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ACCESSION NBR: 9207060230      DOC. DATE: 92/07/01      NOTARIZED: NO      DOCKET #  
FACIL: 50-305 Kewaunee Nuclear Power Plant, Wisconsin Public Service      05000305  
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SUBJECT: Forwards response to Reg Guide 1.97, "Accident Monitoring Instrumentation," in response to NRC 920312 ltr forwarding results of Reg Guide 1.97 insp performed during wk of 920224-28.

DISTRIBUTION CODE: A003D      COPIES RECEIVED: LTR 1 ENCL 1      SIZE: 23  
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July 1, 1992

10CFR50.49(b)(3)

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
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Gentlemen:

Docket 50-305  
Operating License DPR-43  
Kewaunee Nuclear Power Plant  
Regulatory Guide 1.97, Accident Monitoring Instrumentation

- References:
- 1) Letter from M. A. Ring (NRC - Region III) to C. A. Schrock (WPSC) dated March 12, 1992
  - 2) Letter from K. H. Evers (WPSC) to NRC Document Control Desk dated March 27, 1991

Reference 1 provided Wisconsin Public Service Corporation (WPSC) with the results of the NRC Regulatory Guide (RG) 1.97 inspection performed the week of February 24-28, 1992 at the Kewaunee Nuclear Power Plant (KNPP). Based on discussions between WPSC and NRC staff during the inspection period, WPSC committed to supply a followup letter to the NRC staff by July 1, 1992.

The purpose of this letter is to notify the NRC that WPSC commits to the recommendations of RG 1.97, revision 3, with the exceptions and deviations as noted in the attachment. On the attachment, the left hand column is the design and qualification criteria taken verbatim from RG 1.97, revision 3, table 1, and the right hand column lists WPSC's exceptions or deviations to the criteria where applicable. A deviation means that we have an alternative method to implement the recommendation and an exception means that we do not satisfy the criteria in that one specific area. Our intent is to implement RG 1.97, revision 3, with the noted exceptions and deviations for all future plant modifications.

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Document Control Desk

July 1, 1992

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On a related topic, reference 2 provided the NRC with WPSC's plans for upgrading the steam generator (SG) wide range level instrumentation to meet KNPP's design basis for a category 1 variable. Our commitment was to upgrade the electronic portion of the instrumentation loop during the 1993 refueling outage excluding process fluid taps, piping and connections. The separate taps and piping were to be provided for each transmitter as a part of the SG replacement. At the time this commitment was made, SG replacement was tentatively scheduled for 1996. Due to other considerations, the tentative date for SG replacement has been delayed to 1999. For your information, the electronic upgrade portion of the modification was installed ahead of schedule.

If you have questions or need further clarification, please contact myself or a member of my staff.

Sincerely,



C. A. Schrock  
Manager - Nuclear Engineering

SLB/jac

cc - US NRC - Region III  
Mr. Patrick Castleman, US NRC

LIC\NRC\RG1-97.WP

ATTACHMENT

To

Letter from C. A. Schrock (WPSC)

To

Document Control Desk (NRC)

Dated

July 1, 1992

Design and Qualification Criteria for Accident Monitoring Instrumentation

**Design and Qualification Criteria for Instrumentation  
Category 1**

RG 1.97, Rev 3 Criteria

WPSC Exceptions and/or Deviations

**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."

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.

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.

Deviation - Equipment important-to-safety is qualified in accordance with WPSC's Equipment Qualification (EQ) Program. The NRC staff issued a Safety Evaluation Report (SER) for WPSC's EQ Program in a letter dated September 11, 1984, from S. A. Varga (NRC) to C. W. Giesler (WPSC).

**Category 1 (Cont.)**

RG 1.97, Rev. 3 Criteria

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.

WPSC Exceptions and/or Deviations

Deviation - Seismic qualification is in accordance with the KNPP design basis as described in Appendix B of the KNPP Updated Safety Analysis Report (USAR). The NRC staff accepted KNPP's design basis for seismic qualification in lieu of RG 1.100 in the SER for RG 1.97, dated September 28, 1990. In addition, the seismic adequacy of equipment necessary for the safe shutdown of the plant following a seismic event will be verified in response to Generic Letter 87-02 following the procedures set forth by the Seismic Qualification Utility Group (SQUG).

### Category 1 (Cont.)

#### RG 1.97, Rev. 3 Criteria

#### **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 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.

#### WPSC Exceptions and/or Deviations

Redundant or diverse channels are provided for all Category 1 variables with the exception of the radioactivity concentration in the primary coolant. Performing a manual sample and an in-house analysis by the Chemistry Department was reviewed and approved by the NRC in response to NUREG-0737, Item II.B.3 and the SER for RG 1.97, dated September 28, 1990.

Deviation - The separation requirements for existing Category 1 variables are in accordance with the KNPP USAR which predates RG 1.75. This separation criteria was found acceptable for all existing RG 1.97 variables in the SER for RG 1.97, dated September 28, 1990. Additionally, the existing separation design is acceptable for the scheduled 1992 and 1993 modifications which were reviewed by the NRC staff during the RG 1.97 inspection performed in February 1992. (NRC Inspection Report 92-05 dated March 12, 1992.)

When future functional modifications\* to RG 1.97 Category 1 equipment are required, efforts will be made to comply with RG 1.75 cable separation recommendations for the portion of the instrument loop that is being modified. Where compliance to RG 1.97 cannot be achieved using the existing cable tray raceway separation systems, isolated conduit(s) or barriers will be used to comply with the intent of RG 1.75 physical cable separation for associated circuits. Existing plant power supplies that support RG 1.97 instrument loop variables will not be upgraded to comply with RG 1.75 during any functional RG 1.97 loop modifications.

\* A functional modification to an instrument loop is defined as the use of new instrument loop(s) to provide the same RG 1.97 variable or the modification to an existing RG 1.97 loop that alters the physical separation of the loop to its redundant counterpart.

Category 1 (Cont.)

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**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.

Deviation - WPSC is not committed to RG 1.32. Category 1 instrumentation receives power from a safety-related bus with either battery or emergency diesel generator backup. Instrumentation power source information was provided to the NRC staff in a submittal dated October 24, 1988.

**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," or as specified in the technical specifications.

Channel availability shall be as specified in the KNPP Technical Specifications (TS) with a deviation of certain instrumentation channels for which there are no existing TSs for indication. All of these instrumentation channels are covered by approved plant procedures for testing and calibration to ensure equipment reliability.



Category 1 (Cont.)

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

5. Quality Assurance

The recommendations of the following regulatory guides pertaining to quality assurance should be followed:

- Reg Guide 1.28 "Quality Assurance Program Requirements (Design and Construction)"
- Reg Guide 1.30 (Safety Guide 30) "Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment"
- Reg Guide 1.38 "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants"
- Reg Guide 1.58 "Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel"
- Reg Guide 1.64 "Quality Assurance Requirements for the Design of Nuclear Power Plants"
- Reg Guide 1.74 "Quality Assurance Terms & Definitions"

Deviation - Quality assurance requirements shall be in accordance with WPSC's Operational Quality Assurance Program (OQAP). This program incorporates the requirements of 10CFR50, Appendix B, the provisions of ANSI N18.7-1976 and ANSI N45.2.23-1978 and Regulatory Guides 1.8-Rev. 1, 1.30, 1.37, 1.38-Rev. 2, 1.39-Rev. 1, 1.54, 1.58-August 1973, 1.64-Rev. 2, 1.74, 1.88-Rev. 2 and 1.94. The OQAP description has been reviewed and found acceptable by the NRC staff.

All existing structures, systems and components are classified as QA type 1, 2, 3, or NA according to their function and importance in relation to the safe operation of the reactor. The OQAP is mandatory for those items classified as QA type 1. The non-QA-1 equipment installed at KNPP is high-quality commercial grade and selected to withstand the specific service environment.

Modifications or maintenance performed on Category 1 equipment shall be in accordance with the existing QA type of that system, structure or component. When replacement systems, structures or components are required, the replacement shall be commensurate with the requirements for QA type 1 for the portion of the loop that is being modified.

**Category 1 (Cont.)**

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

Reg. Guide 1.88 "Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records"

Reg Guide 1.123 "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants"

Reg Guide 1.144 "Auditing of Quality Assurance Programs for Nuclear Power Plants"

Reg 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 the 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."\*

**6. Display and Recording**

Continuous real-time display should be provided. The indication may be on a dial, digital display, CRT, or stripchart recorder.

No deviations or exceptions for Category 1 variables displayed in the Control Room.

\*A revision to RG 1.28 has been issued.

## Category 1 (Cont.)

### RG 1.97, Rev. 3 Criteria

Recording of instrumentation readout information should be provided for at least one redundant channel.

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.

#### 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.

#### 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.

### WPSC Exceptions and/or Deviations

Deviation - Instrumentation readout information is either recorded or available on the plant process computer for at least one redundant channel.

Exception - Position recording is not provided for the containment isolation valve position. Lack of recording for this variable was found acceptable in the SER for RG 1.97, dated September 28, 1990.

No exceptions or deviations identified. Range information was provided to the NRC in a letter from C R Steinhardt (WPSC) to the NRC, dated October 24, 1988. Based on NRC staff review, WPSC agreed to extend the ranges for some of the indication and install qualified steam generator wide range level instrumentation.

No deviations identified. Type A, B, and C instrumentation displayed in the control room are identified with the exception of the containment isolation valve position status and containment hydrogen concentration. Containment isolation valve position status is centrally located on the containment isolation active status panel. The operators are trained and directed by emergency operating procedures to refer to the active status panel to verify containment isolation. The containment hydrogen concentration primary display is locally at the hydrogen concentration panel and available on the plant process computer. The NRC found

Category 1 (Cont.)

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

local indication for this variable acceptable in the SER for RG 1.97, dated September 28, 1990.

**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.

During the NRC on-site inspection of RG 1.97, the inspectors reviewed instrumentation isolation interfaces. Examples of the isolators reviewed include; the Foxboro model numbers 66GC-OW and 66BC-0 current repeaters, the Foxboro SPEC-200 racks and the input to the plant process computer. The inspectors concluded that with one exception acceptable isolation exists at the KNPP. Electrical isolation at KNPP is provided by transmission of the signal through one of the aforementioned isolation devices, by an isolation device accepted in IEEE 384 - 1977, or by ensuring that the entire instrumentation loop is at the same level of qualification. The exception, containment hydrogen concentration, did not appear to have a qualified isolation interface. WPSC has committed to provide additional information to the NRC by October 31, 1992 with regard to this isolation device.

Category 1 (Cont.)

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**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 testing is less than the normal time interval between plant shutdowns, a capability for testing during power operation should be provided.

Deviation - WPSC is not committed to RG 1.118. Periodic checking, testing, calibration and verification is performed in accordance with controlled plant procedures.

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.

The design should facilitate administrative control of the access to all setpoint adjustments, module calibration adjustments, and test points.

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 is not usually needed.)

The location of the isolation device should be such that it would be accessible for maintenance during accident conditions.

**Category 1 (Cont.)**

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**11. Human Factors**

The instrumentation should be designed to facilitate the recognition, location, replacement, repair, or adjustment of malfunctioning components or modules.

No deviations or exceptions identified.

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.

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.

**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.

No deviations or exceptions identified.

**Design and Qualification for Instrumentation  
Category 2**

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**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."

Deviation - Equipment important-to-safety is qualified in accordance with WPSC's Equipment Qualification (EQ) Program. The NRC staff issued a SER for WPSC's EQ Program in a letter dated September 11, 1984, from S. A. Varga (NRC) to C. W. Giesler (WPSC).

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.

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.

**2. Redundancy**

No specific provisions

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**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.

Deviation - WPSC is not committed to RG 1.32. Category 2 instrumentation receives power from a high reliability power source with battery backup as necessary. Instrumentation power source information was provided to the NRC staff in a submittal dated October 24, 1988.

**Category 2 (Cont.)**

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**4. Channel Availability**

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.

Channel availability shall be as specified in the KNPP TSs with a deviation of certain instrumentation channels for which there are no existing TSs for indication. All of these instrumentation channels are covered by approved plant procedures for testing and calibration to ensure equipment reliability.

**5. Quality Assurance**

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.

Deviation - Quality assurance requirements shall be in accordance with WPSC's OQAP (see response under Category 1 for description of OQAP).

Modifications or component replacements shall be in accordance with the existing QA typing of that system, structure, or component.



## Category 2 (Cont.)

### RG 1.97, Rev. 3 Criteria

### WPSC Exceptions and/or Deviations

#### 6. Display and Recording

The instrumentation signal may be displayed on an individual instrument or it may be processed for display on demand.

No deviations or exceptions identified for Category 2 variables displayed in the Control Room.

Signals from effluent radioactivity monitors and area monitors should be recorded.

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.

Deviation - Instrumentation readout information is either recorded or available on the plant process computer if the trend or transient information is essential for operator action. (Note that redundancy is not a requirement for category 2.)

#### 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.

No deviations or exceptions identified.

#### 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.

No deviations or exceptions identified.

**Category 2 (Cont.)**

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**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.

During the NRC on-site inspection of RG 1.97, the inspectors reviewed instrumentation isolation interfaces. Examples of the isolators reviewed include the Foxboro model number 66GC-OW and 66BC-O current repeaters, the Foxboro SPEC-200 racks and the input to the plant process computer. They concluded that for the Category 2 variables acceptable isolation exists at the KNPP. Electrical isolation at KNPP is provided by transmission of the signal through one of the aforementioned isolation devices, by an isolation device accepted in IEEE 384-1977, or by ensuring that the entire instrumentation loop is at the same level of qualification.

**Category 2 (Cont.)**

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**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 testing is less than the normal time interval between plant shutdowns, a capability for testing during power operation should be provided.

Deviation - WPSC is not committed to RG 1.118. Periodic checking, testing, calibration and verification is performed in accordance with controlled plant procedures.

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.

The design should facilitate administrative control of the access to all setpoint adjustments, module calibration adjustments, and test points.

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.)

The location of the isolation device should be such that it would be accessible for maintenance during accident conditions.

**Category 2 (Cont.)**

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**11. Human Factors**

The instrumentation should be designed to facilitate the recognition, location, replacement, repair, or adjustment of malfunctioning components or modules.

No deviations or exceptions identified.

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.

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.

**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.

No deviations or exceptions identified.

**Design and Qualification Criteria for Instrumentation  
Category 3**

RG 1.97, Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**1. Equipment Qualification**

No specific provision

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**2. Redundancy**

No specific provision

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**3. Power Source**

No specific provision

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**4. Channel Availability**

No specific provision

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**5. Quality Assurance**

The instrumentation should be of high-quality commercial grade and should be selected to withstand the specified service environment.

No deviations or exceptions identified.

**6. Display and Recording**

The instrumentation signal may be displayed on an individual instrument or it may be processed for display on demand.

No deviations or exceptions for Category 3 variables displayed in the Control Room.

Signals from effluent radioactivity monitors, area monitors, and meteorology monitors should be recorded.

**Category 3 (Cont.)**

RG 1.97., Rev. 3 Criteria

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.

**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.

**8. Equipment Identification**

No specific provision --

**9. Interfaces**

No specific provision --

WPSC Exceptions and/or Deviations

Deviation - Instrumentation readout information is either recorded or available on the plant process computer if the trend or transient information is essential for operator action. (Note that redundancy is not a requirement for category 3.)

No exceptions or deviations identified.

**Category 3 (Cont.)**

RG 1.97., Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**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 testing is less than the normal time interval between plant shutdowns, a capability for testing during power operation should be provided.

Deviation - WPSC is not committed to RG 1.118. Periodic checking, testing, calibration and verification is performed in accordance with controlled plant procedures.

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.

The design should facilitate administrative control of the access to all setpoint adjustments, module calibration adjustments, and test points.

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.)

**Category 3 (Cont.)**

RG 1.97., Rev. 3 Criteria

WPSC Exceptions and/or Deviations

**11. Human Factors**

The instrumentation should be designed to facilitate the recognition, location, replacement, repair, or adjustment of malfunctioning components or modules.

No deviations or exceptions identified.

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.

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.

**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.

No deviations or exceptions identified.