practicable, the same instruments should be used for accident monitoring as are used for the normal operations of the plant to enable the operators to use, during accident situations, instruments with which they are most familiar.	Same as Category 1	Same as Category 1
12. Direct Measurement	**12. Direct Measurement**	**12. Direct Measurement**
To the extent practicable, monitoring instrumentation inputs should be from sensors that directly measure the desired variables. An indirect measurement should be made only when it can be shown by analysis to provide unambiguous information.	Same as Category 1	Same as Category 1

TABLE 3

PWR VARIABLES

TYPE A Variables: those variables to be monitored that provide the primary information required to permit the control room operator to take specific manually controlled actions for which no automatic control is provided and that are required for safety systems to accomplish their safety functions for design basis accident events. Primary information is information that is essential for the direct accomplishment of the specified safety functions; it does not include those variables that are associated with contingency actions that may also be identified in written procedures.

A variable included as Type A does not preclude it from being included as Type B, C, D, or E or vice versa.

Variable	Range	Category (see Regulatory Position 1.4 and Table 1)	Purpose
Plant specific	Plant specific	1	Information required for operator action

TYPE B Variables: those variables that provide information to indicate whether plant safety functions are being accomplished. Plant safety functions are (1) reactivity control, (2) core cooling, (3) maintaining reactor coolant system integrity, and (4) maintaining containment integrity (including radioactive effluent control). Variables are listed with designated ranges and category for design and qualification requirements. Key variables are indicated by design and qualification Category 1.

Variable	Range	Category	Purpose
Reactivity Control			
Neutron Flux	10^{-6}% to 100% full power	1	Function detection; accomplishment of mitigation
Control Rod Position	Full in or not full in	3	Verification
RCS Soluble Boron Concentration	0 to 6000 ppm	3	Verification
RCS Cold Leg Water Temperature[1]	50°F to 400°F	3	Verification
Core Cooling			
RCS Hot Leg Water Temperature	50°F to 700°F	1	Function detection; accomplishment of mitigation; verification; long-term surveillance
RCS Cold Leg Water Temperature[1]	50°F to 700°F	1	Function detection; accomplishment of mitigation; verification; long-term surveillance
RCS Pressure[1]	0 to 3000 psig (4000 psig for CE plants)	1[2]	Function detection; accomplishment of mitigation; verification; long-term surveillance
Core Exit Temperature[1]	200°F to 2300°F	3[3]	Verification

[1]Where a variable is listed for more than one purpose, the instrumentation requirements may be integrated and only one measurement provided.

[2]The maximum value may be revised upward to satisfy ATWS requirements.

[3]Instrumentation that is a part of the final ICC detection system should meet the design requirements specified in Item II.F.2 of NUREG-0737. (When Type K thermocouples become part of the system, they are considered to meet the requirements. However, the remainder of the detection system that is outside the reactor vessel should meet the requirements specified.)

TABLE 3 (Continued)

Variable	Range	Category (see Regulatory Position 1.4 and Table 1)	Purpose
TYPE C (Continued)			
Fuel Cladding (Continued)			
Radioactivity Concentration or Radiation Level in Circulating Primary Coolant	1/2 Tech Spec limit to 100 times Tech Spec limit	1	Detection of breach
Analysis of Primary Coolant (Gamma Spectrum)	10 μCi/ml to 10 Ci/ml or TID-14844 source term in coolant volume	3[6]	Detail analysis; accomplishment of mitigation; verification; long-term surveillance
Reactor Coolant Pressure Boundary			
RCS Pressure[1]	0 to 3000 psig (4000 psig for CE plants)	1[2]	Detection of potential for or actual breach; accomplishment of mitigation; long-term surveillance
Containment Pressure[1]	-5 psig to design pressure[4] (-10 psig for subatmospheric containments)	1	Detection of breach; accomplishment of mitigation; verification; long-term surveillance
Containment Sump Water Level[1]	Narrow range top to bottom (sump), wide range (plant specific)	2 1	Detection of breach; accomplishment of mitigation; verification; long-term surveillance
Containment Area Radiation[1]	1 R/hr to 10^4 R/hr	3[7,8]	Detection of breach; verification
Effluent Radioactivity - Noble Gas Effluent from Condenser Air Removal System Exhaust[1]	10^{-6} μCi/cc to 10^{-2} μCi/cc	3[9]	Detection of breach; verification
Containment			
RCS Pressure[1]	0 to 3000 psig (4000 psig for CE plants)	1[2]	Detection of potential for breach; accomplishment of mitigation

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[6]Sampling or monitoring of radioactive liquids and gases should be performed in a manner that ensures procurement of representative samples. For gases, the criteria of ANSI N13.1-1969, "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities," should be applied. For liquids, provisions should be made for sampling from well-mixed turbulent zones, and sampling lines should be designed to minimize plateout or deposition. For safe and convenient sampling, the provisions should include:

a. Shielding to maintain radiation doses ALARA,
b. Sample containers with container-sampling port connector compatibility,
c. Capability of sampling under primary system pressure and negative pressures,
d. Handling and transport capability, and
e. Prearrangement for analysis and interpretation.

[7]Minimum of two monitors at widely separated locations.

[8]Detectors should respond to gamma radiation photons within any energy range from 60 keV to 3 MeV with a dose rate response accuracy within a factor of 2 over the entire range.

[9]Monitors should be capable of detecting and measuring gaseous effluent radioactivity with compositions ranging from fresh equilibrium noble gas fission product mixtures to 10-day-old mixtures, with overall system accuracies within a factor of 2. Effluent radioactivity may be expressed in terms of concentrations of Xe-133 equivalents, in terms of concentrations of any noble gas nuclides, or in terms of integrated gamma MeV per unit time. It is not expected that a single monitoring device will have sufficient range to encompass the entire range provided in this regulatory guide and that multiple components or systems will be needed. Existing equipment may be used to monitor any portion of the stated range within the equipment design rating.

Attachment 4 to AEP:NRC:0856T

Reasons and 10 CFR 50.92 Analysis for Change to the Donald C. Cook Nuclear Plant Unit Nos. 1 and 2 Technical Specifications

Containment Water Level Monitor (II.F.1.5)

The guidance given in Generic Letter No. 83-37 states that:

"A continuous indication of containment water level should be provided in the control room of each reactor during Power Operation, Startup and Hot Standby modes of operation. At least one channel for narrow range and two channels for wide range instruments should be operable at all times when the reactor is operating in any of the above modes. Narrow range instruments should cover the range from bottom to the top of the containment sump. Wide range instruments should cover the range from the bottom of the containment to the elevation equivalent to a 600,000 gallon (or less if justified) capacity.

"Technical Specifications for containment water level monitors should be included with other accident monitoring instrumentation in the present Technical Specifications. LCOs (including the required Actions) for wide range monitors should include the requirement that the inoperable channel will be restored to operable status within 30 days or the plant will be brought to Hot Shutdown condition as required for other accident monitoring instrumentation. Typical acceptable LCO and surveillance requirements for accident monitoring instrumentation are included in Enclosure 3."

We are proposing that T/S Tables 3.3-11 and 3.3-10 for Units 1 and 2, respectively, be revised to include the requirement that at least two containment water level channels and one containment sump level channel be operable during Modes 1, 2, and 3. In addition, we are proposing that T/S Tables 4.3-7 and 4.3-10 for Units 1 and 2, respectively, be revised to include the surveillance requirements for these channels.

In order to follow the above guidance, and maintain internal consistency with our current Technical Specifications, the 30-day action statement in T/S 3.3.3.8 for Unit 1 and 3.3.3.6 for Unit 2 is proposed for the containment water level and containment sump level instrumentation.

The format of T/S Tables 3.3-11 and 3.3-10 for Units 1 and 2 varies from the Generic Letter example because our present T/Ss include only one column listing "Minimum Channels Operable." In order to keep the format similar to other accident monitoring instrumentation included in the present T/Ss, the column listing the "Required No. of Channels" is not included.

Per 10 CFR 50.92, a proposed amendment will not involve a significant hazards consideration if the proposed amendment does not:

(1) involve a significant increase in the probability or consequences of an accident previously evaluated,
(2) create the possibility of a new or different kind of accident from any accident previously analyzed or evaluated, or
(3) involve a significant reduction in a margin of safety.

Criterion 1

These changes will expand the license requirements for post-accident monitoring instrumentation and assist the operator in recovering from an accident. The changes will not involve a significant increase in the probability or consequences of any previously evaluated accident.

Criterion 2

The changes do not affect normal or accident plant operation. In an accident they will serve to provide data to the operator; therefore, the changes will not create the possibility of a new or different kind of accident from any previously analyzed or evaluated.

Criterion 3

The changes do not involve a significant reduction in the margin of safety, since they will only require that additional data be available to the operator.

The Commission has provided guidance concerning the determination of significant hazards by providing certain examples (48 FR 14870) of amendments considered not likely to involve significant hazards consideration. The second of these examples refers to changes that impose additional limitations, restrictions, or controls not presently included in the T/Ss. Since the requirement for sump and containment water level monitors constitute a restriction which the current T/Ss do not have, we believe this example is applicable and that the changes involve no significant hazards consideration.

The above T/S changes constitute additional restrictions to the present T/Ss. Therefore, we believe that these changes do not involve a significant hazards consideration as defined in 10 CFR 50.92.

It is noted that AEP:NRC:0856I also proposed changes for the axial power distribution monitoring system and several administrative changes. We are limiting this submittal to changes for the containment water level and containment sump level instrumentation. We request that your staff continue to review the changes regarding the axial power distribution system and the administrative changes as submitted in AEP:NRC:0856I.