August 26, 1983

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Docket No. 50-333

Mr. J. P. Bayne
Executive Vice President,
Nuclear Generation
Power Authority of the State
of New York
123 Main Street
White Plains, NY 10601

Dear Mr. Bayne:

The Commission has issued the enclosed Amendment No. to Facility Operating License No. DPR-59 for the James A. FitzPatrick Nuclear Power Plant. The amendment authorizes changes to the Technical Specifications in response to your application for amendment dated July 7, 1983. As a result of subsequent discussions with your staff, we made certain changes to your proposed specifications. These changes have been discussed with and agreed to by your staff.

The amendment changes the Technical Specifications to incorporate revised operating limits associated with the modifications to the Scram Discharge Volume (SDV) for improved hydraulic coupling. These long-term SDV modifications have been undertaken to comply with the design and performance criteria set forth in the staff's December 1, 1980 Generic Safety Evaluation, "BWR Scram Discharge System." The SDV system has been modified during the present refueling outage prior to operation in Cycle 6.

Because better hydraulic coupling has been achieved with the long-term SDV modifications, this amendment authorizes the removal of interim conditions to the license that were implemented by the Commission's Orders of October 2, 1980, which required the installation of a system for continuous monitoring of SDV water level, and January 9, 1981, which required the installation of an automatic system to initiate control rod insertion on low pressure in the control air header; and fulfills the conditions specified in the Commission's Order of June 24, 1983, which required implementation of the long-term SDV modifications in accordance with the staff's generic safety evaluation prior to operation in Cycle 6.



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| SURNAME ▶ | | | | | | | |
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A copy of the Commission's related Safety Evaluation is also enclosed.

Sincerely,

Original signed by:

Joseph D. Hegner, Project Manager
Operating Reactors Branch #2
Division of Licensing

Enclosures:
1. Amendment No. 75 to DPR-59
2. Safety Evaluation

cc w/enclosures:
See next page

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OK on enforcement issue S Burns

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| DATE | 8/16/83 | 8/17/83 | 8/17/83 | 8/17/83 | 8/17/83 | 8/18/83 | 8/17/83 |

Mr. J. P. Bayne
Power Authority of the State of New York
James A. FitzPatrick Nuclear Power Plant

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

POWER AUTHORITY OF THE STATE OF NEW YORK

DOCKET NO. 50-333

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 75
License No. DPR-59

1 The Nuclear Regulatory Commission (the Commission) has found that:

A. The application for amendment by the Power Authority of the State of New York (the licensee) dated July 7, 1983 complies with the standards and requirements of the Atomic Energy Act of 1954 as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the amendment authorizes the removal of the interim conditions to Facility Operating License No. DPR-59 that were implemented by the Commission's Orders of October 2, 1980, and January 9, 1981; and fulfills the conditions specified in the Commission's Order of June 24, 1983. The license is further amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C(2) of Facility Operating License No. DPR-59 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 75 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: August 26, 1983

ATTACHMENT TO LICENSE AMENDMENT NO.

FACILITY OPERATING LICENSE NO. DPR-59

DOCKET NO. 50-333

Revise the Appendix "A" Technical Specifications as follows:

| Remove | Replace |
|---|---|
| - | 6a |
| 32 | 32 |
| 34 | 34 |
| 41a | 41a |
| 44 | 44 |
| 45a | 45a |
| 46 | 46 |
| 72 | 72 |
| 73 | 73 |
| 89a | 89a |
| 96 | 96 |

Z. Top of Active Fuel

The Top of Active Fuel, corresponding to the top of the enriched fuel column of each fuel bundle, is located 352.5 inches above vessel zero, which is the lowest point in the inside bottom of the reactor vessel. (See General Electric drawing No. 919D690BD.)

AA. Rod Density

Rod density is the number of control rod notches inserted expressed as a fraction of the total number of control rod notches. All rods fully inserted is a condition representing 100 percent rod density.

## 3.1 BASES

The reactor protection system automatically initiates a reactor scram to:

1. Preserve the integrity of the fuel cladding.

2. Preserve the integrity of the Reactor Coolant System.

3. Minimize the energy which must be absorbed following a loss of coolant accident, and prevent inadvertent criticality.

This specification provides the limiting conditions for operation necessary to preserve the ability of the system to perform its intended function even during periods when instrument channels may be out of service because of maintenance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

The Reactor Protection System is of the dual channel type (Reference subsection 7.2 FSAR). The System is made up of two independent trip systems, each having two subchannels of tripping devices. Each subchannel has an input from at least one instrument channel which monitors a critical parameter.

The outputs of the subchannels are combined in a 1 out of 2 logic; i.e., an input signal on either one or both of the subchannels will cause a trip system trip. The outputs of the trip systems are arranged so that a trip on both systems is required to produce a reactor scram.

This system meets the intent of IEEE-279 (1971) for Nuclear Power Plant Protection Systems. The system has a reliability greater than that of a 2 out of 3 system and somewhat less than that of a 1 out of 2 system.

With the exception of the average power range monitor (APRM) channel the intermediate range monitor (IRM) channels, the scram discharge volume, the main steam isolation valve closure and the turbine stop valve closure, each subchannel has one instrument channel. When the minimum condition for operation on the number of operable instrument channels per untripped protection trip system is met or if it cannot be met and the affected protection trip system is placed in a tripped condition, the effectiveness of the protection system is preserved.

Three APRM instrument channels are provided for each protection trip system. APRM's A and E operate contacts in one subchannel and APRM's C and E operate contacts in the other

3.1 BASES (cont'd)

is discharged from the reactor by a scram can be accommodated in the discharge piping. Each scram discharge instrument volume accommodates in excess of 34 gallons of water and is the low point in the piping. No credit was taken for this volume in the design of the discharge piping as concerns the amount of water which must be accommodated during a scram.

During normal operation the discharge volume is empty; however, should it fill with water, the water discharged to the piping from the reactor could not be accommodated, which would result in slow scram times or partial control rod insertion. To preclude this occurrence, level detection instruments have been provided in each instrument volume which alarm and scram the reactor when the volume of water reaches 34.5 gallons. As indicated above, there is sufficient volume in the piping to accommodate the scram without impairment of the scram times or amount of insertion of the control rods. This function shuts the reactor down while sufficient volume remains to accommodate the discharged water and precludes the situation in which a scram would be required but not be able to perform its function adequately.

A Source Range Monitor (SRM) System is also provided to supply additional neutron level information during startup but has no scram functions (reference paragraph 7.5.4 FSAR).

Thus, the IRM and APRM are required in the refuel and startup/hot standby modes. In the power range the APRM System provides required protection (reference paragraph 7.5.7 FSAR). Thus the IRM System is not required in the run mode. The APRM's cover only the power range. The IRM's and APRM's provide adequate coverage in the startup and intermediate range.

The high reactor pressure, high drywell pressure, reactor low water level and scram discharge volume high level scrams are required for startup and run modes of plant operation. They are, therefore, required to be operational for these modes of reactor operation.

The requirement to have the scram functions indicated in Table 3.1-1 operable in the refuel mode assures that shifting to the refuel mode during reactor power operation does not diminish the protection provided by the Reactor Protection System.

Turbine stop valve closure occurs at 10 percent of valve closure. Below 217 psig turbine first stage pressure (30 percent of rated), the scram signal due to turbine stop valve closure is bypassed because the flux and pressure scrams are adequate to protect the reactor.

TABLE 3.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

| Minimum No. of Operable Instrument Channels per Trip System (1) | Trip Function | Trip Level Setting | Modes in Which Function Must Be Operable: Refuel (6) | Startup | Run | Total Number of Instrument Channels Provided by Design for Both Trip Systems | Action (1) |
|---|---|---|---|---|---|---|---|
| 2 | APRM Downscale | ≥2.5 indicated on scale (9) | | | X | 6 Instrument Channels | A or B |
| 2 | High Reactor Pressure | ≤1045 psig | X(8) | X | X | 4 Instrument Channels | A |
| 2 | High Drywell Pressure | ≤2.7 psig | X(7) | X(7) | X | 4 Instrument Channels | A |
| 2 | Reactor Low Water Level | ≥12.5 in. indicated level (≥177 in. above the top of active fuel) | X | X | X | 4 Instrument Channels | A |
| 3 | High Water Level in Scram Discharge Volume | ≤34.5 gallons per Instrument Volume | X(2) | X | X | 8 Instrument Channels | A |
| 2 | Main Steam line High Radiation | ≤3x normal full power background | X | X | X | 4 Instrument Channels | A |
| 4 | Main Steam Line Isolation Valve Closure | ≤10% valve closure | X(3)(5) | X(3)(5) | X(5) | 8 Instrument Channels | A |

Table 4.1-1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

| Instrument Channel | Group | Functional Test | Minimum Frequency (3) |
|---|---|---|---|
| Mode Switch in Shutdown | A | Place Mode Switch in Shutdown | Each refueling outage. |
| Manual Scram | A | Trip Channel and Alarm | Every 3 months. |
| RPS Channel Test Switch | A | Trip Channel and Alarm | Every refueling outage or after channel maintenance. |
| IRM | | | |
| High Flux | C | Trip Channel and Alarm(4) | Once per week during refueling or startup and before each startup. |
| Inoperative | C | Trip Channel and Alarm(4) | Once per week during refueling or startup and before each startup. |
| APRM | | | |
| High Flux | B | Trip output Relays(4) | Once/week. |
| Inoperative | B | Trip output Relays(4) | Once/week |
| Downscale | B | Trip output Relays(4) | Once/week |
| Flow Bias | B | Calibrate Flow Bias Signal(4) | Once/month(1) |
| High Flux in Startup or Refuel | C | Trip Output Relays(4) | Once per week during refueling or startup and before each startup. |
| High Reactor Pressure | B | Trip Channel and Alarm(4) | Once/month.(1) (Instrument check once per da |
| High Drywell Pressure | A | Trip Channel and Alarm | Once/month(1) |
| Reactor Low Water Level (5) | A | Trip Channel and Alarm | Once/month(1) |
| High Water Level in Scram Discharge Instrument Volume | A | Trip Channel | Once/month(7) |
| High Water Level in Scram Discharge Instrument volume | B | Trip Channel and Alarm | Once/month |
| Main Steam Line High Radiation | B | Trip Channel and Alarm(4) | Once/week. |

Table 4.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

NOTES FOR TABLE 4.1-1 (cont'd)

5. The water level in the reactor vessel will be perturbed and the corresponding level indicator changes will be monitored. This perturbation test will be performed every month after completion of the functional test program.

6. Deleted.

7. The functional test shall be performed utilizing a water column or similar device to provide assurance that damage to a float or other portions of the float assembly will be detected.

Table 4.1-2

## REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
## MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

| Instrument Channel | Group (1) | Calibration (4) | Minimum Frequency Once/week |
|---|---|---|---|
| IRM High Flux | C | Comparison to APRM on Controlled Shutdowns | Maximum frequency once/week |
| APRM High Flux<br>Output Signal<br>Flow Bias Signal | <br>B<br>B | Heat Balance<br>Internal Power and Flow Test with Standard Pressure Source | Daily<br>Every refueling outage |
| LPRM Signal | B | TIP System Traverse | Every 1000 effective full power hours |
| High Reactor Pressure | B | Standard Pressure Source | Once/operating cycle |
| High Drywell Pressure | A | Standard Pressure Source | Every 3 months |
| Reactor Low Water Level | A | Pressure Standard | Every 3 months |
| High Water Level in Scram Discharge Instrument Volume | A | Water Column, Note (6) | Once/operating cycle, Note (6) |
| High Water level in Scram Discharge Instrument Volume | B | Standard Pressure Source | Every 3 months |
| Main Steam Line Isolation Valve Closure | A | Note (5) | Note (5) |
| Main Steam Line High Radiation | B | Standard Current Source (3) | Every 3 months |
| Turbine Plant Stage Pressure Permissive | A | Standard Pressure Source | Every 6 months |
| Turbine Control Valve Fast Closure Oil Pressure Trip | A | Standard Pressure Source | Once/operating cycle |

TABLE 3.2-3

INSTRUMENTATION THAT INITIATES CONTROL ROD BLOCKS

| Minimum no. of Operable Instrument Channels Per Trip System | Instrument | Trip Level Setting | Total Number of Instrument Channels Provided by Design for Both Channels | Action |
|---|---|---|---|---|
| 2 | APRM Upscale (Flow Biased) | $S \leq (0.66W+42\%) x \frac{FRP}{MFLPD}$ | 6 Inst. Channels | (1) |
| 2 | APRM Upscale (Start-up Mode) | $\leq 12\%$ | 6 Inst. Channels | (1) |
| 2 | APRM Downscale | $\geq 2.5$ indicated on scale | 6 Inst. Channels | (1) |
| 1 (6) | Rod Block Monitor (Flow Biased) | $S \leq 0.66W+K$ (8) | 2 Inst. Channels | (1) |
| 1 (6) | Rod Block Monitor (Downscale) | $\geq 2.5$ indicated on scale | 2 Inst. Channels | (1) |
| 3 | IRM Downscale (2) | $\geq 2\%$ of full scale | 8 Inst. Channels | (1) |
| 3 | IRM Detector not in Start-up Position | (7) | 8 Inst. Channels | (1) |
| 3 | IRM Upscale | $\leq 86.4\%$ of full scale | 8 Inst. Channels | (1) |
| 2 (4) | SRM Detector not in Start-up position | (3) | 4 Inst. Channels | (1) |
| 2 (4) (5) | SRM Upscale | $\leq 10^5$ counts/sec | 4 Inst. Channels | (1) |
| 1 | Scram Discharge Instrument Volume High Water Level | $\leq 26.0$ gallons per instrument volume | 2 Inst. Channels | (9) (10) |

NOTES FOR TABLE 3.2-3

1. For the Start-up and Run positions of the Reactor Mode Selector Switch, there shall be two operable or tripped trip systems for each function. The SRM and IRM block need not be operable in run mode, and

TABLE 3.2-3 (Cont'd)

INSTRUMENTATION THAT INITIATES CONTROL ROD BLOCKS

NOTES FOR TABLE 3.2-3

the APRM and RBM rod blocks need not be operable in start-up mode. From and after the time it is found that the first column cannot be met for one of the two trip systems, this condition may exist for up to seven days provided that during that time the operable system is functionally tested immediately and daily thereafter; if this condition lasts longer than seven days, the system shall be tripped. From and after the time it is found that the first column cannot be met for both trip systems, the systems shall be tripped.

2. IRM downscale is bypassed when it is on its lowest range.

3. This function is bypassed when the count rate is ≥ 100 cps.

4. One of the four SRM inputs may be bypassed.

5. This SRM Function is bypassed when the IRM range switches are on range 8 or above.

6. The trip is bypassed when the reactor power is ≤ 30%.

7. This function is bypassed when the Mode Switch is placed in Run.

8. S = Rod Block Monitor Setting in percent of initial.

   W = Loop recirculation flow in percent of rated

   K = Intercept values of 39% 40%, 41% and 42% can be used with appropriate MCPR limits from Section 3.1.B.

9. When the reactor is subcritical and the reactor water temperature is less than 212°F, the control rod block is required to be operable only if any control rod in a control cell containing fuel is not fully inserted.

10. When one of the instruments associated with scram discharge instrument volume high water rod blocks is not operable, the trip system shall be tripped.

b. The control rod directional control valves for inoperable control rods shall be disarmed electrically.

c. Control rods with scram times greater than those permitted by Specification 3.3.C.3 are inoperable, but if they can be inserted with control rod drive pressure they need not be disarmed electrically.

d. Control rods with a failed "Full-in" or "Full-out" position switch may be bypassed in the Rod Sequence Control System and considered operable if the actual rod position is known. These rods must be moved in.

e. When it is initially determined that a control rod is incapable of normal insertion, an attempt to fully insert the control rod shall be made. If the control rod cannot be fully inserted:

shutdown margin test shall be made to demonstrate under this condition that the core can be made subcritical for any reactivity condition during the remainder of the operating cycle with the analytically determined, highest worth control rod capable of withdrawal, fully withdrawn, and all other control rods capable of insertion fully inserted. If Specification 3.3.A.1 and 4.3.A.1 are met, reactor startup may proceed.

f. The scram discharge volume drain and vent valves shall each be full-travel cycled at least once per quarter to verify that the valves close in less than 30 seconds and to assure proper valve stroke and operation.

g. At least once per operating cycle, the operability of the entire scram discharge system as an integrated whole shall be demonstrated by a scram of control rods from a normal control rod configuration of less than or equal to 50% rod density by verifying that the drain and vent valves:

1. Close upon receipt of a signal for control rods to scram; and

2. Open when the scram signal is reset.

This requirement may be satisfied as part of any scram originating from the rod density conditions specified above, provided that Specification 4.3.A.2.f is independently satisfied during the quarter in which the scram occurs.

3.3 (cont'd)

2. The average of the scram insertion times for the three fastest operable control rods of all groups of four control rods in a two-by-two array shall be no greater than:

| Control Rod Notch Position Observed | Average Scram Insertion Time (Sec.) |
|---|---|
| 46 | 0.361 |
| 38 | 0.977 |
| 24 | 2.112 |
| 04 | 3.764 |

4.3 (cont'd)

2. At 8-week intervals, 15 percent of the operable control rod drives shall be scram timed above 950 psig. Whenever such scram time measurements are made, an evaluation shall be made to provide reasonable assurance that proper control rod drive performance is being maintained.

3. All control rods shall be determined operable once each operating cycle be demonstrating the scram discharge volume drain and vent valves operable when the scram test initiated by placing the mode switch in the SHUTDOWN position is performed as required by Table 4.1-1 and by verifying that the drain and vent valves:

   a. Close in less than 30 seconds after receipt of a signal for control rods to scram, and

   b. Open when the scram signal is reset or the scram discharge instrument volume trip is bypassed.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

# SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

## SUPPORTING AMENDMENT NO.75 TO FACILITY OPERATING

## LICENSE NO. DPR-59

## POWER AUTHORITY OF THE STATE OF NEW YORK

## JAMES A. FITZPATRICK NUCLEAR POWER PLANT

## DOCKET NO. 50-333

### I. Introduction

By letter dated July 7, 1983, the Power Authority of the State of New York (the licensee) proposed changes to the Technical Specifications for Facility Operating License No. DPR-59 for the James A. FitzPatrick Nuclear Power Plant. These proposed changes involve:

(1) Revised operating limits as a result of the long-term modifications to the Scram Discharge Volume (SDV);

(2) Removal of license conditions for the continuous monitoring system of SDV water level imposed by the Commission's Order of October 2, 1980; and for the air dump header imposed by the Commission's Order of January 9, 1981; and

(3) Fulfillment of license conditions for implementation of the long-term SDV modifications imposed by the Commission's Order of June 24, 1983.

### II. Discussion

The first change proposed by the licensee reflects the modifications to the SDV system to improve hydraulic coupling and provide diverse instrumentation. These modifications have been undertaken during the refueling outage for Cycle 6 operation to comply with the design and performance criteria described in the staff's December 1, 1980 Generic Safety Evaluation Report (Generic SER), "BWR Scram Discharge System". Change (2) above, removes the license conditions for the air dump header instrumentation and continuous water level monitoring because the improved hydraulic coupling achieved by the modifications noted in change (1) above. Change (3) above, acknowledges that the licensee has fulfilled the conditions imposed by the Commission's Order of June 24, 1983 by implementing the modifications discussed in change (1).

After analyzing events at several operating reactors that involved the SDV system, the staff recommended that SDV systems in all BWRs be modified to assure long-term reliability. To achieve these objectives, an NRC task force and a subgroup of the BWR Owners Group convened to develop revised SDV system design and safety criteria to be used in establishing acceptable SDV system modifications. Short-term and long-term actions were recommended by the staff in the Generic SER. The staff evaluated the licensee's actions under the short-term phase of the program in a January 29, 1982 license amendment. The January 29, 1982 amendment revised the Technical Specifications by adding surveillance requirements for the vent and drain valves and level switches in the instrument volume. The staff also issued Orders which implemented license conditions for an automatic scram function from degraded air supply conditions and for continuous monitoring of SDV water levels as interim measures until the long-term modifications for improved hydraulic coupling were implemented.

The long-term program identifies improvements in three major areas: SDV Instrument Volume (IV) hydraulic coupling, diverse level instrumentation, and system isolation. The Generic SER states the various criteria, the technical bases, and an acceptable means of compliance. This Safety Evaluation summarizes the staff's review of the actions taken by the licensee under the long-term program.

## III. Evaluation

### A. Change (1) - SDV Modifications

We have reviewed the licensee's submittal to determine compliance with the design, safety, functional and operational criteria of the Generic SER by evaluating them against the stated acceptance criteria in the Generic SER. Our evaluation of the licensee's implementation of long-term modifications and associated technical specification changes to improve the SDV reliability at FitzPatrick is discussed below. For reference, the numbering system used to evaluate each criterion parallels that of the Generic SER.

### 4.2.1 Functional Criterion 1

The scram discharge volume shall have sufficient capacity to receive and contain water exhausted by a full reactor scram without adversely affecting control rod drive scram performance.

#### Licensee Response

As modified, the SDV system provides a controlled near-atmospheric volume for the accumulation of scram discharge water which is released from each control rod Hydraulic Control Unit (HCU) upon initiation of a reactor scram.

There are 69 HCU's on the east side of the Reactor Building and 68 HCU's on the west side. The near-atmospheric volume available for scram located in the SDV above and near each bank of HCU's provides 3.34 gallons per HCU during the worst-case fast-fill event

Each Instrument Volume (east and west) has four scram level instruments individually connected via one-inch diameter lines and root valves.

The scram level specified in the proposed Technical Specifications (accumulation of 34.5 gallons in the 24-inch diameter Instrument Volume) has been determined utilizing results from open-channel flow analysis and RPS system time delay in the scram outlet valve actuation. No credit is taken for this volume to accommodate a scram. Thus, adequate volume for scram, under the worst conditions, exists in the modified system.

Staff Evaluation

An acceptable means of meeting this criterion is to provide a minimum scram discharge volume of 3.34 gallons per drive in accordance with the General Electric letter OER 54, dated March 14, 1982, which we previously found acceptable.

We have reviewed the licensee's response against the requirements of the acceptance criterion and have determined that the licensee has used the sizing criterion of 3.34 gallons per drive. Based on the data presented above, we conclude that the SDV high water level scram setpoint of $\leq$ 34.5 gallons has been conservatively selected and provides sufficient margin under worst case conditions. Therefore, the design modifications meet the requirements and are acceptable. Based on the above, the proposed change to the Technical Specifications which sets the scram setpoint of $\leq$ 34.5 gallons is acceptable.

4.2.2 Safety Criteria

4.2.2.1 Safety Criterion 1

No single active failure of a component or service function shall prevent a reactor scram under the most degraded conditions that are operationally acceptable.

Licensee Response

In regard to the operation under degraded conditions, this project has addressed the occurrence of low air pressure in the CRD control air headers. Operation under degraded control air conditions could result in a Scram Discharge Instrument Volume "fast fill" event. The hydraulic design incorporated in this long-term modification addresses this "worst case" situation.

In addition, NRC Regulatory Guide 1.53 requires that no credible single failure result in the inability of a protective system to perform its intended safety related function. The Scram Discharge Instrument Volume (SDIV) electrical power and control and instrumentation is designed on a redundant basis. All wiring, conduit and cable/raceway runs are physically separated to prevent a single physical or electrical failure from isolating the SDIV on a reactor scram or on a high level signal in the SDIV. Redundant control air lines are routed from the SDIV air dump solenoid valves to the redundant vent and drain isolation valves. The SDIV level measuring instruments are provided with redundancy and diversity as described under Safety Criterion No. 3.

Also, in its response to Design Criteria 1 below, the licensee described the system design with respect to the worst-case in-flow rates and states that the system was sized to accommodate such an event. Vent and drain flows are not necessary to assure system function.

Staff Evaluation

An acceptable means of complying with this criterion is to design the system such that partial losses of service function (e.g., degraded control air pressure) as well as full losses do not adversely affect system functions. We have reviewed the licensee's response against this acceptance criterion and against the criteria for Design Criterion 4. We find that the licensee's design as described above meets the requirements and is therefore, acceptable.

4.2.2.2 Safety Criterion 2

No single active failure shall prevent uncontrolled loss of reactor coolant.

Licensee Response

The criterion establishes the design basis for preventing loss of reactor coolant due to a single failure in the SDIV system. It further states an acceptable way of meeting this criterion is to install two isolation valves in series for the vent and drain function.

Two isolation valves are installed in series for the vent and drain functions to prevent a single failure of a valve from preventing the isolation of the vent or drain. An uncontrolled loss of reactor coolant due to single isolation valve failure-to-close is thus prevented.

Two control air lines are routed from the scram solenoid valves to the redundant vent and drain isolation valves. A single failure in one control air line will not prevent the other control air line from closing the redundant isolation valves. The 115 volt a-c scram solenoid valves are backed up by 125 volt d-c solenoid valves powered from the station battery. A single failure of one of the 115 volt a-c solenoid valves will not, therefore, prevent the isolation valves from closing.

Staff Evaluation

An acceptable way of meeting this criterion is to provide two isolation valves in series in all SDV vent and IV drain lines which are sufficiently independent to avoid failure due to solenoid failures. This resolution will also correct the potential for excessive hydrodynamic force generation.

We have evaluated the licensee's modification against this criterion and have concluded that the licensee has designed the system in accordance with the criterion and is therefore acceptable.

4.2.2.3 Safety Criterion 3

The scram discharge system instrumentation shall be designed to provide redundancy, to operate reliably under all conditions, and shall not be adversely affected by hydrodynamic forces or flow characteristics.

Licensee Response

Each SDIV is provided with level measuring instrumentation which meets the requirement for redundancy and diversity. Each SDIV has two float type level switches and two differential pressure type level instruments for actuating a scram on high SDIV level. Float switches and differential pressure actuated switches are arranged electrically in an "or" gate logic so that a failure of one type of measurement due to a common mode failure will not result in the inability to initiate a reactor scram on high SDIV level. The level switches are arranged in a one-out of two taken twice logic arrangement. Therefore, the instrumentation on each SDIV meets the single failure criterion.

A Hydraulic Transient Analysis was made to determine the possible impact of hydrodynamic forces in the system. The effect of the hydrodynamic forces has been incorporated into the design of the two types of instrumentation used in this design. In addition, the impact of flow characteristics has been determined and incorporated into the specification of the instrumentation which may be flow sensitive, i.e., the float-operated level switch.

The level sensors provided for each Trip System are of two diverse types. The float operated level switch (class 1E qualified) is similar in operation and construction to that which is presently in use. The second type of level sensor is a sealed sensor system with a differential pressure transmitter which has operating principles totally different from that employed by the flow-operated level switch. This diverse instrumentation is completely class 1E qualified and provides assurance of protection from common cause failures due to float-crushing, etc. Also, the possibility of a common cause failure is further protected against by: (1) the periodic functional testing of level instrumentation as required by Surveillance Criteria 2 of the NRC SER, (2) the operational principal diversity, and (3) the qualification of instruments to IEEE 323 and 344.

The redundant instrumentation is powered from separate and redundant vital 115 VAC electrical busses such that a loss of electrical power in one bus will not cause an unnecessary scram. The electrical system is arranged so that Bus "A" powers the "A" system instruments and relays and Bus "B" powers the "B" system instruments and relays. A failure of either of these busses will cause a half scram.

Staff Evaluation

An acceptable means of complying with this criterion and addressing the additional staff concerns on common-cause failure of instrumentation is as follows:

(1) With respect to single failures (random) provide sufficient redundancy in the automatic scram level instrumentation to meet the single failure criterion on each instrumented portion of the SDV; and

(2) With respect to common-cause failures:

a. provide additional (or substitute) level-sensing instrumentation for the automatic scram function to include diversity as well as redundancy. The diversity, should, as a minimum, be achieved by level sensors that employ different operating principles for measuring the water level; and

b. for the instrumentation selected, demonstrate how common-cause failures, such as those identified by operating history and those identified in the Foreword to IEEE 379-1977 will be considered.

We have evaluated the licensee's response to this safety criterion and find that sufficient redundancy has been provided to meet the single failure criterion. As stated in the licensee's response to Safety Criterion 1, redundant components in the scram discharge system assure that failure of a single valve, instrument, or other component will not prevent a reactor scram. In addition, the licensee's response to Design Criterion 4 (below) states that each instrumented volume will be equipped with two sets of instrument taps. As stated in the licensee's response to Safety Criterion 3, both float-type and differential pressure sensing type level instruments will be installed thereby providing both redundancy and diversity.

With respect to common-cause failures, the licensee has provided for diversity by using differential pressure and float-type instrumentation. The pressure-differential switches are not susceptible to the hydrodynamic forces experienced with crushed floats. Therefore, we find that sufficient diversity has been provided for and that each type of sensor uses different principles for sensing water level.

For these types of instruments, the licensee has considered common-cause failures as identified by previous operating history and by the Foreword to IEEE 379-1977. Operating history has shown that floats could be crushed because of hydrodynamic forces. As discussed above, the licensee has installed diverse instrumentation to account for this problem.

To protect the instrument from common-cause failures resulting from the external environmental effects, the Foreword to IEEE 379-1977 suggests that system components be designed, qualified and installed to be immune from earthquakes and floods, design and manufacturing errors, and operator and maintenance errors. The licensee has stated that the equipment will meet IEEE Standards 323 and 344. Since the licensee will be installing safety-related equipment, Appendix B of 10 CFR Part 50, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, requires, in part, that licensees assure that manufacturers who provide equipment for use in safety-related applications have design and manufacturing quality assurance programs consistent with Appendix B requirements. Therefore, the use of safety-related equipment in the SDV modifications and the use of qualified maintenance personnel who use approved procedures subject to a quality assurance program, all meet the intent of the IEEE Foreword and are therefore acceptable.

We have reviewed the licensee's proposed changes to the Technical Specification Limiting Condition for Operation and surveillance requirements regarding RPS and rod block instrumentation and find them acceptable because they incorporate both the float and differential pressure type instruments.

4.2.2.4 Safety Criterion 4

System operating conditions which are required for scram shall be continuously monitored.

Licensee Response

The SDIV is measured by redundant and diverse level instrumentation as described in our response to Safety Criterion 3. In addition, the control room operator is provided with appropriate annunciators, computer printouts, and status indicating lights.

Staff Evaluation

An acceptable means of complying with this criterion is provided under Safety Criterion 3. Since diverse and redundant instrumentation will be installed, and the licensee's response was found acceptable for Safety Criterion 3, we therefore, find this item is also acceptable.

4.2.2.5 Safety Criterion 5

Repair, replacement, adjustment, or surveillance of any system component shall not require the scram function be bypassed.

Licensee Response

When a level device is removed from service, the device will be bypassed. Float level switches and analog type (differential pressure) switches on each Instrument Volume in each channel are combined in a logic "or" gate such that bypassing any one switch will not prevent actuation of the associated protective channel.

Staff Evaluation

An acceptable way of complying with this criterion is for instrument (or instrument channel) repair or replacement to implement a half-scram (one out of 2) in accordance with existing Technical Specifications.

We have evaluated the licensee modifications against this criterion and have determined that the system has been designed in accordance with the criterion based on the use of a "one-out-of-two taken twice" logic system and is therefore acceptable.

4.2.3 Operational Criteria

The technical basis on page 42 of the Generic SER states that these criteria are based upon operational convenience and are not directly related to safety given that both the hydraulic coupling between the SDV and IV is sufficient to quickly detect an accumulation of water in the volume and the instrumentation available to detect the water is extremely reliable. For example, operational criteria 1 and 2 are meant to prevent inadvertent scrams resulting from maintenance and test operations and to assure that the operator has enough information available to permit him to take corrective action prior to conditions which would cause an inadvertent scram. Similarly, operational criterion 4 would facilitate placing the plant back in operation after a scram. Yet, these criteria are indirectly related to safety in that they prevent unnecessary challenges to the safety systems and so should be followed.

4.2.3.1 Operational Criterion 1

Level instrumentation shall be designed to be maintained, tested, or calibrated during plant operation without causing a scram.

Licensee Response

The level instrumentation is designed to be maintained, tested or calibrated during plant operation without scram as discussed in the response to Safety Criterion 5. Each instrument can be tested locally with proper function of respective relays, alarms and computer messages assuring full operational readiness.

We have reviewed the licensee's response that the level instrumentation has been designed to allow maintenance, testing, or calibration during plant operations without causing a scram and conclude that the requirements for this criterion have been met.

4.2.3.2 Operational Criterion 2

The system shall include sufficient supervisory instrumentation and alarms to permit surveillance of system operation.

Licensee Response

Level instrumentation is provided with control room annunciator alarms and computer printouts to permit control room surveillance by the operators as follows:

1) Annunciator Inputs

- One common annunciator window for "HIGH LEVEL SDIV SCRAM" on any one of 8 scram level instruments - 4 float switches and 4 differential pressure actuated switches.

- One annunciator window to indicate "SDIV NOT DRAINED". This window is activated from either one of two slave trip units which are activated by their respective differential pressure transmitters on the attainment of the high level alarm point. There is one alarm function associated with each of the SDIVs.

- One annunciator window to indicate "HIGH SDIV TRIP BYPASSED" if bypass is selected in shutdown or refueling mode.

2) Computer Inputs

- One computer input for each of 8 level instruments - 4 float switches and 4 differential pressure actuated switches. Indication is "Hi Level SDV Trip".

- Two computer inputs to indicate "Rod Block Withdrawal". (One at each SDIV)

- Two computer inputs to indicate water level at "Alarm" condition. (One at each SDIV)

3) Status Indicating Lights

- One indicating light for "OPEN" and one for "CLOSED" from each SDIV vent and drain valve. Open = Red, Closed = Green. A total of 16 lights is provided, 2 from each of 8 valves.

Staff Evaluation

We have reviewed the licensee's response and find that it meets the criterion and is, therefore, acceptable.

4.2.3.3 Operational Criterion 3

The system shall be designed to minimize the exposure of operating personnel to radiation.

Licensee Response

The piping system is designed to minimize operating personnel exposure to radiation hazards. To assure minimal exposure of operating personnel to radiation hazards, the IV will be designed to accept temporary shielding and the vent line design will incorporate a protected, non-submerged discharge. In addition, hydrolase connections are provided at critical areas of the drain and SDV headers to permit clean out. Further, the IV and the drain line are provided with concrete block shielding enclosures.

Staff Evaluation

We have reviewed the licensee's response and find it is acceptable because the system has been designed to minimize radiation exposure to operating personnel.

4.2.3.4 Operational Criterion 4

Vent paths shall be provided to assure adequate drainage in preparation for scram reset.

Licensee Response

The vent path provides adequate drainage at reset. The piping design will, assure adequate venting. There will be a one inch diameter comment vent from both the SDV header and the instrument volume.

Staff Evaluation

We have reviewed the licensee's response and find that adequate drainage has been provided because of improved hydraulic coupling as discussed in our evaluation of Functional Criterion 1 above and the venting capability described above.

4.2.3.5 Operational Criterion 5

Vent and drain functions shall not be adversely affected by other system interfaces. The objective of this requirement is to preclude water backup in the scram instrument volume which could cause spurious scram.

Licensee Response

Vent and drains will not be impacted by other system interfaces. The 2-inch diameter drains will be routed independently to equipment drain headers (four inches) which, in turn, travel to the lower elevation equipment drain sumps to ensure highly reliable drainage. Since no increase in drain flow is expected and, in fact, is now split two four-inch diameter drain headers, there is no impact on plant drainage system.

The vents are provided with non-submerged discharge via a water knockdown chamber in the protected environment of nearly RHR heat exchanger rooms. This vent discharge arrangement is presently in operation at the facility and there are no operational problems regarding it.

Staff Evaluation

We have reviewed the licensee's response and find that the system design is adequate to preclude water backup and therefore avoids spurious scrams.

4.2.4 Design Criteria

4.2.4.1 Design Criterion 1

The scram discharge headers shall be sized in accordance with GE OER-54 and shall be hydraulically coupled to the instrumented volume(s) in a manner to permit operability of the scram level instrumentation prior to loss of system function. Each system shall be analyzed based on a plant-specific maximum inleakage to ensure that the system function is not lost prior to initiation of automatic scram. Maximum inleakage is the maximum flow rate through the scram discharge line without control rod motion summed over all control rods. The analysis should show no need for vents and drains.

Licensee Response

The scram discharge volume (headers, connection from header to instrument volume and available portions of the instrument volume) are sized per GE OER-54 for 3.34 gallons per HCU coincident with the worst case in-flow rate determined from plant-specific open-channel hydraulic analysis. The worst case in-flow rate of 6.4 gpm per rod was determined from stall flow tests conducted by the licensee. The open channel analysis utilized this value for inleakage rate summed over all the control rods connected to a header. Vent and drain flows are not necessary to assure system function.

Staff Evaluation

We have evaluated the licensee's response and have determined that the licensee has provided an IV which is an integral part of the SDV for each of the two SDVs, thus assuring adequate hydraulic coupling. The licensee has also designed the system in accordance with the approved GE recommendations and has performed the supporting analyses. We therefore find that the licensee's response meets this design criterion and is acceptable.

We have also reviewed the licensee's proposed changes to the rod block setpoint of $\leq$ 26.0 gallons and conclude that this setpoint is acceptable. Leakage beyond this point will automatically result in a reactor scram.

4.2.4.2 Design Criterion 2

Level instrumentation shall be provided for automatic scram initiation while sufficient volume exists in the scram discharge volume.

Licensee Response

Design and analysis procedures have established instrument settings such that automatic scram initiation will occur with sufficient margin to assure that an adequate scram discharge volume present. Level instrumentation is both redundant and diverse.

Staff Evaluation

Acceptable compliance with Design Criterion 1 is an acceptable means of complying with this design criterion. Having found the licensee's response to Design Criterion 1 acceptable, we find that this item is also acceptable.

4.2.4.3 Design Criterion 3

Instrumentation taps shall be provided on the vertical instrument volume and not on the connected piping.

Licensee Response

The design provides two separate taps directly to the Instrument Volume for each level instrument, not on the connected piping.

Staff Evaluation

We have reviewed the licensee's response against this criterion and have determined that the instrumentation taps have been provided on the vertical IV and not on the connected piping. This is in accordance with the Generic SER criterion and is therefore acceptable.

In addition, this criterion also requires that the functional tests of the level instrumentation be acceptable. These functional tests should be performed after each scram for switches using water since there remains concern for residual common-cause failures. However, the model TS also provide for an alternate test frequency when diverse level instrumentation is employed. Because new diverse instrumentation has been installed, the licensee has elected to perform functional testing on a monthly basis rather than after each scram. Based on having installed the design modification in accordance with the Generic SER criteria, we find the licensee's proposed surveillance frequency to be in accordance with our guidelines and is acceptable.

4.2.4.4 Design Criterion 4

The scram instrumentation shall be capable of detecting water accumulation in the instrumented volume(s) assuming a single active failure in the instrumentation system or the plugging of an instrument line.

Licensee Response

The single failure of level instrumentation is addressed in the licensee's response to Functional Criterion No. 1.

All instrument taps are connected directly to the Scram Discharge Instrument Volume. This reduces or eliminates the possible accumulation of sediment which could plug the instrument sensing lines. Functional testing of the instrumentation of each SDIV in accordance with the technical specifications provides an additional level of assurance that plugging of the sensing lines will not occur.

The sensing line instrument isolation valve taps are located on the SDIV at different orientation to prevent a single plugging incident from disabling all instruments. The analog differential pressure transmitter is provided with sensing taps completely independent from the float level switches. Additionally, the differential pressure type instruments have a filled capillary sensing system which prevents sediment from reaching the instrument sensing mechanism.

Staff Evaluation

An acceptable means of meeting this criterion is to satisfy the requirements under Safety Criterion 3 and to install the instrumentation in such a manner that no credible active or passive failure can significantly impact the ability of the instrumentation to monitor the SDV for the presence or accumulation of water.

The licensee has satisfied the requirements of Safety Criterion 3. In addition, as discussed above, the scram level instruments will be installed such that no credible active or passive failure can significantly affect its ability to detect water. Since each instrument volume has two sets of instrument taps, parallel hydraulic circuits exist and therefore plugging of one line or failure of a single instrument will not prevent scram initiation. Therefore, we conclude that the licensee meets the requirements of this criterion.

4.2.4.5 Design Criterion 5

Structural and component design shall consider loads and conditions including those due to fluid dynamics, thermal expansion, internal pressure, seismic consideration and adverse environment.

Licensee Response

The piping, pipe supports, instrument volume/supports, instruments, conduit and block wall enclosures have considered loads due to fluid dynamics, thermal expansion, internal pressure, seismic consideration and adverse environment, as required.

Staff Evaluation

We have reviewed the licensee's response and find that the structural and component design has considered the loads and conditions required by the criterion and is, therefore, acceptable.

4.2.4.6 Design Criterion 6

The power-operated vent and drain valves shall close under loss of air and/or electric power. Valve position indication shall be provided in the control room.

Licensee Response

All air operated SDIV vent and drain valves are of the air to open/fail close type. A loss of control air, control air tubing break or loss of both channels of vital 115 VAC which operate solenoids SV-31A & B will result in automatic spring-assisted closure of the air operated valves.

Each air operated vent and drain isolation valve is provided with a green and red indicating light on the main control panel to indicate closed and open position, respectively. At intermediate positions of the valve, both lights will be illuminated.

Staff Evaluation

We have evaluated the licensee's requirement and conclude that the requirements of this criterion have been satisfied.

4.2.4.7 Design Criterion 7

Any reductions in the system piping flow path shall be analyzed to assure system reliability and operability under all modes of operation.

Licensee Response

No reduction in flow area occurs in the SDV headers or SDV header to IV piping. The headers are 8 inch diameter along the legs of the "U" and are 10 inch diameter at the cross piece of the "U". A 10 inch diameter pipe connects each of the headers with its respective instrument volume. The instrument volumes are 24 inches in diameter.

Staff Evaluation

This criterion requires the analysis of piping systems when a reduction in the available flow area is caused through a reduction in piping diameter in the SDV and SDV to SDV-IV piping. For lines less than two-inch inner diameter the staff has traditionally required that hydraulic line plugging be assumed as a single failure. Therefore, acceptable system function must be demonstrated, given this potential single failure.

The licensee has addressed this issue by stating that there is no reduction in flow area in the SDV heads or in the SDV header to IV piping. Plugging of a single instrument, vent or drain line is considered a single failure, which is addressed in the response to Safety Criterion 1 and Design Criterion 4.

We have reviewed the licensee's response to this criterion and to the two other criteria referenced above and conclude that the requirements for this criterion have been met.

4.2.4.8 Design Criterion 8

System piping geometry (i.e., pitch, line size, orientation) shall be such that the system drains continuously during normal plant operation.

Licensee Response

The piping for the SDV headers, the SDV header to IV piping, the drain and the vent piping are all sloped at least 1/8 inch per foot downward thus providing for continuous free draining of the SDV.

Staff Evaluation

This criterion addresses the need to provide a flow path which permits the continuous draining of coolant that results from normal rod leakage past the individual scram outlet valves. It requires a positive downward slope of the SDV and associated drain piping, as well as piping that is free of loop seals and adequate in size, to prevent buildup of water in the SDV. This criterion must be satisfied to ensure the assumptions used in the analyses for system function under Design Criterion 1.

We have reviewed the licensee's response and find that the system has been designed such that it continuously drains during normal plant operation. Since the requirements to this criterion have been satisfied, the assumptions to the system functional analysis used in Design Criterion 1 have been ensured. We, therefore, find the licensee's response to this criterion acceptable.

4.2.4.9 Design Criterion 9

Instrumentation shall be provided to aid the operator in the detection of water accumulation in the instrumented volumes prior to scram initiation.

Licensee Response

Annunciators and computer printouts are provided for the operator to determine the occurrence of water accumulation in the SDIV prior to scram initiation. Additional information is provided in the licensee's response to Operational Criterion 2.

This design criteria permits the present alarm and rod block withdrawal alarm to meet the requirements for surveillance provided that an acceptable hydraulic coupling exists. The hydraulic coupling of the scram discharge volume and the IV has been addressed in the licensee's response to Functional Criterion 1.

Staff Evaluation

The water level alarms notify the operator when water is present in the instrument volume. The rod block instrumentation notifies the operator that the water level is continuing to rise and prevents further control rod withdrawal. The licensee has proposed changes to the TS that will reflect the revised rod block setpoints of the instruments as a result of the modifications for improved hydraulic coupling. The licensee has addressed hydraulic coupling in the response to Design Criteria 1 and 7. Because we have found the responses to Design Criteria 1 and 7 acceptable, and because the alarm. rod block instrumentation is adequate, we find that the licensee's response to this criterion is acceptable.

4.2.4.10 Design Criterion 10

Vent and drain line valves shall be provided to contain the scram discharge water with a single active failure and to minimize operational exposure.

Licensee Response

Each drain and vent line is provided with two isolation valves in series and completely independent in operation. The redundancy provided in the valve control air system by the DC solenoids provides acceptance to single failure criteria. Additional information was provided by the licensee in its responses to Safety Criterion 2.

Staff Evaluation

An acceptable way of meeting this criterion is to provide two isolation valves in series for all SDV vent and IV drain valves. The licensee stated that the drain and vent lines contain two air-operated valves in series and discusses them further in its response to Safety Criterion 2.

We have reviewed the licensee's response above and to Safety Criterion 2 and conclude that the requirements to this criterion have been met.

4.2.5 Surveillance Criteria

4.2.5.1 Surveillance Criterion 1

Vent and drain valves shall be periodically tested.

A Surveillance and Test Procedure will cover the periodic testing of the vent and drain valves via the SOV-29 switch which is located in the Main Control Panel. This test will record opening and closing times. Valve closure will be verified to be less than 30 seconds.

Staff Evaluation

Existing Technical Specification surveillance requirements call for this type of test on a quarterly basis. The licensee has proposed to modify the Technical Specifications to reflect the long-term modifications and include the criterion that the testing should show valve closure in less than 30 seconds. Based on the above, we find the licensee's proposed TS regarding vent and drain valve testing to be acceptable.

4.2.5.2 Surveillance Criterion 2

Verifying and level detection instrumentation shall be periodically tested in place.

Licensee Response

Surveillance and Test Procedure No. F-ISP-66 (Scram Discharge Volume High Water Level Instrument Functional Test/Calibration) will be updated to require draining of the instrument via the IV connection following operability testing of each instrument. In addition, operating procedures will be updated to require comparison of the Scram Discharge System drain rate with previous measurements subsequent to scram reset.

The TS changes proposed by the licensee provide specifications for functional testing for the two RPS circuits for High Water Level in the Scram Discharge Instrument Volume. These changes prescribe monthly trip channel functional tests of RPS channel A level instruments (float switches) and require that channel calibration be performed once per operating cycle using a water column. Trip channel and alarm functional tests of RPS channel B level instruments (differential pressure-actuated switches) must be performed monthly, and channel calibration must be performed every three months using a standard pressure source.

Staff Evaluation

An acceptable method to meet this criterion is to require that the instrument chamber is drained after functional tests through the taps off the IV and that post-scram, a comparison is made to determine that the response time (time to lower level) is consistent with previous measurements.

The licensee states that the instrument will be drained via the IV connection to assure proper operation. The licensee has procedures for a post-scram comparison between the response time to previous measurements. The proposed functional tests are in accordance with the model TS provided by the staff. Therefore, we have reviewed the licensee's response to this criterion and find it acceptable.

4.2.5.3 Surveillance Criterion No. 3

The operability of the entire system as an integrated whole shall be demonstrated periodically and during each operating cycle, by demonstrating scram instrument response and valve function at pressure and temperature at approximately 50% control-rod density.

Licensee Response

An integrated system test will be performed during start-up from the current refueling outage. This test will verify operability of the entire system by demonstrating scram instrument volume response and valve function. This test will be performed at operating temperature and pressure with a control rod density of approximately fifty percent.

In addition, the licensee has proposed surveillance requirements to demonstrate the operability of the integrated system each operating cycle.

Staff Evaluation

A total integrated system test will demonstrate that the entire system retains its capability to monitor the accumulation of water in the SDV and to scram the plant when required. This test checks the spectrum of operation, that system components and instrumentation experience when going from normal to scram conditions. Acceptable compliance is for the licensee to show reasonable agreement with design analysis and any previous measurement.

The licensee has stated that once a cycle, instrument response and valve function will be demonstrated by scramming the plant from approximately 50% or less control rod density. The licensee may take credit for any scram during the operating cycle that is initiated from those conditions. We have also reviewed the licensee's response and find that the proposed surveillance requirements meet the criterion and is therefore acceptable.

B. Change (2) - Air Dump Header and Continuous SDV Water Level Monitoring

We have reviewed the licensee's proposed changes to the FitzPatrick license that were transmitted in a letter dated July 7, 1983. The proposed changes would remove the conditions to the license that were implemented by the Commission's Order dated January 9, 1981. These conditions required, as an interim measure, for the licensee to provide an automatic scram from degraded air supply conditions until improved hydraulic coupling was incorporated into the system.

As part of the short-term requirements, the Commission issued Orders for Modification of License which required licensees to promptly implement certain actions to assure the safe operation of BWRs with inadequate SDV-to-IV hydraulic coupling. One of the deficiencies identified in the Generic SER was a failure mode of the control air system, which could conceivably cause an inability to scram the control rods. Sustained low pressure in the control air system could result in complete or partial opening of multiple scram outlet valves before the opening of scram inlet valves, thereby causing the SDV to fill rapidly, thus leaving a relatively short time for the operator to take corrective action before scram capability is lost.

Therefore, as part of the short-term program to provide prompt added protection for credible degraded air conditions in BWR control air supply systems, the staff added license conditions that required an automatic system to be operable by April 9, 1981. The automatic system would initiate control rod insertion by rapidly dumping the control air system header if the air pressure decreased below a prescribed value. The long-term solution to this problem is improved hydraulic coupling. During the outage prior to operation in Cycle 6, the licensee will modify the SDV system to improve hydraulic coupling. Hydraulic coupling will assure detection by level instrumentation and thereby provide a timely automatic scram, independent of the inleakage rate when the SDV headers fill.

Therefore, we have reviewed the licensee's request to remove the interim conditions from the license and find the licensee's proposed changes acceptable because long-term hydraulic coupling will be improved between the scram discharge headers and the instrument volume as discussed above.

The Commission had also issued, as an interim action, a Confirmatory Order on October 2, 1980, pertaining to the addition of continuous monitoring instrumentation for SDV water level. The Order confirmed licensee commitments made in accordance with IE Bulletin No. 80-17, "Failure of 76 of 105 Control Rods to Fully Insert During a Scram at a BWR," and its supplements. The Bulletin and supplements were issued to provide adequate assurance that the licensee could maintain scram capability during operations until an ultimate resolution was achieved by changes in systems design and operating procedures. That ultimate resolution was subsequently identified and designated as the SDV long-term modification program.

Because the licensee has attained this ultimate resolution through its implementation of the long-term SDV modifications evaluated and approved by us in Section A above, we find that the licensee's request to remove the interim conditions imposed by the Commission's October 2, 1980 Confirmatory Order is also acceptable.

C. Change (3) - Long Term Modifications

We have reviewed the licensee's proposed changes to the FitzPatrick license that were transmitted in a letter dated July 7, 1983. The proposed changes would fulfill the conditions to the license that were imposed by the Commission's Order dated June 24, 1983. This Order confirmed the licensee's commitment to install permanent Scram Discharge System modifications prior to operation in Cycle 6. The modifications were to conform to the criteria developed by the BWR Owners Subgroup and endorsed by our Generic Safety Evaluation on the BWR Scram Discharge System, dated December 1, 1980.

Based on our review and acceptance of the licensee's modifications as described in Section A of this Safety Evaluation, we find the licensee's modifications and corresponding proposed technical specifications to be in accordance with the staff's guidance. Therefore, we find that the licensee has fulfilled the conditions imposed by the Commission's June 24, 1983 Order.

IV. Environmental Considerations

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact, and pursuant to 10 CFR Section 51.5(d)(4) that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of the amendment.

V. Conclusions

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: August 26, 1983

Principal Contributor: J. Hegner