CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT

POSITION PAPER

ON

REGULATORY GUIDE 1.97

DATE: 8/9/83

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1.0 INTRODUCTION

This document states Brunswick's position on Regulatory Guide 1.97, Revision 2, "Instrumentation for Light Water Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident" (referred to in this document as RG 1.97). In assessing RG 1.97, Brunswick used information contained in ANS 4.5, BWROG Emergency Procedure Guidelines, Brunswick's FSAR, and assessment of RG 1.97 done by the BWROG. Section 2.0 provides Brunswick's general position statement. Section 3.0 provides Brunswick's position statements on the generic RG 1.97 criteria. Section 4.0 details our position on each of the variables listed in Table 1 of RG 1.97. "Agreement" or "Concurrence" means Brunswick will provide/has provided the recommended range and category stated in RG 1.97 unless noted.

2.0 GENERAL POSITION STATEMENT

Brunswick concurs with the intent of RG 1.97, which is to ensure that necessary and sufficient instrumentation exists in a nuclear power station for assessing plant and environmental condition during and following an accident as required by 10CFR Part 50, Appendix A and General Design Criteria 13, 19, and 64.

3.0 BRUNSWICK'S POSITION STATEMENT ON RG 1.97 REGULATORY POSITIONS

The position statements given below correspond to the referenced paragraphs in Section C, "REGULATORY POSITION" of RG 1.97.

Paragraph 1.1: Brunswick concurs with this definition.

Paragraph 1.2: Brunswick concurs with this definition.

Paragraph 1.3.1a: Brunswick is an operating plant licensed prior to RG 1.89, "Qualification of Class 1E Equipment for Nuclear Power Plants". Brunswick will commit to ensuring environmental qualification as required by NUREG-0588 where applicable and Memorandum and Order CLI-80-21. Additionally, Brunswick will only qualify equipment located in a harsh environment to these requirements. Thus equipment forming part of an instrumentation loop which is located in a mild environment may not be qualified by testing.

Seismic qualification of existing equipment will be in accordance with Brunswick's FSAR for the original plant design. New equipment will be seismically qualified in accordance with IEEE-344-75. An isolation device will be provided between safety and non-safety portion of loops where engineering analysis requires its use.

3.0 BRUNSWICK'S POSITION STATEMENT ON RG 1.97 REGULATORY POSITIONS (Cont'd)

Paragraph 1.3.1b: A third channel of instrumentation for a Category 1 variable will be provided if a failure of one accident monitoring channel results in information ambiguity that would lead operators to defeat or fail to accomplish a required safety function, and if one of the following measures cannot be done:

1. Cross-checking with an independent channel that monitors a different variable bearing a known relationship to the failed monitoring channel.

2. Perturbing the measured variable to determine the failed channel by observing the response on each instrument.

3. Using portable instrumentation to validate correct channel.

Category 1 instrumentation channels shall be electrically divisionalized and handled in accordance with Brunswick's FSAR design requirements for divisionalized channels and circuits. Generally, Brunswick is designed to IEEE-279-1971.

3.0 BRUNSWICK'S POSITION STATEMENT ON RG. 1.97 REGULATORY POSITIONS (Cont'd)

Paragraph 1.3.1c: All Category 1 instrument channels shall be powered by plant emergency power sources designed in accordance with Brunswick's FSAR criteria and commitments.

Paragraph 1.3.1d: Brunswick concurs.

Paragraph 1.3.1e: The quality assurance requirements invoked for the currently installed equipment were the Corporate Quality Assurance Program in effect at the time of purchase. As part of the implementation of this Regulatory Guide, Brunswick will ensure that the equipment associated with Category 1 instrument channels are on the plant's Q-List such that the current Brunswick Quality Assurance Program requirements will be invoked for future procurement, maintenance, and design change activities. Adherence to the requirements of the regulatory guides listed in this paragraph will be done if they are in the Brunswick QA program commitments. Refer to letter OQA-81-026 addressed to Mr. Eisenhut for details on the Brunswick QA program.

Paragraph 1.3.1f: Brunswick concurs with this position.

Paragraph 1.3.1g: Brunswick concurs with this position.

3.0 BRUNSWICK'S POSITION STATEMENT ON RG 1.97 REGULATORY POSITIONS (Cont'd)

Paragraph 1.3.2a: Brunswick's position on these criteria for Category 2 instruments are the same as given for paragraph 1.3.1a above. Instruments that are not part of a safety-related system will not be seismically qualified unless Brunswick's FSAR invokes seismic requirements for the associated system.

Paragraph 1.3.2b: Brunswick concurs with this position.

Paragraph 1.3.2c: Brunswick concurs with this position.

Paragraph 1.3.2d: Brunswick's position on quality assurance requirements for category 2 safety-related instruments is the same as stated for paragraph 1.3.1e above. For non-safety related category 2 instruments the need for quality assurance requirements will be evaluated on a case-by-case basis. In general, quality assurance program requirements will not be imposed on non-safety related Category 2 instruments.

Paragraph 1.3.2e: Brunswick concurs with this position.

Paragraph 1.3.2f: Brunswick concurs with this position.

Paragraph 1.3.3a: Brunswick concurs with this position with the understanding that environmental qualification testing is not necessary in selecting equipment for the service environment.

Paragraph 1.3.3b: Brunswick concurs with this position.

Paragraph 1.4.a: Isolation devices will be provided between monitoring instrument channel and other user circuit only if the other circuit is designed to less stringent requirements, and engineering analysis requires its use.

Paragraph 1.4.b: Brunswick believes the identification of instruments for post-accident monitoring falls into the realm of human factors engineering and must take into consideration all current activities such as control board review, new emergency guidelines and procedures. By incorporating these activities and RG 1.97 into an integrated project (SECY 82-111) the NRC has ensured that human factors engineering and integration is achieved. Brunswick will not commit to labeling the instruments but will develop a philosophy regarding instrument channel identification as part of the SECY-82-111 project. We believe this meets the intent of the guideline position.

3.0 BRUNSWICK'S POSITION STATEMENT ON RG 1.97 REGULATORY POSITIONS (Cont'd)

Paragraph 1.5.a: Servicing, testing, and calibration procedures will be established and performed on a frequency necessary to maintain instrumentation capability. The frequency of servicing, testing, and calibration will be established from equipment experience data. The capability to service, test and calibrate the instruments during plant operation will be provided where necessary and feasible to do so.

Paragraph 1.5.b: Brunswick concurs with this position.

Paragraph 1.5.c: The utilization of design features such as locked cabinets and seals to allow establishment of controlled access to equipment setpoint, calibration and other adjustments is not feasible at Brunswick. Brunswick does not usually endorse such design considerations, but relies on procedure controls and personnel training.

Paragraph 1.5.d: Brunswick concurs with this position.

Paragraph 1.5.e: Brunswick concurs with this position.

Paragraph 1.5.f: Brunswick generally concurs with this position. However, several exceptions are specified in Section 4.0.

3.0 BRUNSWICK'S POSITION STATEMENT ON RG 1.97 REGULATORY POSITIONS (Cont'd)

Paragraph 1.5.h: Periodic checking, testing, calibration and calibration verification for protection instrumentation is in accordance with IEEE-338-1971, "Trial - Use Criteria for the Periodic Testing of Nuclear Power Generating Stations Protective Systems."

Paragraph 1.6: Brunswick's specific position on each variable is given in Section 4.0.

Regulatory Guide Section C.2

Paragraphs 2.1, 2.2, 2.3 and 2.4: Brunswick concurs with these positions.

Paragraph 2.5: Brunswick's position is outlined in our positions stated for paragraphs 1.3.1a through 1.3.3b, 1.4a, 1.4b and 1.6.

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE

4.1 Plant-Specific Variables Considered by Brunswick to be Type A

RG 1.97 defines Type A variables as "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

4.1 Plant-Specific Variables Considered by Brunswick to be Type A (Cont'd)

no automatic control is provided and that are required for safety systems to accomplish their safety functions for design basis events". Primary information is defined by RG 1.97 as "information that is essential for the direct accomplishment of the specified safety functions." (Variables associated with contingency actions that may be identified in written procedures are excluded from this definition of primary information.) The following paragraphs discuss each Type A variable by designating the safety function(s), operator action(s), and giving a measurement range for the variable. All Type A variables are category one and have been or will be provided at Brunswick.

4.1.1 Variable A1 - RPV Pressure

The RPV Pressure gives the information needed for the operator to maintain core cooling and reactor coolant system integrity. Operator action calls for depressurizing the RPV to maintain a safe cooldown rate by any of several systems, such as HPCI, RCIC, ADS, and RWCU. The operator can also manually open one SRV to reduce pressure to below the SRV setpoint if any SRV is cycling. The range

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE (Cont'd)

4.1.1 Variable A1 - RPV Pressure

recommended for this variable is 0 to 1500 psig in accordance with FSAR Section 5.2.2.2 and FSAR Table 7.5.1-1.

4.1.2 Variable A2-RPV Water Level

The RPV Water Level gives the information needed by the operator to restore and maintain RPV water level. The range recommended for this variable is -180 to +295 inches of water. The installed range will meet or exceed the recommended range.

4.1.3 Variable A3 - Suppression Pool Water Temperature

Suppression Pool Water temperature gives the information needed by the operator to maintain containment integrity and reactor coolant system integrity. Operator actions are: Operate available suppression pool cooling system when the suppression pool temperature exceeds the normal operating limit, maintain RPV pressure at a reduced pressure if the suppression pool temperature cannot be maintained below the heat capabity temperature limit, and attempt to close any stuck open relief valve. The recommended range for this variable is 30° to 230°F. The installed range will meet or exceed the recommended range.

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE (Cont'd)

4.1 Plant-Specific Variables Considered by Brunswick to be Type A (Cont'd)

4.1.4 Variable A4 - Suppression Pool Water Level

Suppression pool water level provides information necessary for the operator to maintain containment integrity. Operator action calls for maintaining suppression pool water level within normal operating limits. If the suppression pool water level cannot be maintained below the suppression pool load limit, the operator is to maintain the RPV pressure below its corresponding limit. The range will be approximately minus ten feet, which is the mid-plane of the lowest ECCS suction line to a position six feet above normal water level. This range follows from NUREG-0737 Item II.F.1, Attachment 5.

4.1.5 Variable A5 - Drywell Pressure

Drywell pressure provides information necessary for the operator to maintain containment and reactor coolant system integrities. Operation action is to control primary containment pressure by containment pressure control systems. A range of minus 5 to plus 245 psig is provided and is in accordance with NUREG-0578. See PM 80-025, 026.

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE (Cont'd)

4.1 Plant-Specific Variables Considered by Brunswick to be Type A

4.1.6 Variable A6 - Drywell Temperature

Drywell temperature provides information necessary for the operator to maintain containment and reactor coolant system integrities. Operator action is to operate the drywell cooling system and those systems necessary to compensate reactor water level. The range recommended for this variable is 40° to 440°F. See Brunswick's FSAR section 6.2.1.1.1, page 6.2.1-4.

4.1.7 Variable A7 - Suppression Pool Pressure

The Suppression Pool Pressure gives the information needed by the operator to maintain containment and reactor coolant system integrities. The operator uses this information along with drywell temperature and suppression pool temperature to determine when to initiate the suppression pool and drywell sprays. A suitable range for this variable is minus 5 to plus 245 psig.

4.1.8 Variable A8 - Drywell and Suppression Pool Hydrogen, Oxygen Concentration

Containment Hydrogen and Oxygen concentrations provide information necessary for the operator to maintain containment integrity. Operator action is to initiate the combustible gas control system in the Containment Atmosphere Dilution (CAD) system in the Brunswick design. The ranges for these variables will meet or exceed the requirements of RG 1.97.

4.2 Brunswick's Position on RG 1.97 Type B Variables

RG 1.97 defines Type B variables as those that provide "information about the accomplishment of plant safety functions". Key variables under type B are those variables which most directly indicate the accomplishment of a safety function.

Each variable is discussed in the following paragraphs and where this variable is covered under another variable type, it is indicated.

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE

4.2 Brunswick's Position on RG 1.97 Type B Variables

4.2.1 Variable B1 - Neutron Flux

The worst case scenario in which neutron flux monitoring would be useful for post-accident monitoring consists of a failure of the control rods to insert (completely or partially) and operator actuation of the standby liquid control system. (If all rods insert, subcriticality is not a factor.) A failure of the control rod drive is not postulated to occur concurrently with a LOCA event. Based on the above scenario this environment is not one in which the neutron monitoring system would be rendered inoperable and environmental qualification is not necessary. This position is consistent with Q.12 and A.12 in Supplement No. 2 to IE Bulletin No. 79-01B.

While neutron flux is a key variable for measuring reactivity control, the degree to which this variable is important to safety is another consideration. There is little probability that there would be, simultaneously, a need for this measurement (in terms of operator action to be taken) and an accident environment in which the neutron

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE (Cont'd)

4.2 Brunswick's Position on RG 1.97 Type B Variables

4.2.1 Variable B1 - Neutron Flux (Cont'd)

monitoring system (NMS) would be rendered inoperable. Additionally, the large number of detectors that are driven into the core soon after shutdown makes it highly probable that one or more of the existing NMS detectors will be inserted and functioning. In light of the regulatory guide's graded approach to importance to safety and our position that this variable is less critical than others, we believe a designation as Category 2 is more appropriate and meets the intent of the regulatory guide.

4.2.2 Variable B2 - Control Rod Position

Brunswick is in agreement with RG 1.97 and indication is provided to monitor this variable.

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE

4.2 Brunswick's Position on RG 1.97 Type B Variables

4.2.2 Variable B2 - Control Rod Position

Brunswick is in agreement with RG 1.97 and indication is provided to monitor this variable.

4.2.3 Variable B3 - RCS Soluble Boron Concentration

Brunswick concurs with the ability to obtain a sample of reactor core coolant. Sampling will be done through the Post-Accident Sampling System. Analysis will be performed in accordance with NUREG-0737, Item II.B.3.

4.2.4 Variable B4 - Coolant Level in Reactor

Refer to variable A2, paragraph 4.1.2.

4.2.5 Variable B5 - BWR Core Thermocouples

Not required at this time per Supplement 1 to NUREG-0737.

4.2.6 Variable B6 - RCS Pressure

Refer to variable A1 paragraph 4.1.1.

4.2 Brunswick's Position on RG 1.97 Type B Variables

4.2.7 Variable B7 - Drywell Pressure

Refer to variable A5, paragraph 4.1.5.

4.2.8 Variables B8 - Drywell Sump Level

The Brunswick plant design does not require continuous measurement of drywell sump level. A LOCA signal will prevent operation of the sump pumps and will close containment isolation valves to eliminate the possibility of radioactive materials leaking outside the primary containment. During and after a LOCA, the drywell sumps overflow to the suppression pool. Measuring sump level after an accident would not accomplish anything.

4.2.9 Variable B9 - Primary Containment Pressure

Total primary containment pressure is monitored by the combination of drywell pressure and suppression pool pressure. Refer to variable A5, paragraph 4.1.5 and variable A7, paragraph 4.1.7.

4.2.10 Variable B10 - Primary Containment Isolation Valve Position

Brunswick provides position indication for all isolation and containment boundary valves except check valves and manually operated valves.

4.3 Brunswick's Position on RG 1.97 Type C Variables

RG 1.97 defines Type C variables as "those variables that provide information to indicate the potential for being breached or the actual breaching of the barriers to fission product releases. The barriers are (1) fuel cladding, (2) primary coolant pressure boundary, and (3) containment." Key variables under Type C are "those variables which most directly indicate the accomplishment of a safety function." Each variable is discussed in the following paragraphs and where this variable is covered under another variable type, it is indicated.

4.3.1 C1 - Radioactivity Concentration or Radiation Level in Circulating Primary Coolant

Brunswick does not intend to continuously monitor the radioactivity level of the primary coolant. During normal operation the Radiation Monitoring System provides indication of breach. During accident conditions the Post-Accident Sampling System will provide local indication of

4.3.1 (Continued)

radioactivity concentration in the reactor coolant while samples are being taken for analysis.

4.3.2 Variable C2 - Analysis of Primary Coolant

Brunswick concurs and will provide a system that meets the requirements of NUREG-0737 Item II.B.3.

4.3.3 Variable C3 - BWR Thermocouple

See variable B5, paragraph 4.2.5.

4.3.4 Variable C4 - RCS Pressure

The requirements for the variable are met by variable A1, paragraph 4.1.1.

4.3.5 Variable C5 - Primary Containment Area Radiation

See Variable E1, paragraph 4.5.1.

4.3.6 Variable C6 - Drywell Drain Sumps Level

See discussion for variable B8, paragraph 4.2.8.

4.3.7 Variable C7 - Suppression Pool Water Level

Refer to variable A4, paragraph 4.1.4.

4.3.8 Variable C8 - Drywell Pressure

Refer to variable A5, paragraph 4.1.5.

4.3.9 Variable C9 - RCS Pressure (0 to 1500 psig)

Refer to variable A1, paragraph 4.1.1.

4.3.10 Variable C10 - Primary Containment Pressure

Refer to varable A5, paragraph 4.1.5 and variable A7, paragraph 4.1.7.

4.3.11 Variable C11 - Containment & Drywell Hydrogen Concentration

Refer to variable A8, paragraph 4.1.8.

4.3.12 Variable C12 - Containment & Drywell Oxygen Concentration

Refer to variable A8, paragraph 4.1.8.

4.3.13 Variable C13 - Containment Effluent Radioactivity - Noble Gases

Refer to variables E4 and E5, paragraph 4.5.4 and 4.5.5.

4.3.14 Variable C14 - Radiation Exposure Rate

Not required at this time per Supplement 1 to NUREG-0737.

4.3.15 Variable C15 - Effluent Radioactivity - Noble Gases

Refer to variables E4 and E5, paragraph 4.5.4.

4.4 Brunswick's Position on RG 1.97 Type D Variables

Type D variables as stated in the RG are, "those variables that provide information to indicate the operation of individual safety systems and other systems important to safety. These variables are to help the operator make appropriate decisions in using the individual systems important to safety in mitigating the consequences of an accident." Key variables that are type D are defined as "those variables that most directly indicate the operation of a safety system." These variables are discussed in the following paragraphs and where the variable has been covered under another variable type, it is indicated.

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE (Cont'd)

4.4 Brunswick's Position on RG 1.97 Type D Variables

4.4.1 Variable D1 - Main Feedwater Flow

Brunswick is in agreement with RG 1.97 concerning this variable. At the Brunswick plant there is a minor range deficiency on the high end of 0.212%. This is a negligible value. The "110% of design value" stated in the RG is considered a guideline. Brunswick will use the current value of 12,000,000 #/hr, for high end monitoring.

4.4.2 Variable D2 - Condensate Storage Tank Level

Brunswick concurs with RG 1.97.

4.4.3 Variable D3 - Suppression Spray Flow

Brunswick does not concur with RG 1.97 on this variable. For the Brunswick design RHR flow can be used to monitor the operation of primary containment related systems. Also, the following parameters give indication that the safety system is accomplishing its task:

4.4.3 (Continued)

Drywell Pressure - A5, B7, C8, D4, B9, C10

Drywell Temperature - A6, D7

Suppression Pool Pressure - A7

Suppression Pool Temperature - A3, D6.

RHR flow and the above list of variables provide adequate information to monitor operation of primary containment related systems.

4.4.4 Variable D4 - Drywell Pressure

Brunswick concurs with RG 1.97 on this variable.

4.4.5 Variable D5 - Suppression Pool Water Level

Refer to variable A4, paragraph 4.1.4.

4.4.6 Variable D6 - Suppression Pool Water Temperature

Refer to variable A3, paragraph 4.1.3.

4.4.7 Variable D7 - Drywell Atmosphere Temperature

Refer to variable A6, paragraph 4.1.6.

4.4 Brunswick's Position on RG 1.97 Type D Variables (Cont'd)

4.4.8 Variable D8 - Drywell Spray Flow

Brunswick's position on this variable is the same as that discussed under D3, paragraph 4.4.3.

4.4.9 Variables D9 - MSIV Leakage Control System Pressure

These systems are not included in the Brunswick plant design. Brunswick does not intend to add these systems.

4.4.10 Variable D10 - Primary System Safety Relief Valve Positions Including ADS or Flow Through or Pressure in Valve Lines

Brunswick is in agreement with RG 1.97 on this variable, and provides instrumentation for this variable.

D11 - Isolation Condenser System Shell-Side Water Level

D12 - Isolation Condenser System Valve Position

These systems are not included in the Brunswick plant design. Brunswick does not intend to add these systems.

4.4 Brunswick's Position on RG 1.97 Type D Variables (Cont'd)

4.4.11 Variable D13 - RCIC Flow

Brunswick agrees with the intent of RG 1.97 concerning this variable. Current design has indication as part of the flow controller and therefore indication is not isolated from the control loop. Brunswick does not plan to provide isolation between indication and control. If controller and/or flow indicator fail, RCIC performance can be monitored by monitoring the response of the reactor water level.

4.4.12 Variables - D14 - HPCI Flow
D15 - Core Spray System Flow
D16 - LPCI System Flow

The HPCI and CS systems each have one branch line - - the test line - - downstream of the flow - measuring element. The test line is provided with a motor operated valve that is normally closed (two valves in series in the case of the HPCI). Further, the valve in the test line closes automatically when the emergency system is activiated, thereby ensuring that indicated flow is not being diverted by the test line. Proper valve position can be verified by a direct indication of valve position. (Although LPCI has

4.4 Brunswick's Position on RG 1.97 Type D Variables (Cont'd)

4.4.12 (Continued)

several branch lines located downstream of each flow measuring element, each of those lines is normally closed.) For all of these systems, there are valid primary indicators other than flow measurement to verify the performance of the emergency system; for example, vessel water level.

The existing flow-measurement schemes for the HPCI, CS and LPCI are all adequate in that they meet the intent of RG 1.97.

4.4.13 Variable D17 - SLCS Flow

The SLC system is manually initiated. Flow measuring devices were not provided for this system. The pump discharge header pressure, which is indicated in the control room, will indicate SLC pump operation. Besides the discharge header pressure observation, the operator can verify the proper functioning of the SLCS by monitoring the following:

4.4 Brunswick's Position on RG 1.97 Type D Variables (Cont'd)

4.4.13 Variable D17 - SLCS Flow (Cont'd)

1. Decrease in the level of the boric acid storage tank.

2. Reactivity change in the reactor as measured by neutron flux.

3. Squib valve continuity indicating lights.

The use of these indications is believed to be a valid alternative to SLCS flow indication.

4.4.14 Variable D18 - SLCS Storage Tank Level

Brunswick is in agreement with the regulatory guide range of bottom to top level monitoring. At the Brunswick Plant, this level is given in percent.

Brunswick is in disagreement with the category 2 designation for this variable. The current design basis for the SLCS assumes a need for an alternative method of reactivity control without a concurrent loss-of-coolant accident or high-energy line break. The environment in which the SLCS instrumentation must work is therefore a "mild" environment for qualification purposes.

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE (Cont'd)

4.4 Brunswick's Position on RG 1.97 Type D Variables (Cont'd)

4.4.14 Variable D18 - SLCS Storage Tank Level (Cont'd)

The current design basis for the SLCS recognizes the system has an importance to safety less than the importance to safety of the reactor protection system and agrees with the graded approach to quality assurance specified in RG 1.97. It is unnecessary to apply a full quality assurance program to this instrumentation. Brunswick will classify this variable category 3. A category 3 requirement is consistent with the 79-01B stand on the SLCS, which is that the system is not required to help mitigate a HELB or a LOCA.

4.4.15 Variable D19 - RHR System Flow

Brunswick concurs with RG 1.97 on this variable.

4.4.16 Variable D20 - RHR Heat Exchanger Outlet Temperature

Brunswick concurs with RG 1.97 on this variable.

4.4 Brunswick's Position on RG 1.97 Type D Variables (Cont'd)

4.4.17 Variable D21 - Cooling Water Temperature to ESF Components

At Brunswick the Service Water System provides cooling water to the ESF components. Water is taken from the Cape Fear River via the intake canal. It is a once-through, open-loop system designed for 33° to 90°F water temperature according to Brunswick's FSAR. Since there are no heat sources between the intake canal and the ESF components, there will be no significant change in water temperature. Also, there are no operator actions based on water temperature. The EOP's assume a worst-case water temperature and use this in the calculations. Due to this design there is no need for this indication for post-accident monitoring. There are other indications such as cooling water flow that can be used to monitor system operation. Brunswick does not intend to provide this variable.

4.4.18 Variable D22 - Cooling Water Flow to ESF System Components

Brunswick concurs with RG 1.97 on this variable and will provide flow measurement and indication of main service water flow in the conventional and nuclear service water headers.

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE (Cont'd)

4.4 Brunswick's Position on RG 1.97 Type D Variables (Cont'd)

4.4.19 Variable D23 - High Radioactivity Liquid Tank Level

Brunswick concurs with RG 1.97 on this variable.

4.4.20 Variable D24 - Emergency Ventilation Damper Position

Brunswick concurs with RG 1.97 on this variable. Brunswick interprets this variable to be dampers which could release radiation to the surrounding plant environment or expose control room personnel to radiation.

4.4.21 Variable D25 - Status of Standby Power & Other Energy Sources Important to Safety (Electric, Hydraulic, Pneumatic)

At Brunswick the standby AC power supply and distribution system for the two units consists of four diesel generators and four 4.16 kv Class IE buses. The 4 kv emergency buses are E1, E2, E3 and E4. The voltage is stepped down to the 480V emergency buses E5, E6, E7, and E8. The 480V emergency bus feeds the 120V AC emergency bus.

4.4 Brunswick's Position on RG 1.97 Type D Variables (Cont'd)

The DC standby power is supplied by batteries. The instrument air pressure is supplied by the standby air compressors.

Diesel generator terminal voltage, feeder breaker indication, and feeder breaker trip annunciation are provided in the control room and provide adequate information on bus voltage. Also, process computer points E039, E040 and E042 give E1, E2, E3, and E4 feeder bus voltage respectively.

Feeder breaker trip annunciation is available in the control room for both the 480V and the 120V AC emergency buses. Feeder breaker indication and feeder equipment malfunction annunciation are available for the 480V emergency bus.

Brunswick believes that its treatment of this variable is adequate in that it provides information which is consistent with the definition of the Type D variable.

4.4 Brunswick's Position on RG 1.97 Type D Variables (Cont'd)

4.4.22 Plant Designer Selected Variables

In accordance with RG 1.97's statement, "The plant designer should select variables and information display channels required by his design to enable the control room personnel to ascertain the operating status of each individual safety system and other systems important to safety to the extent necessary to determine if each system is operating or can be placed in operation...", Brunswick has selected four additional type D, category 3 variables to monitor. The basis for choosing these variables is the capability of using the main condenser as a heat sink for main steam from the reactor. This involves bypassing the main turbine provided the hotwell level is low enough to accommodate additional condensate, and that there is sufficient vacuum for operation. Verification of the number of condensate pumps running is also recommended. The four variables are:

D26 - Turbine Bypass Valve Position

D27 - Condenser Hotwell Level

D28 - Condenser Vacuum

D29 - Condensate Pump & Booster Pump Status

4.5 Brunswick's Position on RG 1.97 Type E Variables

The RG 1.97 definition for type E variables is: "those variables to be monitored as required for use in determining the magnitude of the release of radioactive materials and for continually assessing such releases." Key variables that are type E are defined as variables that most directly indicate the release of radioactive material. Each variable is discussed in the following paragraphs and Brunswick's position on the variable is given. Where a variable has already been discussed under another type, it is indicated.

4.5.1 Variable E1 - Primary Containment Area Radiation - High Range

Brunswick concurs with the RG 1.97 recommendation on this variable and the requirements of NUREG 0737 (Table II.F.1-3). Brunswick is currently installing equipment to measure this variable. Refer to TMI plant modifications 80-030 and 80-031.

4.5.2 Variable E2 - Reactor Building or Secondary Containment Area Radiation

See Variable C14, paragraph 4.3.14.

4.5 Brunswick's Position on RG 1.97 Type E Variables (Cont'd)

4.5.3 Variable E3 - Radiation Exposure Rate

The stated purpose of this variable is to monitor buildings or areas where access is required to service safety equipment. The Brunswick plant is not designed for servicing equipment in the reactor building during or after an accident. Redundancy of system design mitigates the requirement for servicing a safety system after an accident.

4.5.3 Variables E4 - Noble Gases and Vent Flow Rate
E5 - Particulates and Halogens

In the Brunswick design there are five identifiable release points: the stack, two turbine building vents, and two reactor building vents. The instrumentation on the reactor building vents is not required because the reactor building isolates upon the receipt of a high radiation signal to the monitoring instrumentation. CP&L has NRC approved for this position provided in a letter from the NRC dated May 5, 1982, concerning NUREG-0737 Action Items II.F.1.1 (Noble Gas Monitor) and II.F.1.2 (Iodine/Particulate Sampling).

4.5 Brunswick's Position on RG 1.97 Type E Variables

4.5.4 (Continued)

Under variable E4 in RG 1.97, there are six sub-headings. For convenience and clarity of discussion, the six are listed below and their applicability to Brunswick summarized:

RG 1.97	Brunswick
1. Drywell Purge, SGTS	Stack
2. Secondary Containment Purge	Reactor Building
3. Secondary Containment (RX Shield Bldg. Annulus)	N/A
4. Auxiliary Building	N/A
5. Common Plant Vent	Stack
6. All other Release Points	Turbine Vents

Instrumentation for the stack and turbine building vents will be provided through TMI plant modifications 80-034, 35 and 36. These plant modifications meet the requirements of NUREG-0737 and applicable standards and regulatory guides including RG 1.97.

4.0 PLANT-SPECIFIC POSITION ON EACH VARIABLE (Cont'd)

4.5 Brunswick's Position on RG 1.97 Type E Variables (Cont'd)

4.5.5 Variable E6 - Radiation Exposure Meters

On hold due to lack of requirements from NRC. Refer to NRC ERRATA dated July 1981.

4.5.6 Variable E7 - Airborne Radiohalogens and Particulates Portable Sampling with On-Site Analysis Capability)

Brunswick concurs with RG 1.97.

4.5.7 Variable E8 - Plant & Environs Radiation (Portable Instrumentation)

Brunswick concurs with RG 1.97.

4.5.8 Variable E9 - Plant & Environs Radioactivity (Portable Instrumentation)

Brunswick concurs with RG 1.97.

4.5.9 Variables E10 - Wind Direction

E11 - Wind Speed

E12 - Estimation of Atmosphere Stability

Brunswick will install new equipment which will meet the recommendations of RG 1.97.

4.5 Brunswick's Position on RG 1.97 Type E Variables

4.5.10 Variable E13 - Primary Coolant & Sump

Accident Sampling of primary coolant will be done at two points in the jet pump pressure instrument system and from a single sample line connected to both loops in the RHR system. Refer to Plant Modification 80-28 and 80-29.

Sampling of the containment sumps is not necessary at the Brunswick plant because accident conditions will close isolation valves G16-F003, F004, F019 and F020, which prevents release of radioactive materials from primary containment.

4.5.11 Variable E14 - Containment Air

Containment air sampling will be taken from the drywell and suppression pool atmosphere. Refer to Plant Modification 80-028 and 80-029.

5.0 ABBREVIATIONS

ADS	-	Automatic Depressurization System
BWR	-	Boiling Water Reactor
BWROG	-	Boiling Water Reactor Owners Group
CAD	-	Containment Atmospheric Dilution
CS	-	Core Spray
ECCS	-	Emergency Core Cooling System
ESF	-	Engineered Safety Features
FSAR	-	Final Safety Analysis Report
HPCI	-	High Pressure Coolant Injection
LPCI	-	Low Pressure Coolant Injection
NA	-	Not Applicable
QA	-	Quality Assurance
RCS	-	Reactivity Control System
RCIC	-	Reactor Core Isolation Cooling
RG	-	Regulatory Guide
RHR	-	Residual Heat Removal
RPV	-	Reactor Pressure Vessel
RWCU	-	Reactor Water Clean Up
RX	-	Reactor
R/hr	-	Rems per hour
SGTS	-	Standby Gas Treatment System
SLCS	-	Standby Liquid Control System
SRV	-	Safety Relief Valve
TMI	-	Three Mile Island

6.0 REFERENCES

1. ANS 4.5
2. Brunswick FSAR
3. Brunswick System Descriptions
4. BWROG Emergency Procedure Guidelines, Rev. 3 (Prepublication draft)
5. BWROG Position Paper on RG 1.97, Rev. 2
6. IE Bulletin 79-01B
7. NUREG-0578
8. NUREG-0737 and Supplement 1
9. Plant Modifications:

   77-268, Pressure Switch Analog Replacement U1

   77-269, Pressure Switch Analog Replacement U2

   77-303, CST & MVD Level Indicator Addition & Range Change

   80-137, TSC Computer Input Points U1

   80-138, TSC Computer Input Points U2

   80-180, Nuclear Boiler Instrumentation U1

   80-181, Nuclear Boiler Instrumentation U2

   81-251, Suppression Pool Instrumentation U1

   81-252, Suppression Pool Instrumentation U2

   82-049, Drywell RTD Replacement
10. RG 1.97, Rev. 2, Rev. 3
11. TMI Action Item Plant Modifications:

    80-025, Drywell Pressure Instrumentation U1

    80-026, Drywell Pressure Instrumentation U2

    80-028, Improved Post Accident Sampling U1

6.0 REFERENCES (Cont'd)

11. (Continued)

80-029, Improved Post Accident Sampling U2

80-030, Containment Rad Monitoring U1

80-031, Containment Rad Monitoring U2

80-032, Containment Hydrogen Monitoring U1

80-033, Containment Hydrogen Monitoring U2

80-034, TB Vent High Range Rad Monitor U1

80-035, TB Vent High Range Rad Monitor U2

80-036, Stack Radiation Monitors

80-078, Wide Range Torus Level U1

80-079, Wide Range Torus Level U2

12. 10CFR50 Appendix A and General Design Criteria 13, 19, and 64

13. IE Supplement No. 2 to Bulletin No. 79-01B

14. NEDC-22253, BWR Owners' Group Evaluation of Containment Isolation Concerns

CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT

BRUNSWICK RESPONSE TO NUREG 737 SUPPLEMENT 1 - REGULATORY GUIDE 1.97 - APPLICATION TO EMERGENCY RESPONSE FACILITIES

DATE: 8/9/83

SUBMITTED BY: W E Brown Mark Warenko.

RECOMMENDED BY: B Eckman

APPROVED BY: J H Holloway

REV. NO.	SUBMITTED BY	RECOMMENDED BY	APPROVED BY	DATE
1	Mark Warenko	B Eckman	J H Holloway	10/24/83

TABLE OF CONTENTS

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GENERAL NOTES

Use of Table

Each variable contains the eight items, lettered (a) through (h), requested in Supplement 1 to NUREG-0737 on page 14. To the right of each item are two columns. The first column gives Regulatory Guide 1.97 recommendations and the other indicates what is currently provided at Brunswick.

Item (h) describes what action, if any, is to be taken toward the variable.

The designation of 1E appearing under item (e) states that the power supply is fed from standby power.

This report is applicable to Unit 1 and Unit 2. Where differences exist, they are so noted.

Specific Notes (References by specific Variable)

NOTE 1: All essential transmitters are being qualified by 79-01B. Indicators and recorders located in the Control Room shall not be environmentally qualified by testing. Justification for this approach is given in the Brunswick position on RG 1.97, paragraph 1.3.1.a.

NOTE 2: See Brunswick position on RG 1.97, paragraph 1.3.1.e.

LIST OF EFFECTIVE PAGES

Brunswick Response to NUREG 737 Supplement 1 - Regulatory Guide 1.97 - Application to Emergency Response Facilities

Page(s)	Revision
i-iv	1
1-73	1

VARIABLE A1 - RPV PRESSURE

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	0-1500 psig	0-1200 psig
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	Yes	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	1E	1E
(f)	Redundance and Sensor Location	Yes	Yes

Sensor	Tag No.	Range	Location
Transmitter	C32-PT-N005A	0-1200 psig	H21-P004 - Reactor Building
Transmitter	C32-PT-N005B	0-1200 psig	H21-P005 - Reactor Building

(g) Location of Display

Display	Tag No.	Range	Location
Indicator	C32-P1-R605	0-1200 psig	H12-P603 - Control Room
Indicator	C32-PR-R608	0-1200 psig	H12-P603 - Control Room

(h) Schedule - System will be modified to provide the required range. Work for Unit 1 will be scheduled for completion during refueling outage #5 and work for Unit 2 will be scheduled for completion during refueling #6.

VARIABLE A2 - RPV WATER LEVEL

	Recommended By RG1.97	Provided by Brunswick
(a) Instrument Range	-180 to + 295"	-100 to +550"
(b) Environmental Qualification	Yes	Note 1
(c) Seismic Qualification	Yes	Note 1
(d) Quality Assurance	Yes	Note 2
(e) Power Supply	1E	1E
(f) Redundance and Sensor Location	Yes	Partial Redundancy

Sensor	Tag. No.	Range	Location
Transmitter	B21-LT-N036	-100 to + 200"	H21-P009 - Reactor Building
Transmitter	B21-LT-N037	-100 to + 200"	H21-P010 - Reactor Building
Transmitter	B21-LT-N026A	0 to 210"	H21-P004A - Reactor Building
Transmitter	B21-LT-N026B	0 to 210"	H21-P005B - Reactor Building
Transmitter	B21-LT-N027	+150 to + 550"	H21-P004B - Reactor Building

(g) Location of Display

Display	Tag No.	Range	Location
Indicator	B21-LI-R610	-100 to + 200"	H12-P601 - Control Room
Recorder	B21-LR-R615	-100 to + 200"	H12-P601 - Control Room
Indicator	B21-LI-R604A	0 to 210"	H12-P603 - Control Room
Indicator	B21-LI-R604B	0 to 210"	H12-P603 - Control Room
Indicator	B21-LI-R605	+150 to + 550"	H12-P603 - Control Room
*Indicator	C32-LI-R606A	+150 to + 210"	H12-P603 - Control Room
*Indicator	C32-LI-R606B	+150 to + 210"	H12-P603 - Control Room
*Indicator	C32-LI-R606C	+150 to + 210"	H12-P603 - Control Room

*Will not be used for post accident monitoring.

(h) Schedule - Transmitters B21-LT-N036, N037 will be respanned to satisfy the low range requirement. A transmitter and indicator will be added to satisfy redundancy for the high level range.

A redundant power supply will be added for B21-LT-N026B. Work for Unit 1 will be scheduled for completion during refueling outage #5 and work for Unit 2 will be scheduled for completion during refueling outage #6. Transmitter B21-LT-N027 will be replaced to comply with environmental qualification on a schedule consistent with IE Bulletin 79-01B and 10CFR50.49.

VARIABLE A3 - SUPPRESSION POOL WATER TEMPERATURE

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	30-230°F	0-400°F
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	Yes	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	1E	1E
(f)	Redundance and Sensor Location	Yes	Partial - Div. I and Div. II sensors, but only one recorder.

Sensor	Tag No.	Range	Location
RTD	CAC-TE-1258-14	0-400°F	Suppression Pool
RTD	CAC-TE-1258-21	0-400°F	Suppression Pool

(g) Location of Display

Display	Tag No.	Range	Location
Recorder	CAC-TR-1258	0-400°F	XU-3 - Control Room

(h) Schedule - Plant Modifications 81-251 and 81-252 will upgrade the existing temperature monitoring system to meet NUREG 0661 requirements and RG 1.97 recommendations. Unit 1 work will be scheduled for completion during refueling outage #4 and Unit 2 work will be scheduled for completion during refueling outage #5.

VARIABLE A4 - SUPPRESSION POOL WATER LEVEL

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	-10' to +6'	-10' to +6'
(b)	Environmental Qualification	Yes	Yes
(c)	Seismic Qualification	Yes	Yes
(d)	Quality Assurance	Yes	Yes
(e)	Power Supply	1E	1E
(f)	Redundance & Sensor Location	Yes	Yes

Sensor	Tag Number	Range	Location
Transmitter	CAC-LT-2601	-10' to +6'	Reactor Building
Transmitter	CAC-LT-2602	-10' to +6'	Reactor Building
Transmitter	CAC-LT-3342	-10' to +6'	Reactor Building
Transmitter	CAC-LT-4177	-42" to -18"	Reactor Building

(g) Location of Display

Display	Tag Number	Range	Location
Indicator	CAC-LI-2601	-10' to +6'	XU-51, Control Room
Recorder	CAC-LR-2602	-10' to +6'	XU-51, Control Room
Indicator	CAC-LI-3342	-10' to +6'	IR-RB-4
Indicator	CAC-LI-4177	-42" to -18"	XU-51, Control Room

(h) Schedule: No changes are anticipated to this instrumentation.

VARIABLE A5 - DRYWELL PRESSURE

		Recommended RG 1.97	Provided by Brunswick
(a)	Instrument Range	-5 to +245 psig	-5 to +245 psig
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	Yes	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	1E	1E
(f)	Redundance & Sensor Location	Yes	Yes

Sensor	Tag Number	Range	Location
Transmitter	CAC-PT-4175	-5 to +245 psig	Reactor Building
Transmitter	CAC-PT-4176	-5 to +245 psig	Reactor Building

(g) Location of Display

Display	Tag Number	Range	Location
Recorder	CAC-PR-1257-1	-5 to +245 psig	XU-2 - Control Room
Indicator	CAC-PI-4176	-5 to +245 psig	XU-51 - Control Room

(h) Schedule - No changes to existing instrumentation are anticipated.

VARIABLE A6 - DRYWELL TEMPERATURE

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	40° to 440°F	0° to 400°F
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	Yes	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	1E	1E
(f)	Redundance & Sensor Location	Yes	Partial - Div. I and Div. II Sensors, but only one Recorder

Sensor	Tag Number	Range	Location
Temperature Element	CAC-TE-1258-1,2,3,4,5,6, 7,8,9,10,11,12,13,22,23,24	0 to 400°F	Drywell

(g) Location of Display

Display	Tag Number	Range	Location
Recorder	CAC-TR-1258	0° to 400°F	XU-3 Control Room

(h) Schedule - The existing system will be modified to provide redundant recording* and range.

Unit 1 work will be scheduled for completion during refueling outage #5 and Unit 2 work will be scheduled for completion during refueling outage #6.

*Redundancy is provided for this variable in that there are at least two sensors at each elevation zone in the drywell. These sensors are not necessarily at the same azimuth.

VARIABLE A7 - SUPPRESSION POOL PRESSURE

		Required by RG 1.97	Provided by Brunswick
(a)	Instrument Range	-5 to 186 psig	0-75 psig
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	Yes	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	1E	1E
(f)	Redundance and Sensor Location	Yes	No

Sensor	Tag Number	Range	Location
Transmitter	CAC-PT-1257-2	0-75 psig	Reactor Building

(g) Location of Display

Display	Tag Number	Range	Location
Indicator	CAC-PI-1257-3	0-75 psig	XU-51 - Control Room

(h) Schedule

A redundant transmitter and indicator will be installed. The range will be changed to -5 to +245 psig. Unit 1 work will be scheduled for completion during refueling outage #5 and work for Unit 2 will be scheduled for completion during refueling outage #6.

VARIABLE A8 - DRYWELL AND SUPPRESSION POOL HYDROGEN & OXYGEN CONCENTRATION

	Recommended by RG 1.97	Provided by Brunswick
(a) Instrument Range		
Hydrogen	0-30%	0-5%, 0-25%) Does not meet 12 psia
Oxygen	0-10%	0-10%, 0-20%) to design pressure recommendation of RG 1.97
(b) Environmental Qualification	Yes	Note 1
(c) Seismic Qualification	Yes	Note 1
(d) Quality Assurance	Yes	Note 2
(e) Power Supply	1E	1E
(f) Redundance and Sensor Location	Yes	Yes

Sensor	Tag Number	Range	Location
Monitor	CAC-AT-1259	See above	Reactor Building
Monitor	CAC-AT-1263	See above	Reactor Building

(g) Location of Display

Display	Tag Number	Range	Location
Recorder	CAC-AR-1259	See above	XU-51 - Control Room
Recorder	CAC-AR-1263	See above	XU-51 - Control Room

(h) Schedule - The current system will be upgraded to improve reliability. The range and design pressure recommendations of RG 1.97 will be met. Unit 1 is being installed on the current outage. Unit 2 will be upgraded on the next scheduled outage of sufficient duration to accomplish the remaining work.

VARIABLE B1 - NEUTRON FLUX

		Recommended By RG 1.97	Provided by Brunswick
(a)	Instrument Range	10^{-6}% to 100% Full Power	10^{-6} % > Range > 100% Full Power
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	Yes	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Redundance & Sensor Location	Yes	Yes - Sensors are located in reactor core
(f)	Power Supply	1E	1E

(g) Location of Display

Display	Tag No.	Range	Location
Indicator	C51-NI-R600A	10^{-1} to 10^{6} counts/sec	H12-P603 Control Room
Indicator	C51-NI-R600B	10^{-1} to 10^{6} counts/sec	" " "
Indicator	C51-NI-R600C	10^{-1} to 10^{6} counts/sec	" " "
Indicator	C51-NI-R600A	10^{-1} to 10^{6} counts/sec	" " "
Indicator	C51-NI-R601A	-100 to ∞ to +10 period in sec	" " "
Indicator	C51-NI-R601B	" " " "	" " "
Indicator	C51-NI-R601C	" " " "	" " "
Recorder	C51-NI-R602	0-40%, 0-125% Full Power	" " "
Recorder	C51-NI-R603A	" " " "	" " "
Recorder	C51-NI-R603B	" " " "	" " "
Recorder	C51-NI-R603C	" " " "	" " "
Recorder	C51-NI-R603D	" " " "	" " "
Indicator	C51-NI-R604(X)*	0-125% Full Power	" " "

*There are 16 LPRM's

(h) Schedule - There are no anticipated changes to this system.

VARIABLE B2 - CONTROL ROD POSITION

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	Full In Full Out	Full in - Full out
(b)	Environmental Qualification	No	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	High Quality Commercial Grade	Note 2
(e)	Power Supply	Non-1E	High Reliability
(f)	Redundance and Sensor Location	No	No

Sensor	Tag Number	Range	Location
Position Switch	C12-Z5-XX-XX*	Full in-Full out	Control Rod

(g) Location of Display

Display	Tag Number	Range	Location
Indicator	C12-Z5	Full-In-Full-Out	H12-P603 Control Room

(h) Schedule: There are no anticipated changes to the RPIS (Rod Position Indication System).

*NOTE: There are 137 Control Rod Drive Position Indicator Probes.

VARIABLE B3 - RCS SOLUBLE BORON CONCENTRATION (Sample)

		Recommended By RG 1.97	Provided by Brunswick
(a)	Instrument Range	0-1000 ppm	Range exceeds RG 1.97 Recommendation
(b)	Environmental Qualification	No specific position	Sampling System will be qualified. Analysis equipment is high quality commercial.
(c)	Seismic Qualification	No specific position	Sampling system will be seismically qualified. Analysis equipment has not been qualified.
(d)	Quality Assurance	High Quality Commercial Grade	Sampling System has full QA Program commitment. Analysis equipment is high quality commercial grade.
(e)	Power Supply	Non-1E	1E
(f)	Redundance & Sensor Location	No	Redundant Sample Points Only

RCS Samples are taken from the RHR Heat Exchanger A and B shell sides and from the No. 6 and No. 14 jet pumps.

(g) Location of Display

The sample will be analyzed on site in the chemistry lab located in the service building. Back up analysis will be performed by Babcock and Wilcox. Boron concentration is logged by the laboratory technician and phoned in to the control room operator where it is logged by him.

(h) Schedule

TMI modifications 80-028 and 80-029 have provided this Post Accident Sampling System.

VARIABLE B4 - COOLANT LEVEL IN REACTOR - RG 1.97 recommendations will be met by Variable A2.

VARIABLE B5 - BWR CORE TEMPERATURE - Not required at this time per NUREG-0737 supplement 1.

VARIABLE B6 - RCS PRESSURE - RG 1.97 recommendations will be met by Variable A1.

VARIABLE B7 - DRYWELL PRESSURE - RG 1.97 recommendations will be met by Variable A5.

VARIABLE B8 - DRYWELL SUMP LEVEL - Not provided. The Brunswick plant design does not require continuous measurement of drywell sump level. A LOCA signal will prevent operation of the sump pumps and will close containment isolation valves to eliminate the possibility of radioactive materials leaking outside the Primary Containment. During and after a LOCA, the drywell sumps overflow to the suppression pool.

VARIABLE B9 - PRIMARY CONTAINMENT PRESSURE - RG 1.97 recommendations will be met by Variables A5 and A7.

VARIABLE B10 - PRIMARY CONTAINMENT ISOLATION VALVE POSITION

		Recommended By RG 1.97	Provided By Brunswick
(a)	Instrument Range	Closed - Not Closed	Green indicating light - closed Red indicating light - open
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	Yes	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	1E	1E
(f)	Redundance & Sensor Location	No	No All sensors are located on the primary containment isolation valves.
(g)	Location of Display		All the valves at the Brunswick plant involved in primary containment isolation that are air/solenoid or motor operated are listed below by penetration number. All the panels listed are located in the main control room.

Penetration No.	Valve Tag No.	Location of Display
3B	CAC-V49#	XU-51
3B	CAC-V50#	XU-51
7A	B21-F022A	H12-P601
7B	B21-F022B	" "
7C	B21-F022C	" "
7D	B21-F022D	" "
7A	B21-F028A	" "
7B	B21-F028B	" "
7C	B21-F028C	" "
7D	B21-F028D	" "
8	B21-F016	" "
8	B21-F019	" "
9A	B21-F032A	H12-P603
9A	E41-F006	H12-P601
9B	B21-F032B	H12-P603
9B	E51-F013	H12-P601
9B	G31-F042	H12-P603

VARIABLE B10 - PRIMARY CONTAINMENT ISOLATION VALVE POSITION (Cont'd)

Penetration No.	Valve Tag No.	Location
10	E51-F007	H12-P601
10	E51-F008	" "
11	E41-F002	" "
11	E41-F003	" "
12	E11-F009	" "
12	E11-F008	" "
13A	E11-F015A	" "
13A	E11-F017A	" "
13B	E11-F015B	" "
13B	E11-F017B	" "
14	G31-F001	" "
14	G31-F004	" "
16A	E21-F005A	" "
16B	E21-F004A	" "
16B	E21-F005B	" "
16B	E21-F004B	" "
17	E11-F022	" "
17	E11-F023	" "
18	G16-F003	" "
18	G16-F004	" "
19	G16-F019	" "
19	G16-F020	" "
23	RCC-V-52	XU-3
24	RCC-V-28	"
25	CAC-V6	XU-51
25	CAC-V15	"
25	CAC-V55#	"
25	CAC-V56#	"
25	CAC-V48#	"
25	CAC-V4	"
26	CAC-V9	"
26	CAC-V10	"
26	CAC-V23	XU-56
35A	TIP-V1	H12-P601
35B	TIP-V2	"
35C	TIP-V3	"
35D	TIP-V4	"
39A	E11-F016A	"

VARIABLE B10 - PRIMARY CONTAINMENT ISOLATION VALVE POSITION (Cont'd)

Penetration No.	Valve Tag No.	Location
39A	E11-F021A	H12-P601
39B	E11-F016B	" "
39B	E11-F021B	" "
49B	CAC-PV-1200B	XU-2
49B	CAC-PV-1261	"
51A	E11-F043C	"
51B	E11-F043A	"
51C	E11-F037C	"
51D	E11-F037A	"
51E (Spared)	B21-PV-1212E	"
53A	B21-F049C	"
53B	B21-F047C	"
53C	B21-F046A	"
53D	B21-F008	"
53E	B21-F040	"
53F	B21-F048A	"
54A	B21-F014B	"
54B	B21-F014A	"
54C	B21-F014E	"
54D	B21-F014F	"
54E	CAC-PV-3439	"
54E	CAC-PV-1211E	"
54E	CAC-PV-3438	"
54E	CAC-PV-3437	"
54F	CAC-PV-1262	"
54F	CAC-PV-1211F	"
55	RNA-V101	XU-51
56A	B21-F014K	XU-2
56B	B21-F014J	"
56C	B21-F014N	"
56D	B21-F014P	"
56E (Spared)	B32-F019	H12-P603
56E	B32-F020	" "
56F (Spared)	B21-PV-1210F	XU-2
57A	CAC-PV-1209A	"
57A	CAC-SV-1263-4*	"
57B	CAC-PV-1209B	"
57B	CAC-SV-1263-3*	"

VARIABLE B10 - PRIMARY CONTAINMENT ISOLATION VALVE POSITION (Cont'd)

Penetration No.	Valve Tag No.	Location
57C (Spared)	B21-PV-1209C	XU-2
57D	CAC-PV-1209D	"
57E (Spared)	B21-PV-1209E	"
57F (Spared)	B21-PV-1209F	"
58A	B21-F058N	"
58B	B21-F052C	"
58C	B21-F058R	"
58E	B21-F058T	"
58F	B21-F050C	"
59A	B21-F050A	"
59B	B21-F058C	"
59C	B21-F058G	"
1-59D, 2-58D	B21-F058A	"
1-58D, 2-59D	B21-F058L	"
59E	B21-F058E	"
59F	B21-F052A	"
60A (Spared)	B32-F056F	"
60B (Spared)	B32-F056C	"
60C	E41-F023A	"
60D	E41-F023C	"
60E	CAC-PV-1205E	"
60E	CAC-SV-1263-2 ★	"
60F (Spared)	B21-PV-1205F	"
61A	B21-F056	"
61B	B21-F054	"
61C (Spared)	B32-F056H	"
61D (Spared)	B32-F056A	"
61E	E51-F043C	"
61F	E51-F043A	"
62A	B32-V22	"
62B	IA-PV-1204B	"
62C	IA-PV-1204C	"
1-68A, 2-68C	E11-F037D	"
1-68C, 2-68A	E11-F043D	"
68B	E11-F043B	"
68D	E11-F037B	"
68E (Spared)	B21-PV-1229E	"
68F (Spared)	B21-PV-1229F	"
69A	B21-F042B	"

VARIABLE B10 - PRIMARY CONTAINMENT ISOLATION VALVE POSITION (Cont'd)

Penetration No.	Valve Tag No.	Location
69B	B21-F044B	XU-2
69C	B21-F046B	"
69D	B21-F048B	"
69E	IA-PV-1217E	"
1-69F, 2-Spared	B21-F049D	"
70A	E41-F023D	"
70B	E41-F023B	"
70C	B32-F056G	"
70D	B32-F056B	"
70E (Spared)	B21-PV-1228E	"
70F (Spared)	B21-PV-1228F	"
71	RNA-V103	XU-51
72A	B32-F056E	XU-2
72B	B21-F060	"
72C (Spared)	B21-PV-1226C	"
72D	B32-F056D	"
72E	E51-F043D	"
72F	E51-F043B	"
73A	CAC-PV-1227A	"
73A	CAC-SV-1259-4 *	"
73B	CAC-PV-1227B	"
73B	CAC-SV-1259-3*	"
73C	CAC-PV-1227C	"
1-73C, 2-73E	CAC-SV-1259-2 *	"
1-73E, 2-73C	CAC-PV-1260	"
73D	E21-F017B	"
73E	CAC-PV-1227E	"
73F	B21-PV-1227F	"
74A	B21-F058P	"
74B	B21-F058S	"
74C	B21-F052D	"
74D	B21-F050D	"
74E	B21-F058M	"
74F	B21-F058U	"
1-75A, 2-75D	B21-F050B	"
75B	B21-F058H	"
75C	B21-F058D	"
1-75D, 2-75A	B21-F052B	"

VARIABLE B10 - PRIMARY CONTAINMENT ISOLATION VALVE POSITION (Cont'd)

Penetration No.	Valve Tag No.	Location
75E	B21-F058B	XU-2
75F	B21-F058F	"
76A	B21-F014L	"
76B	CAC-PV-L225B	"
76B	CAC-PV-3440	"
76B	CAC-PV-3441	"
76B	CAC-PV-3442	"
76C	CAC-PV-1225C	"
76D	B21-F014S	"
76E	B21-F014R	"
76F	B21-F014M	"
77A	B21-F014C	"
77B	RCC-PV-1222B	XU-3
77C	RCC-PV-1222C	"
77D	B21-F014H	XU-2
77E	B21-F014G	"
77F	B21-F014D	"
78A	B32-V30 *	H12-P603
82A (Spared)	IA-PV-1201A	XU-2
82B	B21-F042A	"
82C	E21-F017A	"
82D	B21-F044A	"
205	CAC-V5	XU-51
205	CAC-V47 #	"
205	CAC-V16	"
205	CAC-V17	"
206A/A	CAC-SV-1218A	XU-2
206A/C	CAC-PV-1218C	"
206A/D	E41-PV-1218D	"
206B/B	CAC-PV-1219B	"
206B/C	CAC-PV-1219C	"
206B/D	E41-PV-1219D	"
206C/C	CAC-PV-1220C	"
206C/D	E41-PV-1220D	"
206D/C	CAC-PV-1221C	"
206D/D	E41-FV-1221D	"
209B/A	CAC-SV-1213A	"
2-209B/B	RXS-SV-4188	XU-75

VARIABLE B10 - PRIMARY CONTAINMENT ISOLATION VALVE POSITION (Cont'd)

Penetration No.	Valve Tag No.	Location
2-209B/L	RXS-SV-4189	XU-79
2-209B/D	RXS-SV-4186	XU-75
2-209B/D	RXS-SV-4187	XU-79
210A	E11-F024A	H12-P601
210A	E11-F007A	" "
210A	E11-FC11A	" "
210B	E11-F024B	" "
210B	E41-F012	" "
210B	E51-F019	" "
210B	E11-F007B	" "
210B	E11-F011B	" "
211A	E11-F027A	" "
211A	E11-F028A	" "
211B	E11-F027B	" "
211B	E11-F028B	" "
214	E11-F103B	" "
214	E11-F103A	" "
216	E51-F066	" "
216	E51-F062	" "
218	E41-F079	" "
218	E41-F075	" "
220	CAC-V7	XU-2
220	CAC-V8	XU-2
220	CAC-V22	XU-2
223A	E21-F015A	H12-P601
223A	E21-F031A	" "
223B	E21-F031B	" "
223B	E21-F015B	" "
224	E51-F031	" "
225A	E11-F020A	" "
225B	E11-F020B	" "
226	E41-F042	" "
227A	E21-F001B	" "
227B	E21-F001B	" "
1-231	TD-V4	XU-3
2-231	TD-V22	"
241	B32-F039B	XU-2
241B	B32-F058B	"
241C	B32-F006B	"
241D	B32-F005B	"

VARIABLE B10 - PRIMARY CONTAINMENT ISOLATION VALVE POSITION (Cont'd)

Penetration No.	Valve Tag No.	Location of Display
241F	B32-F039D	XU-2
1-243A, 2-243D	B32-F042B	"
1-243D, 2-243A	B32-F041B	"
1-243E, 2-243F	B32-F041A	"
1-243F, 2-243E	B32-F042A	"
244A	B32-F041C	"
244B	CAC-PV-1231B	"
244B	CAC-SV-1259-1*	"
244D	B32-F042C	"
244E	B32-F042D	"
244F	B32-F041D	"
245A	B32-F039C	"
245B	B32-F058A	"
245C	B32-F006A	"
245D	B32-F005A	"
245F	CAC-PV-1215E	"
245F	CAC-SV-1263-1*	"
245F	B32-F039A	"

NOTES: PM 82-287, 288 involve replacement of some reactor instrument penetration (RIP) valves. All RIP valves are included in the above list.
Limit switch, flow switch, and position switch qualification for primary containment isolation valves is being done by the 79-01B task force.
*Indicates the valve has been deleted on U1 by PM 80-032 and will be deleted on U2 by PM 80-033 during the next outage of sufficient duration to accomplish the work.
#PM's 80-133, 134 are replacing the air operators and/or the solenoid valves on these valves with qualified solenoid valves.

h) Schedule: PM 82-287 (U1) is to be scheduled to be completed during refueling outage #5 and PM 82-288 (U2) by March 1985. PM 80-133 (U1) is scheduled to be completed during refueling outage #4 and PM 80-134 will be scheduled for completion on the next outage of sufficient duration to accomplish the work.

VARIABLE C1 - RADIOACTIVITY CONCENTRATION OR RADIATION LEVEL IN CIRCULATING PRIMARY COOLANT

	Recommended by RG 1.97	Provided by Brunswick
(a) Instrument Range	1/2 Tech Spec. Limit to 100 Times Tech Spec. Limit	Brunswick meet required Range
(b) Environmental Qualification	Yes	Yes (Sampling System)
(c) Seismic Qualification	Yes	Yes (Sampling System)
(d) Quality Assurance	Yes	Yes (Sampling System)
(e) Power Supply	1E	1E (Sampling System)
(f) Redundance & Sensor Location	Yes	Yes

Primary coolant samples are taken from the Reactor Water Cleanup System during normal operation and analyzed at the counting room by an ND 6620 system. During accident situations, Primary Coolant samples are taken by the Post Accident Sampling System located outside the Reactor Building. The sample is analyzed by the ND 6620 system in the counting room. A portable ND 66 is available to do analysis and a mobile station equipped with an ND 6620 is available. The Technical Support Center will also have an ND-66 linked to the ND 6620 in the counting room. Radiation level is logged and the results are phoned in to the Control Room and logged by the Operator.

(g) Location of Display - Counting Room, Mobile Station

(h) Schedule - TMI Plant Modifications 80-028 and 80-029 have provided the POST ACCIDENT SAMPLING SYSTEM for Unit 1 and 2 respectively.

VARIABLE C2 - ANALYSIS OF PRIMARY COOLANT (GAMMA SPECTRUM)

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	10^{-5} Ci/gm to 10 Ci/gm or TID-14844 Source Term in Coolant Volume	Brunswick meets required range
(b)	Environmental Qualification	No	Yes (Sampling System)
(c)	Seismic Qualification	No	Yes (Sampling System)
(d)	Quality Assurance	High Quality Commercial Grade	Yes (Sampling System)
(e)	Power Supply	Non-1E	1E (Sampling System)
(f)	Redundance & Sensor Location	No	Yes

Primary coolant samples are taken from the Reactor Water Cleanup System during normal operation and analyzed at the Counting Room by an ND 6620 system. During accident situations Primary Coolant samples are taken by the Post Accident Sampling System located outside the Reactor Building. The sample is analyzed by the ND 6620 system in the Counting Room. A portable ND 66 is available to do analysis and a mobile station equipped with an ND 6620 is available. The Technical Support Center will also have an ND-66 linked to the ND 6620 in the counting room. Radiation level is logged and the results are phoned in to the Control Room and logged by the Operator.

(g) Location of Display - Counting Room, Mobile Station

(h) Schedule - TMI Plant Modifications 80-028 and 80-029 have provided the Post Accident Sampling System for Unit 1 and 2, respectively.

Variable C3 - BWR Core Temperature - Not required at this time per NUREG 0737 Supplement 1.

Variable C4 - RCS Pressure - RG 1.97 recommendations will be met by Variable A1.

Variable C5 - Primary Containment Area Radiation - RG 1.97 recommendations will be met by Variable E1. See discussion for Variable E1.

Variable C6 - Drywell Drain Sumps Level - Not required. See discussion for Variable B8.

Variable C7 - Suppression Pool Water Level - RG 1.97 recommendations will be met by Variable A4.

Variable C8 - Drywell Pressure - RG 1.97 recommendations will be met by Variable A5.

Variable C9 - RCS Pressure RG 1.97 recommendations will be met by Variable A1.

Variable C10 - Primary Containment Pressure - RG 1.97 recommendations will be met by Variables A5 & A7.

Variable C11 - Containment and Drywell Hydrogen Concentration - RG 1.97 recommendations will be met by Variable A8.

Variable C12 - Containment and Drywell Oxygen Concentration - RG 1.97 recommendations will be met by Variable A8.

Variable C13 - Containment Effluent Readioactivity-Noble Gases - RG 1.97 recommendations will be met by Variables E4 and E5.

Variable C14 - Radiation Exposure Rate - Not required at this time per NUREG 0737 Supplement 1.

Variable C15 - Effluent Radioactivity - RG 1.97 recommendations will be met by Variables E4 and E5.

VARIABLE D1 - MAIN FEEDWATER FLOW

		Recommended by RG 1.97	Provided by Brunswick
a)	Instrument Range	0-110% design	0-109.8% (0-12,000,000 #/Hr.
b)	Environmental Qualification	No	Yes
c)	Seismic Qualification	No	Note 1
d)	Quality Assurance	No	Note 2
e)	Power Supply	Non-1E	High Reliability
f)	Redundance & Sensor Location	No	No

Sensor	Tag Number	Range	Location
Flow Element	C32-FE-N001A	0 to 6 x 10^6 #/hr	Main FW line 9-18-B-1
Flow Element	C32-FE-N001B	0 to 6 x 10^6 #/hr	Main FW line 8-18-B-1
Flow Transmitter	C32-FT-N002A	0 to 6 x 10^6 #/hr	IR-TB-8
Flow Transmitter	C32-FT-N002-B	0 to 6 x 10^6 #/hr	IR-TB-8

(g) Location of Display

Display	Tag Number	Range	Location
Indicator	C32-FI-R604A	0 to 6 x 10^6 #/hr	H12-P603 Control Room
Indicator	C32-FI-R604B	0 to 6 x 10^6 #/hr	H12-P603 Control Room
Recorder	C32-FR-R607	0 to 12 x 10^6 #/hr	H12-P603 Control Room

(h) Schedule - No changes to the instrumentation are required.

VARIABLE D2 - CONDENSATE STORAGE TANK LEVEL

	Recommended by RG 1.97	Provided by Brunswick
(a) Instrument Range	Top to Bottom	0-100%
(b) Environmental Qualification	No	Note 1
(c) Seismic Qualification	No	Note 1
(d) Quality Assurance	No	Note 2
(e) Power Supply	Non-1E	High Reliability
(f) Redundance & Sensor Location	No	No

Sensor	Tag Number	Range	Location
Level Transmitter	CO-LT-3473	0-100%	Local

(g) Location of Display

Display	Tag Number	Range	Location
Indicator	CO-LI-1160A	0-100%	XU-2 Control Room
Indicator	CO-LI-1160B	0-100%	Radwaste Pnl. G16-P001

(h) Schedule - No changes are required

VARIABLE D3 - Suppression Spray Flow

Brunswick does not intend to provide this variable. RHR flow can be used to monitor the operation of primary containment related systems. Drywell pressure, drywell temperature, suppression pool pressure and suppression pool temperature give indication that the safety systems are accomplishing their tasks. These variables are provided at Brunswick.

VARIABLE D4 - DRYWELL PRESSURE

		Recommended by RG 1.97	Provided by Brunswick
a)	Instrument Range		
	Narrow range	-2.7 to + 3 psig	0 to + 2 psig
	Wide range	0 to 110% design pressure	See Variable A5
b)	Environmental		
	Narrow range	Yes	No
	Wide range	Yes	See Variable A5
c)	Seismic Qualification		
	Narrow range	No	No
	Wide range	No	See Variable A5
d)	Quality Assurance		
	Narrow range	Yes	Note 2
	Wide range	Yes	See Variable A5
e)	Power Supply		
	Narrow range	Non-1E	Non-1E
	Wide range	Non-1E	See Variable A5
f)	Redundance & Sensor Location	No	No

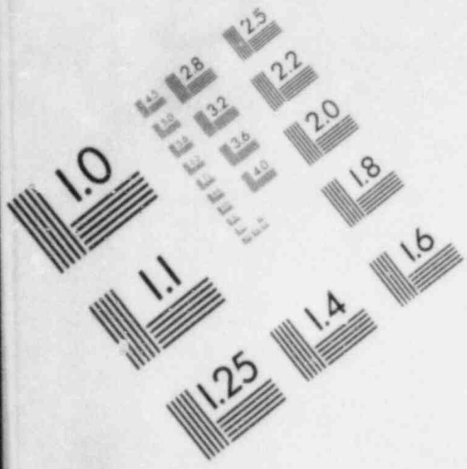
Sensor	Tag Number	Range	Location
Narrow Range Transmitter	CAC-PT-2685	0 to + 2	Local
Wide Range Transmitter	See Variable A5		

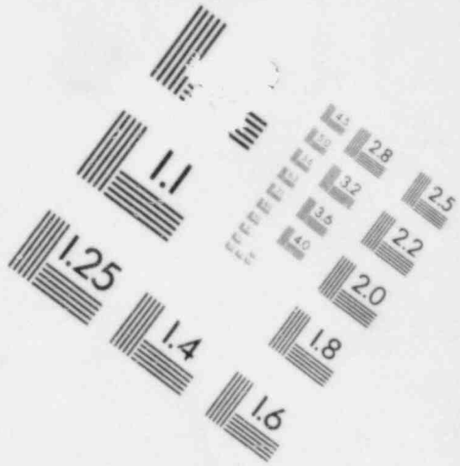
g) Location of Display

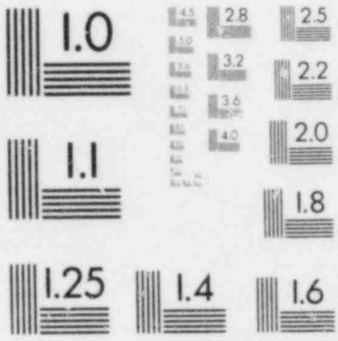
Display	Tag Number	Range	Location
Narrow Range Indicator/Controller	CAC-PIC-2685	0 to + 2 psig	XU-51 Control Room
Wide Range Display	See Variable A5		

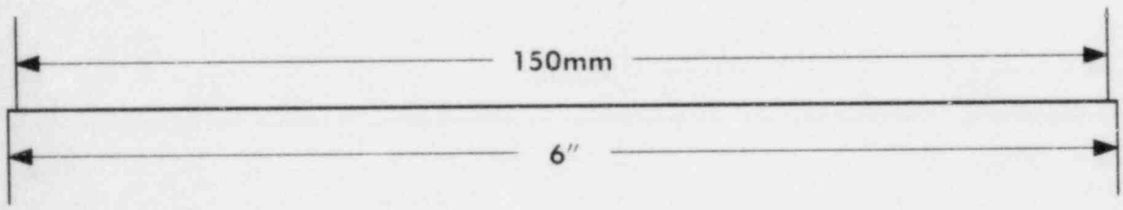
h) Schedule — Brunswick will install a new transmitter and indicator with a -5 to +3 psig range Unit 1 work will be scheduled for completion during refueling outage #5 and Unit 2 work will be scheduled for completion during refueling outage #6.

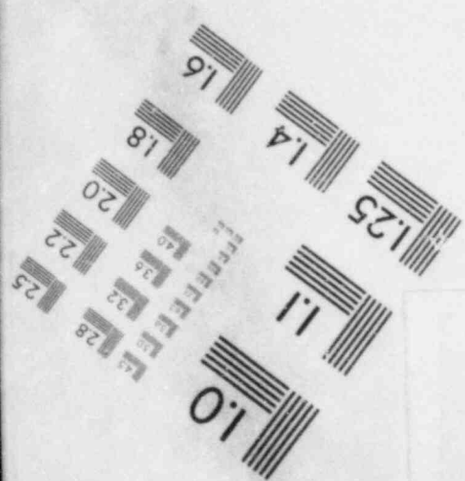
IMAGE EVALUATION
TEST TARGET (MT-3)

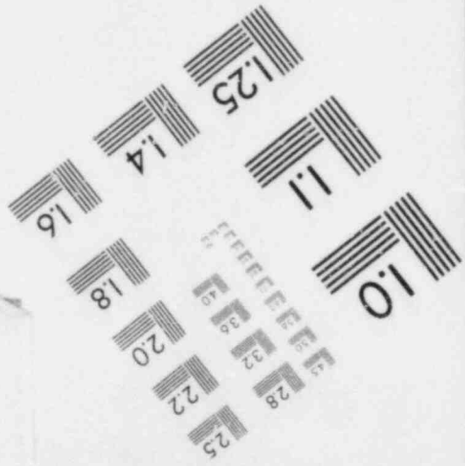












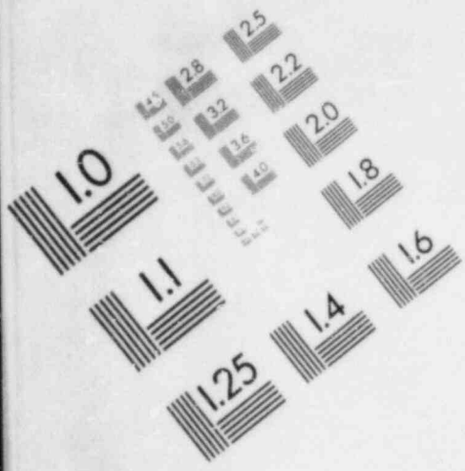
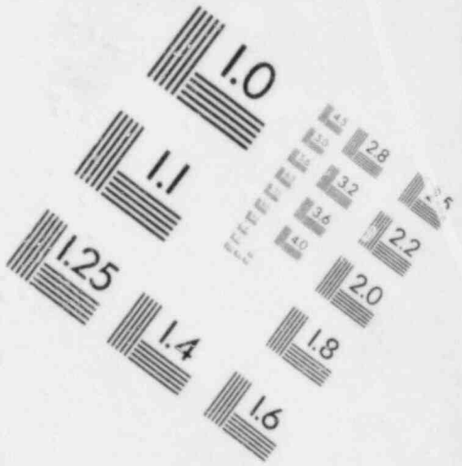
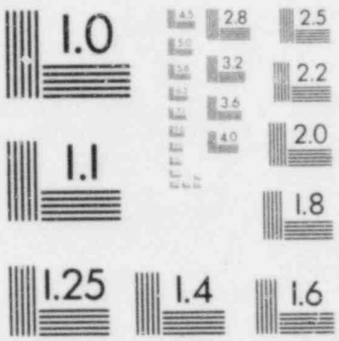
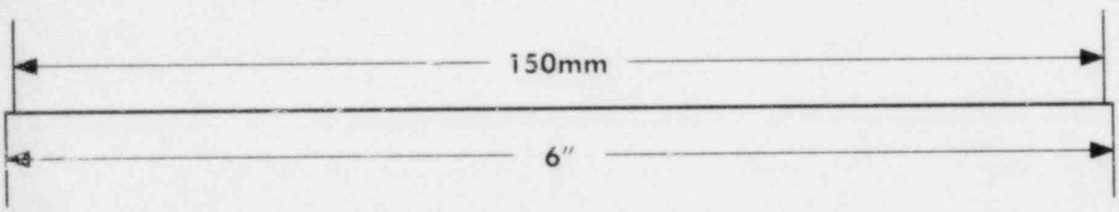
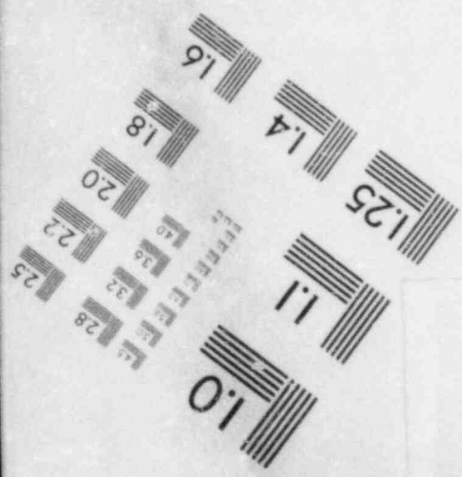


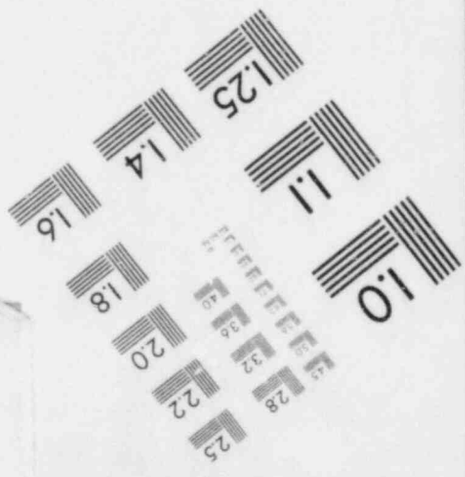
IMAGE EVALUATION TEST TARGET (MT-3)











VARIABLE D5 - Suppression Pool Water Level - RG 1.97 recommendations for this variable will be met by variable A4.

VARIABLE D6 - Suppression Pool Water Temperature - RG 1.97 recommendations for this variable will be met by Variable A3.

VARIABLE D7 - Drywell Atmosphere Temperature - RG 1.97 recommendations for this variable will be met by Variable A6.

VARIABLE D8 - Drywell Spray Flow - Brunswick does not intend to provide this variable for the same reasons given for variable D3.

VARIABLE D9 - MSIV Leakage Control System Pressure - Not Required. This system is not included in the Brunswick design.

VARIABLE D10 - PRIMARY SYSTEM SAFETY RELIEF VALVE POSITION

		Recommended by RG 1.97	Provided by Brunswick
a)	Instrument Range	Closed - Not Closed	Green Indicating light - Closed Red Indicating light - Open
b)	Environmental Qualification	Yes	The NDT International flow transmitters used at Brunswick are currently undergoing environmental qualification at Wyle Laboratories.
c)	Seismic Qualification	No	Yes
d)	Quality Assurance	Yes	Note 2
e)	Power Supply	Non-1E	High Quality
f)	Redundance & Sensor Location	No	No

Sensor	Tag Number	Range	Location
Transmitter	B21-FT-4157	Closed-not closed	VLV F013A
Transmitter	B21-FT-4158	Closed-not closed	VLV F013B
Transmitter	B21-FT-4159	Closed-not closed	VLV F013C
Transmitter	B21-FT-4160	Closed-not closed	VLV F013D
Transmitter	B21-FT-4161	Closed-not closed	VLV F013E
Transmitter	B21-FT-4162	Closed-not closed	VLV F013F
Transmitter	B21-FT-4163	Closed-not closed	VLV F013G
Transmitter	B21-FT-4164	Closed-not closed	VLV F013H
Transmitter	B21-FT-4165	Closed-not closed	VLV F013J
Transmitter	B21-FT-4166	Closed-not closed	VLV F013K
Transmitter	B21-FT-4167	Closed-not closed	VLV F013L

VARIABLE D10 - PRIMARY SYSTEM SAFETY RELIEF VALVE POSITION (Continued)

g) Location of Display

Display	Tag Number	Range	Location
Indicator light	B21-D51A	Green	H12-P601 Control Room
Indicator light	B21-D52A	Red	H12-P601 Control Room
Indicator light	B21-D51B	Green	H12-P601 Control Room
Indicator light	B21-D52B	Red	H12-P601 Control Room
Indicator light	B21-D51C	Green	H12-P601 Control Room
Indicator light	B21-D52C	Red	H12-P601 Control Room
Indicator light	B21-D51D	Green	H12-P601 Control Room
Indicator light	B21-D52D	Red	H12-P601 Control Room
Indicator light	B21-D51E	Green	H12-P601 Control Room
Indicator light	B21-D52E	Red	H12-P601 Control Room
Indicator light	B21-D51F	Green	H12-P601 Control Room
Indicator light	B21-D52F	Red	H12-P601 Control Room
Indicator light	B21-D51G	Green	H12-P601 Control Room
Indicator light	B21-D52G	Red	H12-P601 Control Room
Indicator light	B21-D51H	Green	H12-P601 Control Room
Indicator light	B21-D52H	Red	H12-P601 Control Room
Indicator light	B21-D51J	Green	H12-P601 Control Room
Indicator light	B21-D52J	Red	H12-P601 Control Room
Indicator light	B21-D51K	Green	H12-P601 Control Room
Indicator light	B21-D52K	Red	H12-P601 Control Room
Indicator light	B21-D51L	Green	H12-P601 Control Room
Indicator light	B21-D52L	Red	H12-P601 Control Room

h) Schedule: Should replacement of the transmitters prove necessary, 79-01B scope will replace them with qualified transmitters on a schedule consistent with IE Bulletin 79-01B and 10CFR 50.49.

VARIABLE D11 - ISOLATION CONDENSER SYSTEM SHELL-SIDE WATER LEVEL

This variable is not required. This system is not included in the Brunswick design.

VARIABLE D12 - ISOLATION CONDENSER SYSTEM VALVE POSITION

This variable is not required. This system is not included in the Brunswick design.

VARIABLE D13 - RCIC FLOW CONTROL

		Recommended By RG 1.97	Provided by Brunswick
(a)	Instrument Range	0 to 110% design flow	0 to 110% design flow
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	Non-1E	1E
(f)	Redundance & Sensor Location	No	No

Sensor	Tag Number	Range	Location
Flow Element	E51-FE-N001	0-450" Water Col.	RCIC Pump Discharge line
Flow Transmitter	E51-FT-N003	0-450" Water Col.	E51-2-4-605

(g) Location of Display

Display	Tag Number	Range	Location
Flow Indicator/ Controller	E51-FIC-R600	0-500 gpm	H12-P601 Control Room

(h) Schedule: Transmitter E51-FT-N003 will be replaced to comply with environmental qualification on a schedule consistent with IE Bulletin 79-01B and 10CFR50.49.

VARIABLE D14 - HPCI FLOW

		Recommended By RG 1.97	Provided By Brunswick
(a)	Instrument Range	0 to 110% design flow	0 to 110% design flow
(b)	Environmental Qualification	Yes	No, to be provided by PM 82-263, 264
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	Non-1E	1E
(f)	Redundance & Sensor Location	No	No

Sensor	Tag Number	Range	Location
Flow Element	E41-FE-N007	0-5000 gpm	HPCI Pump Discharge Line E41-2-14-605
Flow Transmitter	E41-FT-N008	0-5000 gpm	H21-P014

(g) Location of Display

Display	Tag Number	Range	Location
Flow Indicator/ Controller	E41-FIC-R600	0-5000 gpm	H12-P601 Control Room

(h) Schedule: There are no changes required for the basic instrument loop. Plant modifications 82-263, and 82-264 are to replace the transmitters to comply with environmental qualification on a schedule consistent with IE Bulletin 79-01B and 10CFR50.49.

VARIABLE D15 - CORE SPRAY SYSTEM FLOW

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	0 to 110% design flow	0 to 110% design flow, 0 to 5198 gpm
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	Non-1E	1E
(f)	Redundance & Sensor Location	No	No

Sensor	Tag Number	Range	Location
Flow Element	E21-FE-N002A	0-638" water Col.	CS pump line E21-2-12-300
Flow Element	E21-FE-N002B	" " " "	CS pump line E21-6-12-300
Transmitter	E21-FT-N003A	" " " "	H21-P001 Reactor Bldg.
Transmitter	E21-FT-N003B	" " " "	H21-P019 Reactor Bldg.

(g) Location of Display

Display	Tag Number	Range	Location
Flow Indicator	E21-FI-R601A	0-7000 gpm	H12-P601 Control Room
Flow Indicator	E21-FI-R601B	" "	" " " " "

(h) Schedule: Transmitters E21-FT-N003A and E21-FT-N003B will be replaced to comply with environmental qualification on a schedule consistent with IE Bulletin 79-01B and 10CFR50.49.

VARIABLE D16 - LPCI SYSTEM FLOW

Low pressure coolant injection is a mode of the RHR (Residual Heat Removal) system. Low pressure cooling systems at Brunswick include the Core Spray System and the RHR system. Refer to variables D15 and D19.

VARIABLE D17 - SLCS FLOW

Refer to Brunswick Position Paper paragraph 4.4.13.

VARIABLE D18 - SLCS STORAGE TANK LEVEL

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	Bottom to Top	0 to 100% (Bottom to Top)
(b)	Environmental Qualification	Yes	No, per category 3 designation in Brunswick Position Paper on RG 1.97
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	No	Note 2
(e)	Power Supply	Non-1E	1E
(f)	Redundance Sensor Location	No	No

Sensor	Tag Number	Range	Location
Level Transmitter	C41-LT-N001	0-200 in. water	H21-P001 Reactor Bldg.

(g) Location of Display

Display	Tag Number	Range	Location
Indicator	C41-LI-R601	0-100%	H12-P603 Control Room

(h) Schedule: No changes to the instrument loop are required.

VARIABLE D19 - RHR SYSTEM FLOW

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	0 to 110% design flow	0 to 110% design flow, 0 to 22,880 gpm
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	Non-1E	1E
(f)	Redundance and Sensor Location	No	No

Sensor	Tag Number	Range	Location
Flow Element	E11-FE-N014A	0-25,000 gpm	Pipe E11-18-20-300 Reactor Bldg.
Flow Element	E11-FE-N014B	" " "	Pipe E11-21-20-300 Reactor Bldg.
Flow Transmitter	E11-FT-N015A	0-30,000 gpm	Rack H21-P018 Reactor Bldg.
Flow Transmitter	E11-FT-N015B	" " "	Rack H21-P021 Reactor Bldg.

(g) Location of Display

Display	Tag Number	Range	Location
Flow Indicator	E11-FI-R603A	0-30,000 gpm	H12-P601 Control Room
Flow Indicator	E11-FI-R603B	" " "	" " " " "

(h) Schedule: Transmitters E11-FT-N015A and E11-FT-N015B will be replaced to comply with environmental qualification on a schedule consistent with IE Bulletin 79-01B and 10CFR50.49.

VARIABLE D20 - RHR HEAT EXCHANGER OUTLET TEMPERATURE

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	32° to 350°F	0 - 600°F
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	Non-1E	1E
(f)	Redundance & Sensor Location	No	No

Sensor	Tag Number	Range	Location
Temperature Element	E11-TE-N027A	0-600°F	Pipe E11-18-20-300 Reactor Bldg.
Temperature Element	E11-TE-N027B	0-600°F	Pipe E11-21-20-300 Reactor Bldg.

(g) Location of Display

Display	Tag Number	Range	Location
Recorder	E41-TR-R605	0-600°F	H12-P614 Control Room

(h) Schedule: Temperature elements E11-TE-N027A and E11-TE-N027B will be replaced to comply with environmental qualification on a schedule consistent with IE Bulletin 79-01B and 10CFR50.49.

VARIABLE D21 - COOLING WATER TEMPERATURE TO ESF SYSTEM COMPONENTS

Brunswick does not intend to provide this variable. See Brunswick Position Paper on RG. 1.97 paragraph 4.4.17.

VARIABLE D22 - COOLING WATER FLOW TO ESF SYSTEM COMPONENTS

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	0 to 110% design flow	0 to 150%, 0 to 12,000 gpm for RHR Service water. There are no flow Indicators on the seal cooling exchangers, RHR pump room cooler, or Core spray fan cooling units.
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	Non-1E	1E for RHR Service Water Flow only.
(f)	Redundance/Sensor Location	No	No

ESF Component	Sensor	Tag Number	Range	Location
RHR Heat Exchangers Service Water Flow	Flow Transmitter	E11-FT-N007A	0-800 in. water	H21-P018 Rx. Bldg.
	" " "	E11-FT-N007B	" " "	H21-P021 Rx. Bldg.
Sealing Cooling Exch.	Flow Switch	SW-FSL-834	Low Flow	Pipe SW-135-1-157A
" " " "	" " "	SW-FSL-835	" "	Pipe SW-130-1-157A
" " " "	" " "	SW-FSL-836	" "	Pipe SW-136-1-157A
" " " "	" " "	SW-FSL-825	" "	Pipe SW-129-1-157A
Fan Cooling Units CS Pump Room "1A"	Pressure Switch	SW-PSL-1174	Low Pressure	Pipe SW-116-2-157A
Pump Room "1B"	" " "	SW-PSL-1178	" "	Pipe SW-123-6-157
RHR Pump Room Coolers 1B, 2A	Not Applicable			

VARIABLE D22 - Continued

(g) Location of Display

ESF Component	Display	Tag Number	Range	Location
RHR Heat Exchangers Service Water Flow	Indicator	E11-FI-R602A	0-12,000 gpm	H12-P601 Control Rm.
	"	E11-FI-R602B	" " "	" " "
Seal Cooling Exchangers				
RHR Pump 1A	Annunciator	UA-A1	Low Flow	H12-P601 Control Rm.
" 1B	" "	UA-A1	" "	" " " "
" 1C	" "	UA-A1	" "	" " " "
" 1D	" "	UA-A1	" "	" " " "
Fan Cooling Units CS Pump Room "1A"	Annunciator	UA-5	Low Pressure	XU-3, Control Room
"1B"	" "	UA-5	" "	" " " "
RHR Pump Room Coolers 1B, 2A	Not Applicable			

(h) Schedule: Brunswick will provide flow instrumentation for the conventional and nuclear service water header lines SW-100-24-157 and SW-103-30-157 respectively. Work for Unit 1 will be scheduled for completion during refueling outage #5 and work for Unit 2 will be scheduled for completion during outage #6. Transmitters E11-FT-N007A and E11-FT-N007B will be replaced to comply with environmental qualification on a schedule consistent with IE Bulletin 79-01B and 10CFR50.49.

VARIABLE D23 - HIGH RADIOACTIVITY LIQUID TANK LEVEL

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	Top to Bottom	Top to Bottom, 0 - 100%
(b)	Environmental Qualification	No	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	No	Note 2
(e)	Power Supply	Non-1E	Conventional Power Supply
(f)	Redundance/Sensor Location	No	No

Sensor	Tag Number	Range	Location
Transmitter	G16-LT-N026	0-190"	Waste Collector Tank A002 Radwaste Bldg.

(g) Location of Display

Display	Tag Number	Range	Location
Recorder - Alarm	G16-LRS-R008	0-100%	P001 Radwaste Control Room

(h) Schedule: No changes are required to the existing instrumentation.

VARIABLE D24 - EMERGENCY VENTILATION DAMPER POSITION

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	Open - Closed	Open - Closed
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	Non-1E	1E
(f)	Redundance/Sensor Location	No	No

Sensor	Tag Number	Range	Location
Position Switch	2-VA-ZS-916B	Open-Closed	Emergency Makeup Damper 2L-D-CB Control Bldg.
Position Switch	2-VA-ZS-916A	Open-Closed	Normal Make-up Damper 2L-D-CB-Control Bldg.
Flow Switch	1-VA-FS-928A	Off-On	Cable Spreading Room Fan 1A-SF-CB Supply Duct-Control Building
Flow Switch	1-VA-FS-928B	Off-On	Cable Spreading Room Exhaust Fan 1A-EF-CB Duct-Control Building
Flow Switch	2-VA-FS-929A	Off-On	Cable Spreading Room Supply Fan 2A-SF-CB Duct-Control Building
Flow Switch	2-VA-FS-929B	Off-On	Cable Spreading Room Exhaust Fan 2A-EF-CB Duct-Control Building
Flow Switch	2-VA-FS-918A	Off-On	Mechanical Equipment Room Supply Fan 2F-SF-CB Duct - Control Building
Flow Switch	2-VA-FS-918B	Off-On	Mechanical Equipment Room Exhaust Fan 2E-EF-CB Duct - Control Building
Flow Switch	2-VA-FS-915A	Off-On	Emer Recirc Fan 2A-ERF-CB Duct-Control Bldg.
Flow Switch	2-VA-FS-915B	Off-On	Emer Recirc Fan 2B-ERF-CB Duct-Control Bldg.
Position Switch	2-VA-ZS-918B	Open-Closed	Mechanical Equipment Room Exhaust Damper 2T-D-CB-Control Building
Position Switch	2-VA-ZS-918A	Open-Closed	Mechanical Equipment Room Supply Damper 2K-D-CB - Control Building

Sensor	Tag Number	Range	Location
Position Switch	2-VA-ZS-917	Open-Closed	Control Room Exhaust Damper 2H-D-CB - Control Bldg.
Position Switch	2-VA-ZS-915A	Open-Closed	Emergency Recirc Damper 2A-EAD-CB - Control Building
Position Switch	2-VA-ZS-915C	Open-Closed	Emergency Recirc Damper 2C-EAD-CB - Control Building
Position Switch	2-VA-ZS-915B	Open-Closed	Emergency Recirc Damper 2B-EAD-CB - Control Building
Position Switch	2-VA-ZS-915D	Open-Closed	Emergency Recirc Damper 2D-EAD-CB - Control Building
Position Switch	2-VA-ZS-929A	Open-Closed	Cable Spreading Room Supply Fan Damper 2B-D-CB-Control Bldg.
Position Switch	2-VA-ZS-929B	Open-Closed	Cable Spreading Room Exhaust Fan Damper 2E-D-CB-Control Bldg.
Position Switch	1-VA-ZS-928A	Open-Closed	Cable Spreading Room Supply Fan Damper 1B-D-CB-Control Bldg.
Position Switch	1-VA-ZS-928B	Open-Closed	Cable Spreading Room Exhaust Fan Damper 1E-D-CB-Control Bldg.
Position Switch	LSO-RX-321	Open	Reactor Building Supply Isolation Damper 1A
Position Switch	LSC-RX-321	Closed	Reactor Building Supply Isolation Damper 1A
Position Switch	LSO-RX-321	Open	Reactor Building Exhaust Isolation Damper 1C
Position Switch	LSC-RX-321	Closed	Reactor Building Exhaust Isolation Damper 1C
Position Switch	LSO-RX-321	Open	Reactor Building Supply Isolation Damper 1B
Position Switch	LSC-RX-321	Closed	Reactor Building Supply Isolation Damper 1B
Position Switch	LSO-RX-321	Open	Reactor Building Exhaust Isolation Damper 1D
Position Switch	LSC-RX-321	Closed	Reactor Building Exhaust Isolation Damper 1D
Position Switch	-	Open-Closed	Drywell Purge Valve IN-BFV-RB Open-Closed
Position Switch	-	Open-Closed	Drywell Pump Valve 1A-BFV-RB Open-Closed

g) Location of Display

Display	Tag Number	Location	Function
Control Switch(a) & Light Assembly	2VA-CS-918-1	XU-3 Control Room	Mechanical Equip Room Exhaust Damper 2T-D-CB-Open
"	2VA-CS-918-1	XU-3 Control Room	Mechanical Equipment Room Exhaust 2T-D-CB Closed
"	2VA-CS-918-1	XU-3 Control Room	Mechanical Equip Room Exhaust Fan 2E-EF-CB - Running
"	2VA-CS-918-1	XU-3 Control Room	Mechanical Equip Room Exhaust Fan 2E-EF-CB-Off
"	2VA-CS-918-1	XU-3 Control Room	Mechanical Equip Room Supply Damper 2K-D-CB Open
"	2VA-CS-918-1	XU-3 Control Room	Mechanical Equip Room Supply Damper 2K-D-CB Closed

g) Location of Display

Display	Tag Number	Location	Function
(a)			
Control Switch & Light Assm.	2-VA-CS-918-1	XU3-Control Room	Mechanical Equip Room Supply Fan 2F-SF-CB Running
"	2-VA-CS-918-1	XU3-Control Room	Mechanical Equip Room Supply Fan 2F-SF-CB Off
"	2-VA-CS-917-1	XU3-Control Room	Control Room Exhaust Damper 2H-D-CB Open
"	2-VA-CS-917-1	XU3-Control Room	Control Room Exhaust Damper 2H-D-CB Closed
"	2-VA-CS-917-1	XU3-Control Room	Control Room Exhaust Fan 2D-EF-CB Running
"	2-VA-CS-917-1	XU3-Control Room	Control Room Exhaust Fan 2D-EF-CB Off
(b)			
"	2-VA-CS-915A	XU3-Control Room	Emergency Recirc Fan 2A-ERF-CB Dampers Open
"	"	XU3-Control Room	Emergency Recirc Fan 2A-ERF-CB Dampers Closed
"	"	XU3-Control Room	Emergency Recirc Fan 2A-ERF-CB Running
"	"	XU3-Control Room	Emergency Recirc Fan 2A-ERF-CB Standby
"	2-VA-CS-915B	XU3-Control Room	Emergency Recirc Fan 2A-ERF-CB Dampers Open
"	2-VA-CS-915B	XU3-Control Room	Emergency Recirc Fan 2B-ERF-CB Dampers Closed
(c)			
Indicating Light Assm.	1VA-ZL-915A	XU3-Control Room	Emergency Recirc Fan 2A-ERF-CB Dampers Open
"	1VA-ZL-915A	XU3-Control Room	Emergency Recirc Fan 2A-ERF-CB Dampers Closed
"	1VA-ZL-915B	XU3-Control Room	Emergency Recirc Fan 2B-ERF-CB Dampers Open
"	1VA-ZL-915B	XU3-Control Room	Emergency Recirc Fan 2B-ERF-CB Dampers Closed
"	1VA-ZL-916A	XU3-Control Room	Emergency Makeup Damper 2J-D-CB Open
"	1VA-ZL-916A	XU3-Control Room	Emergency Makeup Damper 2J-D-CB Closed
"	1VA-ZL-916B	XU3-Control Room	Normal Makeup Damper 2L-D-CB Open
"	1VA-ZL-916B	XU3-Control Room	Normal Makeup Damper 2L-D-CB Closed
(d)			
Control Switch Light Assm.	2VA-CS-929-1	XU3-Control Room	U2 Cable Spreading Rm Supply Fan Damper 2B-D-CB-Open
"	"	XU3-Control Room	U2 Cable Spreading Rm Supply Fan Damper 2B-D-CB Closed
"	"	XU3-Control Room	U2 Cable Spreading Rm Exhaust Fan Damper 2B-D-CB Open
"	"	XU3-Control Room	U2 Cable Spreading Rm Exhaust Fan Damper 2B-D-CB Closed
"	"	XU3-Control Room	U2 Cable Spreading Rm Supply Fan 2A-SF-CB Running
"	"	XU3-Control Room	U2 Cable Spreading Rm Supply Fan 2A-SF-CB Off
"	"	XU3-Control Room	U2 Cable Spreading Rm Exhaust Fan 2A-EF-CB Running
"	"	XU3-Control Room	U2 Cable Spreading Rm Exhaust Fan 2A-EF-CB Off

VARIABLE D24 - EMERGENCY VENTILATION DAMPER POSITION (Cont'd)

g) Location of Display (Cont'd)

Display	Tag Number	Location	Function
(d)			
Control Switch & Light Assmbly.	1VA-CS-928-1	XU3-Control Room	U-1 Cable Spreading Rm Supply Fan Damper 1B-C-DB Open
"	"	"	U-1 Cable Spreading Rm Supply Fan Damper 1B-C-DB Closed
"	"	"	U-1 Cable Spreading Rm Exhaust Fan Damper 1E-D-CB Open
"	"	"	U-1 Cable Spreading Rm Exhaust Fan Damper 1E-D-CB Closed
"	"	"	U-1 Cable Spreading Rm Supply Fan 1A-SF-CB Running
"	"	"	U-1 Cable Spreading Rm Supply Fan 1A-SF-CB Off
"	"	"	U-1 Cable Spreading Rm Exhaust Fan 1A-EF-CB Running
"	"	"	U-1 Cable Spreading Rm Exhaust Fan 1A-EF-CB Off
"	VA-CS-1510	"	Reactor Building Supply Isolation Damper 1A Open
"	"	"	Reactor Building Supply Isolation Damper 1A Closed
"	"	"	Reactor Building Exhaust Isolation Damper 1C Open
"	"	"	Reactor Building Exhaust Isolation Damper 1C Closed
"	VA-CS-1512	"	Reactor Building Supply Isolation Damper 1B Open
"	"	"	Reactor Building Supply Isolation Damper 1B Closed
"	"	"	Reactor Building Exhaust Isolation Damper 1D Open
"	"	"	Reactor Building Exhaust Isolation Damper 1D Closed
"	VA-CS-1589	"	Reactor Building Purge Valve IN-BFV-RB Open-Closed
"	"	"	Reactor Building Purge Valve IN-BFV-RB Open-Closed

h) Schedule: No changes required for this instrumentation.

a) On both Unit 1 and Unit 2 Panel

b) On Unit 2 Panel Only

c) On Unit 1 Panel Only

d) Other Unit has Indication, No Control

VARIABLE D25 - STATUS OF STANDBY POWER AND OTHER ENERGY SOURCES IMPORTANT TO SAFETY (ELECTRIC, HYDRAULIC, PNEUMATIC)

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	Plant Specific	See Section (g)
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	Non-1E	1E
(f)	Redundance	No	No

(g) For simplicity and clarity of this report, the instrumentation for each diesel generator is presented by giving voltage indication followed by breaker indication. The same is done for the normal source feeders. These are followed by DC battery voltage instrumentation and instrument air pressure indication.

VARIABLE D25 - STATUS OF STANDBY POWER AND OTHER ENERGY SOURCES IMPORTANT TO SAFETY (ELECTRIC, HYDRAULIC, PNEUMATIC)

Sensor Location (Diesel Generator Voltage)

The sensors for the diesel generator voltages are potential transformers located at the respective diesel generators.

Location of Display

Display	Tag Numbers	Range	Location
DG No. 1 Voltmeter	DG-VM-1265	0-5,000 Volts	Panel XU-2 Control Room
DG No. 2 Voltmeter	DG-VM-1272	0-5,000 Volts	Panel XU-2 Control Room
DG No. 3 Voltmeter	DG-VM-1279	0-5,000 Volts	Panel XU-2 Control Room
DG No. 4 Voltmeter	DG-VM-1286	0-5,000 Volts	Panel XU-2 Control Room

Sensor Location (Diesel Generator Breakers to Emergency Buses)

Breaker No.	Sensor	Location
AE9 (DG No. 1 to Bus E1)	Breaker Auxiliary Contact	4160V SWGR E1 Compt. AE9
AG7 (DG No. 2 to Bus E2)	Breaker Auxiliary Contact	4160V SWGR E2 Compt. AG7
AI5 (DG No. 3 to Bus E3)	Breaker Auxiliary Contact	4160V SWGR E3 Compt. AI5
AK2 (DG No. 4 to Bus E4)	Breaker Auxiliary Contact	4160V SWGR E4 Compt. AK2

Location of Display

Breaker No.	Display	Tag Number	Range	Location
AE9	Position Light	EB-CS-950	Green light-open Red light-closed	Panel XU-2, Control Room
AG7	Position Light	EB-CS-957	Green light-open Red light-closed	Panel XU-2, Control Room
AI5	Position Light	EB-CS-952	Green light-open Red light-closed	Panel XU-2, Control Room
AK2	Position Light	EB-CS-968	Green light-open Red light-closed	Panel XU-2, Control Room

Sensor Location (Normal Source Feeder Bus Voltage)

The sensors for the normal source voltage instrumentation are transducers located on the respective buses.

VARIABLE D25 (Continued)

Location of Display

Display	Tag Number	Range	Location
Bus B Voltmeter	ED-VM-752	0-5,000V	Panel XU-2, Control Room
Bus C Voltmeter	ED-VM-753	0-5,000V	Panel XU-2, Conrrol Room
Bus D Voltmeter	ED-VM-754	0-5,000V	Panel XU-2, Control Room

Sensor Location (Normal Source Series Breakers to Emergency Buses)

Breaker No.	Sensor	Location
AE6	Breaker Auxiliary Contact	4160V SWGR E1 Compt. AE6
1-AD1	Breaker Auxiliary Contact	4160V, SWGR 1D Compt. 1-AD1
AG4	Breaker Auxiliary Contact	4160V SWGR E2 Compt. AG4
1-AC8	Breaker Auxiliary Contact	4160V SWGR 1C Compt. 1-AC8
AI2	Breaker Auxiliary Contact	4160V SWGR E3 Compt. AI2
2-AD1	Breaker Auxiliary Contact	4160V SWGR 2D Compt. 2-AD1
AJ9	Breaker Auxiliary Contact	4160V SWGR E4 Compt. AJ9
2-AC8	Breaker Auxiliary Contact	4160V SWGR 2C Compt. 2-AC8

VARIABLE D25 (Continued)

Location of Display

Breaker No.	Display	Tag Number	Range	Location
AE6	Position Light	ED-ZL-951	Green-open/Red-Closed	Panel XU-2, Control Room
1-AD1	Position Light	ED-ZL-951	Green-open/Red-Closed	Panel XU-2, Control Room
AG4	Position Light	ED-ZL-958	Green-open/Red-Closed	Panel XU-2, Control Room
1-AC8	Position Light	ED-ZL-958	Green-open/Red-Closed	Panel XU-2, Control Room
AI2	Position Light	ED-ZL-963	Green-open/Red-Closed	Panel XU-2, Control Room
2-AD1	Position Light	ED-ZL-963	Green-open/Red-Closed	Panel XU-2, Control Room
AJ9	Position Light	ED-ZL-969	Green-open/Red-Closed	Panel XU-2, Control Room
2-AC8	Position Light	ED-ZL-969	Green-open/Red-Closed	Panel XU-2, Control Room

Sensor Location (DC Standby Power)

The sensors for the 125/250V DC bus and 24/48V DC bus are the battery charger output terminals.

Location of Display

Display	Tag Number	Range	Location
Voltage Indicator	BAT-VM-737	0-150V	XU-1, Control Room
Voltage Indicator	BAT-VM-738	0-150V	XU-1, Control Room
Voltage Indicator	BAT-VM-739	0-150V	XU-1, Control Room
Voltage Indicator	BAT-VM-740	0-150V	XU-1, Control Room
Voltage Indicator	BAT-VM-741	0-60V	XU-1, Control Room
Voltage Indicator	BAT-VM-741-1	0-60V	XU-1, Control Room
Voltage Indicator	BAT-VM-742-1	0-60V	XU-1, Control Room

Standby Instrument Air Pressure

Currently, there is no control room indication for standby instrument air pressure. IA-PI-3785 and IA-PI-3786 provide local pressure indications. The standby instrument air compressors are presently scheduled to be spared and the containment pump back system will provide pneumatic power to systems in the primary containment. The pump back system being installed by PM 82-008 and PM82-009 will provide for pressure indication in the control room. If the current plans to spare the standby instrument air compressors change, the need for pressure indication will have to be re-evaluated.

h) Schedule: No changes are required for the diesel generator, normal source feeder, or DC battery instrumentation. The instrument air instrumentation will be scheduled for completion during refuel #5 for both units.

VARIABLE D26 - TURBINE BYPASS VALVE POSITION

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	Plant Designer Selected	Green light-closed/Red light-open
(b)	Environmental Qualification	No	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	No	Note 2
(e)	Power Supply	Non-IE	High Reliability
(f)	Redundance	No	No

Sensor Location

All sensors are position switches located on the ten valves in the Turbine Steam Chest and are listed below by tag number.

MS-ZS-BVCS1	MS-ZS-BVOS1
MS-ZS-BVCS2	MS-ZS-BVOS2
MS-ZS-BVCS3	MS-ZS-BVOS3
MS-ZS-BVOS4	MS-ZS-BVOS4
MS-ZS-BVCS5	MS-ZS-BVOS5
MS-ZS-BVCS6	MS-ZS-BVOS6
MS-ZS-BVCS7	MS-ZS-BVOS7
MS-ZS-BVCS8	MS-ZS-BVOS8
MS-ZS-BVCS9	MS-ZS-BVOS9
MS-ZS-BVCS10	MS-ZS-BVOS10

(g) Location of Display

Display	Tag Number	Range	Location
Position Light	EHC-CS-436	Open/Close	Panel XU-2, Control Room

The indicating lights are part of the EHC (electro hydraulic control) panel insert located on Panel XU-1.

(h) Schedule: No changes required.

NOTE: The instrumentation above is for Unit 2. Unit 1 is similar but has only four bypass valves.

VARIABLE D27 - CONDENSER HOTWELL LEVEL

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	Plant Designer Selected	-24 to +24 inches
(b)	Environmental Qualification	No	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	No	Note 2
(e)	Power Supply	Non-IE	High Reliability
(f)	Redundance	No	No

Sensor	Tag Number	Range	Location
Transmitter	CO-LT-2	0-48 inches	Condenser 1A
Transmitter	CO-LT-3	0-48 inches	Condenser 1A
Transmitter	CO-LT-4	0-48 inches	Condenser 1B
Transmitter	CO-LT-5	0-48 inches	Condenser 1B

(g) Location of Display

Display	Tag Number	Range	Location
Level Indicator	CO-LI-2	-24 to +24 inches	Panel XU-2, Control Room
Level Indicator	CO-LI-3	-24 to +24 inches	Panel XU-2, Control Room
Level Indicator	CO-LI-4	-24 to +24 inches	Panel XU-2, Control Room
Level Indicator	CO-LI-5	-24 to +24 inches	Panel XU-2, Control Room

(h) Schedule: No changes to the instrumentation are required.

VARIABLE D28 - CONDENSER VACUUM

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	Plant Designer Selected	0 to 30 in. Hg Vac
(b)	Environmental Qualification	No	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	High Quality Commercial Grade	Note 2
(e)	Power Supply	Non-1E	High Reliability
(f)	Redundance/Sensor Location	No	No

Sensor	Tag Number	Range	Location
Transmitter	OG-PT-23-1,2	0-30 in. Hg. Vac.	IR-TB-6 Turbine Bldg.

(g) Location of Display

Display	Tag Number	Range	Location
Pressure Recorder	OG-PR-23	0-30 in. Hg Vac.	XU-2, Control Room

(h) Schedule: No changes are required for the above instrumentation.

VARIABLE D29 - CONDENSATE PUMP AND BOOSTER PUMP STATUS

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	Plant Designer Selected	Green light - off Red light - on
(b)	Environmental Qualification	No	Note 1
(c)	Seismic Qualification	No	Note 1
(d)	Quality Assurance	High Quality Commercial Grade	Note 2
(e)	Power Supply	Non-1E	1E
(f)	Redundance/Sensor Location	No	No

	Sensor	Location
Condensate Pump		
A	Breaker Auxiliary Contact	4160V SWGR D
B	Breaker Auxiliary Contact	4160V SWGR C
C	Breaker Auxiliary Contact	4160V SWGR D
Condensate Booster Pump		
A	Breaker Auxiliary Contact	4160V SWGR C
B	Breaker Auxiliary Contact	4160V SWGR B
C	Breaker Auxiliary Contact	4160V SWGR A

(g) Location of Display

Condensate Pump	Display	Tag Number	Location
A	Position Light	CO-CS-305	Panel XU-2, Control Room
B	Position Light	CO-CS-306	Panel XU-2, Control Room
C	Position Light	CO-CS-307	Panel XU-2, Control Room
Condensate Booster Pump			
A	Position Light	COD-CS-311	Panel XU-2, Control Room
B	Position Light	COD-CS-312	Panel XU-2, Control Room
C	Position Light	COD-CS-313	Panel XU-2, Control Room

(h) Schedule: No changes required.

VARIABLE - E1 PRIMARY CONTAINMENT AREA RADIATION-HIGH RANGE

		Recommended By RG 1.97	Provided by Brunswick
(a)	Instrument Range	1R/hr to 10^7 R/hr	1R/hr to 10^7 R/hr
(b)	Environmental Qualification	Yes	Note 1
(c)	Seismic Qualification	Yes	Note 1
(d)	Quality Assurance	Yes	Note 2
(e)	Power Supply	1E	1E
(f)	Redundance & Sensor Location	Yes	Yes

Sensor	Tag No.	Range	Location
Radiation Detector	D22-RM-4195	1 R/hr to 10^7 R/hr	Drywell AZ 64° El 30'6"
" " " "	D22-RM-4196	" " " "	Drywell AZ 15° El 57'7"
" " " "	D22-RM-4197	" " " "	Drywell AZ 239° El 23'
" " " "	D22-RM-4198	" " " "	Drywell AZ 195° El 57'7"

(g) Location of Display

Display	Tag No.	Range	Location
Indicator	D22-RI-4195	1 R/hr to 10^7 R/hr	XU-75 Electronic Equip. Room
Indicator	D22-RI-4196	" " " "	" " " " " "
Recorder	D22-RR-4195	" " " "	" " " " " "
Indicator	D22-RI-4197	" " " "	XU-79 " " " "
Indicator	D22-RI-4198	" " " "	" " " " " "
Recorder	D22-RR-4197	" " " "	" " " " " "

VARIABLE - E1 (Continued)

(h) Schedule - No changes required.

VARIABLE E2 - Reactor Building or Secondary Containment Area Radiation	-	High range monitoring of this variable is not required for Brunswick. The Reactor Building vent is closed when the radiation level reaches 5 mr/hr and secondary containment atmosphere is routed through the standby gas treatment system. See Brunswick position paper.

VARIABLE E3 - Radiation Exposure Rate (inside buildings of areas where access is required to service equipment important to safety)	-	See Variable C14. The Brunswick Plants are not designed to allow servicing equipment following an accident. This variable is not required.

VARIABLE E4 - NOBLE GASES AND VENT FLOW RATE

VARIABLE E5 - PARTICULATE AND HALOGEN

. Drywell Purge, Standby Gas Treatment System Purge.	Not required. Brunswick discharges through the Standby Gas Treatment System and then through common vent (stack).
. Secondary Containment Purge	Not required, on high radiation the reactor vent closes and secondary containment atmosphere is routed through the Standby Gas Treatment System and then through common vent (stack).
. Secondary Containment (reactor shield building annulus, if in design)	Not applicable.
. Auxiliary Building	Not applicable.
. Common Plant Vent/Turbine Building Vent	

	Recommended by RG 1.97	Provided by Brunswick
(a) Instrument range		
Stack Flow	0-110% design flow	See Below
Stack gas	10^{-6} μCi/cc -10^{4} μCi/cc	" "
Stack Particulated Halogen	10^{-3} μCi/cc -10^{2} μCi/cc	" "
Turbine Bldg Vent flow	0-110% design flow	" "
Turbine Bldg Vent gas	10^{-6} μCi/cc -10^{2} μCi/cc	" "
Turbine Bldg Particulate & Halogen	10^{-3} - 10^{2} μCi/cc	" "
(b) Environmental Qualification		
Noble Gas	Yes	See Note 1
Flow Rate	Yes	See Note 1
Particulate & Halogen	No	-

VARIABLE E4 - NOBLE GASES AND VENT FLOW RATE

VARIABLE E5 - PARTICULATE AND HALOGEN

. Drywell Purge, Standby Gas Treatment System Purge.	Not required. Brunswick discharges through the Standby Gas Treatment System and then through common vent (stack).
. Secondary Containment Purge	Not required, on high radiation the reactor vent closes and secondary containment atmosphere is routed through the Standby Gas Treatment System and then through common vent (stack).
. Secondary Containment (reactor shield building annulus, if in design)	Not applicable.
. Auxiliary Building	Not applicable.
. Common Plant Vent/Turbine Building Vent	

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument range		
	Stack Flow	0-110% design flow	See Below
	Stack gas	10^{-6} μCi/cc -10^{4} μCi/cc	" "
	Stack Particulated Halogen	10^{-3} μCi/cc -10^{2} μCi/cc	" "
	Turbine Bldg Vent flow	0-110% design flow	" "
	Turbine Bldg Vent gas	10^{-6} μCi/cc -10^{2} μCi/cc	" "
	Turbine Bldg Particulate & Halogen	10^{-3} - 10^{2} μCi/cc	" "
(b)	Environmental Qualification		
	Noble Gas	Yes	See Note 1
	Flow Rate	Yes	See Note 1
	Particulate & Halogen	No	-

VARIABLE E4, E5

		Recommended By RG 1.97	Provided by Brunswick
(c)	Seismic Qualification	No	
(d)	Quality Assurance	Not Required	See Note 2
(e)	Power Supply	High Reliability	High Reliability
(f)	Redundance & Sensor Location	No	Partially as shown below

Sensor	Tag No.	Range	Location	Function
Radiation Detection	D12-K600A	10^{-1} -10^{6} CPS	Local	Stack monitor
" " " "	D12-K600B	" " "	Local	Stack monitor
" " " "	VA-AQH-3215	10-10^{6} CPS	Local	Turbine Vent
" " " "	D12-RE-4561	High	IR-TB-31	TB Vent Rad Mon
" " " "	D12-RE-4562	Mid	"	"
" " " "	D12-RE-4563	Low	"	"
" " " "	D12-RE-4573	High	IR-SH-34	OG Stack Rad Mon
" " " "	D12-RE-4574	Mid	"	"
" " " "	D12-RE-4982	Low	"	"
Flow Transmitter	VA-FT-3358	0-15000 SCFM	Local	Turbine Vent
Flow Transmitter	VA-FT-3359	0-100,000 SCFM	Local	Plant Stack

(g) Location of Display

Display	Tag No.	Range	Location	Service
Recorder	D12-RR-R600A	10^{-1}-10^{6} CPS	XU-3 Control Room	Stack
Recorder	D12-RR-R600B	" " "	" " " "	Stack
Indicator	VA-AQH-3215-1	10^{1}-10^{6} CPS	XU-55 " " "	Turbine Vent Particulate
Indicator	VA-AQH-3215-2	" " "	" " " "	Turb. Vent. Iodine
Indicator	VA-AQH-3215-3	" " "	XU-55 " "	Turb. Vent Gas
Recorder	D12-RR-4548-1	10^{-7} to 10^{-1} uCi/cc	XU-75 Control Room	TB Vent Rad Mon
Recorder	D12-RR-4548-2	10^{-4} to 10^{2} "	" " "	"
Recorder	D12-RR-4548-3	10^{-1} to 10^{5} "	" " "	"
Effluent Recorder	D12-RR-4549	10^{1} to 10^{13} uCi/Sec	" " "	"
Radiation Recorder	D12-RR-4599-1	10^{-7} to 10^{-1} uCi/cc	XU-79 Control Room	OG Stack Rad Mon
Radiation Recorder	D12-RR-4599-2	10^{-4} to 10^{-2} "	" " "	"
Radiation Recorder	D12-RR-4599-3	10^{-1} to 10^{5} "	" " "	"
Effluent Recorder	D12-RR-4600	10^{1} to 10^{13} UCi/Sec	" " "	"

VARIABLE E4, E5

(g) Location of Display (Continued)

Display	Tag No.	Range	Location	Service
Totalizer	VA-FlQ-3358		XU-62 Control Room	Turbine Vent
Totalizer	VA-FlQ-3358		" " "	Stack
Recorder	VA-FR-3356	0-200000 SCFM	XU-51 Control Room	Stack
Recorder	VA-FR-3356	0-15000 SCFM	" " "	Turbine Vent

(h) Schedule - TMI Plant Modifications 80-034, 80-035 and 80-036 have provided the instrumentation to monitor the stack and turbine building vents.

VARIABLE E6 -	Radiation Exposure Meters (continuous indication at fixed locations)	- Not required to be implemented. Refer to NRC Errata dated July 1981 and RG 1.97 Rev. 3.

VARIABLE E7 - AIRBORNE RADIOHALOGENS AND PARTICULATES
(Portable Sampling with onsite analysis capability)

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range	10^{-9} Ci/cc to 10^{-3} Ci/cc	10^{-14} Ci/cc to 10^{-2} Ci/cc
(b)	Environmental Qualification	No specific provision	No
(c)	Seismic Qualification	No specific provision	No
(d)	Quality Assurance	High Quality Commercial Grade	High Quality Commercial Grade
(e)	Power Supply	No specific provision	-
(f)	Redundance & Sensor Location	Not Required	Yes

Item	Range	Location
ND 66 & ND 6620	10^{-14} Ci/cc to 10^{-2} Ci/cc	Counting Room
ND 6620	" " " " " "	Mobile Station

(g) Location of Display - Counting Room, Mobile Station. The Technical Support Center will also have an ND-66 linked to the ND 6620 in the counting room.

(h) Schedule - No changes are required.

VARIABLE #8 - PLANT AND ENVIRONS RADIATION
(PORTABLE INSTRUMENTATION)

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range Photons Beta & low energy photons	10^{-3} R/hr to 10^{4} R/hr " " " " "	
(b)	Environmental Qualification	No specific provisions	-
(c)	Seismic Qualification	No specific provisions	-
(d)	Quality Assurance	High Quality Commercial Grade	High Quality Commercial Grade
(e)	Power Supply	No specific provision	Battery Powered
(f)	Redundance & Sensor Location	Not Required	Yes - multiple units provided

Item	Quantity	Range	Measurement	Location
ES-20	50	0 R/hr -2 R/hr	Photons	Service Bldg.
E-400	6	0 - 200 mr/hr	Photons	" " "
Minirad	28	0 - 5 R/hr	Photons	" " "
PIC-6A	30	0 - 1000 R/hr	Photons	" " "
PRM-7	6	10^{-5} R/hr -5 x 10^{-3} R/hr	Photons	" " "
Ro-7	2	0 - 20,000 R/hr	Photons, beta & low energy photons	" " "
Ro-2	20	0 - 5 R/hr	Beta & low energy photons	" " "
Teletektor	35	0 - 1000 R/hr	Photons	" " "
Ro-2A	15	0 - 50 R/hr	Beta & low energy photons	" " "

(g) Location of Display - Display is integral part of portable instrument.

(h) Schedule - No changes required.

VARIABLE E9 - Plant and Environs Radioactivity (Portable Instrumentation)

		Recommended by RG 1.97	Provided by Brunswick
a)	Instrument Range	Multichannel Gamma Ray Spectrometer	ND-66 Multichannel Gamma Ray Spectrometer
b)	Environmental Qualification	No specific provision	-
c)	Seismic Qualification	No specific provision	-
d)	Quality Assurance	High Quality Commercial Grade	High Quality Commercial Grade
e)	Power Supply	No specific provision	-
f)	Redundance & Sensor Location	Not Required	Yes

ND 56 located in Counting Room
ND 6620 located in Mobile Lab

g) Location of Display - Display is integral part of portable instrument.

h) Schedule - No changes are required.

Variable E10 - Wind Direction
Variable E11 - Wind Speed
Variable E12 - Estimation of Atmospheric Stability

	Recommended by RG 1.97	Provided by Brunswick
Instrument Range E10	0 to 360° (± 5° accuracy with a deflection of 15°). Starting speed 0.45 mps (1.0 mph). Damping ratio between 0.4 and 0.6, distance constant ≤2 meters.	0 to 540°, ± 5.4°
E11	0 to 30 mps (67 mph) ± 0.22 mps (0.5 mph). Accuracy for wind speeds less than 11 mps (25 mph) with a starting threshold of less than 0.45 mps (1.0 mph).	0 to 125 mph, ± .4 mph
E12	Based on vertical temperature difference from primary system.-5°C to 10°C (-9°F to 18°F and ± .15°C accuracy per 50 meter intervals (± .3°F accuracy per 164-foot intervals) or analogous range for alternative stability estimates.	Differential temperature System ± .186 F over ambient temperature range from -50°C to + 30°F
b) Environmental Qualification	No specific provision	High Quality Commercial
c) Seismic Qualification	No specific provision	No

Variable E10 (Continued)
Variable E11 (Continued)
Variable E12 (Continued)

		Recommended by RG 1.97	Provided by Brunswick
d)	Quality Assurance	High Quality Commercial	High Quality Commercial
e)	Power Supply	No specific provision	Conventional Power Sources
f)	Redundance and Sensor Location	Redundancy not required	No redundancy

Sensors are located at the Meteorological Tower

g) Location of Display - Displays are located in an environmentally controlled shelter located near the tower. A computer system polls the meteorological station, and provides print-outs in the control room for operators.

h) Schedule - Brunswick will replace the existing system with new equipment which will fully meet RG 1.97 requirements. The new system is scheduled to go into operation December, 1983.

VARIABLE E13 - Primary Coolant and Sump (ANALYSIS CAPABILITY ON SITE)

		Recommended by RG 1.97	Provided by Brunswick
a)	Instrument Range		
	Gross Activity	10 uCi/ml to 10 Ci/ml	1 uCi/ml to 10 uCi/ml
	Gamma Spectrum	Isotopic Analysis	Isotopic Analysis
	Boron Content	0 to 1000 ppm	20 to 6000 ppm
	Chloride Content	0 to 20 ppm	0.5 to 20 ppm
	Dissolved Hydrogen or Total Gas	0 to 2000 cc (STP)/Kg	$\leq$ 1 to 100%
	Dissolved Oxygen	0 to 20 ppm	$\leq$ 1 to 30%
	pH	1 to 13	1 to 14
b)	Environmental Qualification	No specific provision	Sampling System will be qualified. Analysis equipment is high quality commercial.
c)	Seismic Qualification	No specific provision	Sampling system will be seismically qualified. Analysis equipment has not been qualified.
d)	Quality Assurance	High Quality Commercial Grade	Sampling system has full QA Program commitment. Analysis equipment is high quality commercial grade.

VARIABLE E13 (Continued)

	Recommended by RG 1.97	Provided by Brunswick
(e) Power Supply	No specific provision	Sampling System will be 1E power. Analysis equipment is powered from conventional sources.
(f) Redundance & Sensor Location	Redundancy not required	-

The Post Accident Sampling System allows samples of primary coolant to be taken from a remote station in the Turbine Building breezeway. Analyzing equipment is located as follows:

Gross Activity and Gamma Spectrum - Counting Room, Mobile Trailer

Chemical Analysis - Chemistry Lab

(f) Location of Display

The chemistry analysis is made in the Chemistry Lab and the results logged. Gross activity and gamma spectrum displays are available in the Counting Room and Mobile Trailer.

(h) Schedule: TMI Plant Modifications 80-028 and 80-029 have provided the Post Accident Sampling System for Unit 1 and 2, respectively.

VARIABLE E14 - Containment Air

		Recommended by RG 1.97	Provided by Brunswick
(a)	Instrument Range		
	Hydrogen Content	0 to 30%	≤ 1 to 100%
	Oxygen Content	0 to 30%	≤ 1 to 30%
	Gamma Spectrum	(Isotopic Analysis)	Isotopic Analysis
(b)	Environmental Qualification	No specific provision	Sampling system will be environmentally qualified. Analysis equipment is high quality commercial.
(c)	Seismic Qualification	No specific provision	Sampling System will be seismically qualified. Analysis equipment has not been qualified.
(d)	Quality Assurance	High Quality Commercial Grade	Brunswick QA program applies to the sampling system. Analysis equipment is high quality commercial grade.
(e)	Power Supply	No specific provision	Sampling System will be 1E power. Analysis equipment is powered from conventional sources.

Variable E14 (Continued)

	Recommended by RG 1.97	Provided by Brunswick
(f) Redundance & Sensor Location	Redundancy Not Required	-

The Post Accident Sampling System allows samples of primary coolant to be taken from a remote station in the Turbine Building breezeway. The analysis equipment is located in the Chemistry Lab.

(g) Location of Display - The display is located in the Chemistry Lab and sample results are logged.

(h) Schedule: TMI Plant Modifications 80-028 and 80-029 have provided the Post Accident Sampling System for Units 1 and 2, respectively.