BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

Docket No. 50-387

PENNSYLVANIA POWER & :
LIGHT COMPANY

PROPOSED AMENDMENT No. 170
FACILITY OPERATING LICENSE NO. NPF-14
SUSQUEHANNA STEAM ELECTRIC STATION
UNIT NO. 1

Licensee, Pennsylvania Power & Light Company, hereby files proposed Amendment No. 170 to its Facility Operating License No. NPF-14 dated July 17, 1982.

This amendment contains a revision to the Susquehanna SES Unit 1 Technical Specifications.

PENNSYLVANIA POWER & LIGHT COMPANY
BY:

R. G. Byram
Sr. Vice President - Nuclear

Sworn to and subscribed before me
this 22nd of August, 1994

NOTARIAL SEAL
KAREN B. BOGWIST, Notary Public
Allentown, Lehigh County
My Commission Expires Dec. 18, 1995

Karen B. Bogwist
Notary Public

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

Docket No. 50-388

PENNSYLVANIA POWER & :
LIGHT COMPANY

PROPOSED AMENDMENT No. 124
FACILITY OPERATING LICENSE NO. NPF-22
SUSQUEHANNA STEAM ELECTRIC STATION
UNIT NO. 2

Licensee, Pennsylvania Power & Light Company, hereby files proposed Amendment No. 124 to its Facility Operating License No. NPF-22 dated March 23, 1984.

This amendment contains a revision to the Susquehanna SES Unit 2 Technical Specifications.

PENNSYLVANIA POWER & LIGHT COMPANY
BY:

R. G. Byram
Sr. Vice President - Nuclear

Sworn to and subscribed before me
this 22nd of August, 1994.

NOTARIAL SEAL
KAREN B. BOGWIST, Notary Public
Allentown, Lehigh County
My Commission Expires Dec. 18, 1995

Karen B. Bogwist
Notary Public

SAFETY ASSESSMENT

SCRAM DISCHARGE VOLUME
TECHNICAL SPECIFICATION 3/4.1.3

BACKGROUND

The purpose of the Scram Discharge Volume (SDV) is to receive reactor coolant that is discharged from the Control Rod Drive Units during a scram. The SDV vent and drain valves are provided to isolate the SDV during a scram and contain the reactor coolant discharge. Water level in the SDV is monitored by float type switches and pressure sensors located in the SDV Instrument Volume. Any irregular filling of the SDV results in control room alarms, control rod blocks, and a reactor scram should the water level reach certain setpoints.

Current SSES Technical Specification 3.1.3.1.d requires a single inoperable vent or drain valve be returned to operable status within 24 hours. Susquehanna SES system design places two vent valves or two drain valves in each SDV line. By having two valves in series, the system function is protected from any single valve failure in the open or closed position. The safety analysis provided here will show that extending the restoration time for one inoperable valve is consistent with the Improved Standard Technical Specifications and can be safely adopted at Susquehanna SES.

Surveillance Requirement 4.1.3.1.4a requires an 18 month demonstration of SDV vent and drain valve operability during a scram from less than or equal to 50% rod density. The intent of this surveillance is to demonstrate vent and drain valve operability at typical reactor coolant pressure and temperature. However, meeting the 50% rod density requirement can result in unnecessary scrams that challenge safety related systems. This situation occurred at Susquehanna SES in October 1984. Unit 1 was shut down to perform the 18 month SDV vent and drain valve operability check. One vent valve failed to close within 30 seconds, and was replaced. Three days later, Unit 1 was brought up in power to 50% control rod density and was scrammed in order to clear the Limiting Condition for Operation for the failed surveillance. The NRC concluded in NUREG 1366 that the 50% rod density requirement has no strong technical basis and recommended performing the test from shutdown conditions. The safety analysis provided here will show that the NRC recommended change can be safely adopted at Susquehanna SES.

The purpose of Surveillance Requirement 4.1.3.1.4.b is to ensure the ball floats in the SDV Instrument Volume are not crushed after a scram by verifying proper float switch response. In response to float switch malfunctions at Southern Nuclear Operating Co. (Hatch 1&2), Susquehanna SES implemented design changes to reduce the high differential pressure experienced by the float switches during a scram reset and provide redundant and diverse level measuring instrumentation. The design changes have resulted in no crushed ball floats at SSES after a scram, thereby eliminating the need for S.R. 4.1.3.1.4.b. The safety analysis provided here will show that deleting S.R. 4.1.3.1.4.b is consistent with the Improved Standard Technical Specifications and can be safely adopted at Susquehanna SES.

DESCRIPTION OF CHANGE

1. Extend the restoration time for Technical Specification 3.1.3.1.d from 24 hours to 7 days. The Technical Specification requires that inoperable and open SDV vent and drain valves be returned to operable status. This change is consistent with the provisions of the Improved Standard Technical Specifications.

2. Replace the requirement to perform Surveillance Requirement 4.1.3.1.4.a for a scram test from less than or equal to 50% rod density with a requirement to perform the testing at shutdown conditions. Also, the footnote on 4.1.3.1.4.a which exempted the surveillance from Specification 4.0.4 (to allow entry into Operational Condition 2 provided the surveillance is performed within 12 hours after achieving less than or equal to 50% rod density) will no longer be needed and will therefore be deleted. This change is consistent with the guidance provided in Generic Letter 93-05, Line Item Improvements for Technical Specifications.

3. Delete Surveillance Requirement 4.1.3.1.4.b. requiring proper float response by verifying float switch actuation after a scram. This change is consistent with the provisions of the Improved Standard Technical Specifications.

SAFETY ANALYSIS

1. Safety Analysis for extending restoration time for Technical Specification 3.1.3.1.d

Extending the restoration time for one inoperable vent and/or one inoperable drain valve from 24 hours to 7 days will not impact the safe operation of Susquehanna SES. A 7 day completion time, as identified in NUREG 1433, is reasonable given the level of redundancy in the lines and the low probability of a scram occurring while the valve is inoperable and the line is not isolated. Two vent and drain valves in each line provide redundant system logic. Because of the existence of two vent or two drain valves in each line, the isolation function can still be satisfied if at least one valve is operable in each line or the line is isolated. If the inoperable valve fails open, the redundant valve in the line allows for leakage from the CRD to be drained out and also allows for the line to be isolated if necessary. If the valve fails closed, the line becomes isolated. However, float switches and pressure sensors contained in the instrument volume will notify operators of water buildup in the instrument volume by way of alarms, control rod blocks and ultimately a scram. Redundancy of vent and drain valves ensures that an uncontrolled loss of reactor coolant would not result in the event of a single active failure.

During periods when one vent or drain valve is inoperable, the single failure criterion will not be preserved, and additional Technical Specification controls are in place to respond to the failure of the remaining operable valve. In the event that both valves in a SDV vent or drain line are inoperable, Technical Specification 3.1.3.1.e allows for 8 hours to restore one of the inoperable valves to operable status or be in at least Hot Shutdown within the next 12 hours.

The SDV vent and drain valves are tested for operability by Surveillance Requirement 4.1.3.1.1 which consists of two tests: a 31 day verification that each valve is open (Surveillance Requirement 4.1.3.1.1.a) and a 92 day cycling of each valve through at least one cycle of full travel (Surveillance Requirement 4.1.3.1.1.b). A discussion with the System Engineer and review of the surveillance data, revealed the vent and drain valves rarely fail the initial operability test and require rework. The low failure rate combined with redundancy of the valves makes for a highly reliable system.

2. Safety analysis for deleting 50% or less rod density scram test from Surveillance Requirement 4.1.3.1.4.a

This Technical Specification change deletes the requirement to perform the 18 month demonstration of SDV vent and drain valve operability during a scram from less than or equal to 50% rod density. Operability may be verified during the 18 month reactor mode switch shutdown position functional check, performed in either cold shutdown or refueling mode. Deletion of this requirement will not cause a reduction in safety.

The purpose of the 50% rod density requirement is to provide a test environment having typical operating conditions of reactor coolant pressure and temperature, and CRD scram discharge flow rate. This surveillance verifies that the SDV vent and drain valves:

1. close within 30 seconds after receipt of a signal for control rods to scram, and

2. open when the scram signal is reset.

This surveillance ensures that the safety functions of the valves are met. These functions are briefly described as follows.

The primary safety function of the vent and drain valves is to prevent an uncontrolled release of reactor coolant following a scram. This function is ensured by the requirement that the valves close within 30 seconds following a scram signal. A passive safety function of the valves is to remain open during normal operation to prevent CRD leakage from accumulating in the SDV. (Redundant level instrumentation ensures that, in the event of flow blockage or valve failure, water will never accumulate to the amount which will inhibit a reactor scram.) The drain and vent valves are also indirectly related to safety in that they are required to open when the scram signal is reset, which prevents leakage accumulation.

Performance of the 4.1.3.1.4.a surveillance during shutdown conditions will still ensure that these safety functions are met, even though the test conditions of nearly ambient pressure and temperature, and reduced CRD discharge flow due to the rods being fully inserted prior to the scram signal do not match operating conditions. The maximum SDV pressure during shutdown conditions will be equal to the pressure head of RPV water, as opposed to rated RPV pressure during the test at 50% rod density. During this surveillance, however, pressure does not influence the vent and drain valve closure rates, since the SDV is of sufficient volume and initially vented such that peak pressure prior to SDV isolation will not be substantial. After the valves are closed, the SDV will fill due to post-scram CRD leakage, and SDV pressure will be on the order of reactor pressure. Since back pressure during scram will not be significant from either 50% rod density or shutdown conditions, the condition of initial reactor pressure will not affect the ability to meet the 30 second closure criterion. Specification 4.1.3.1.4.a also requires the valves

to open when the scram signal is reset. Back pressure will become significant following a test from 50% rod density, but will not be appreciable from condition 4 or 5. It must be noted, however, that the ability of the valves to open against rated pressure is demonstrated after each reactor scram that occurs during the 18 month interval between surveillance tests. Along with group valve position indication lights in the control room, there are float switches and pressure sensors contained in the instrument volume that verify that the SDV has drained. Thus, an initial condition of rated reactor pressure is not essential to ensure the validity of the surveillance.

The cooler reactor coolant temperature during shutdown will have negligible effect (if any) on the valve stroke times measured in the surveillance. Specification 4.1.3.1.4.a requires verification that the SDV vent and drain valves close within 30 seconds after receipt of a scram signal. Since this requirement permits a long valve stroke time, any slight variation in closure time due to temperature differences will be relatively insignificant.

The quantity of CRD discharge flow will not affect the ability to meet the 30 second valve closure requirement, since the SDV will not become pressurized until some time after the valves have closed. The CRD discharge flow rate is an indicator of possible obstructions in the CRD discharge lines and SDV vent and drain lines. Determination of possible obstructions is not within the scope of Specification 4.1.3.1.4.a. It is noteworthy however, that obstructions in the 3/4 inch piping between each CRD and the SDV headers would be made evident during periodic control rod scram time testing. Also, lack of obstructions in the vent and drain lines is continuously indicated during normal operations by redundant SDV level sensing instrumentation.

Based on the above arguments, performance of the 4.1.3.1.4.a surveillance at shutdown will not affect the validity of the surveillance results. Thus, this proposed Technical Specification change will still ensure the safety functions of the SDV vent and drain valves, and therefore, is not a reduction in safety. Moreover, since every reactor scram is a potential challenge to safety related systems, the potential decrease in future scrams resulting from this Technical Specification change represents a safety benefit.

3. Safety analysis for deleting float switch response requirement (4.1.3.1.4.b)

Float type level switches and pressure sensors monitor water level in the SDV instrument volume for any irregular filling of the SDV. The result is control room alarms, control rod blocks, and a reactor scram should the water level reach certain setpoints. When a small amount of water accumulates in the instrument volume, either or both of the first two level switches actuate and cause an alarm in the control room. When the water level reaches 44 gallons, either or both of the next two level float switches actuate and cause a control rod block. This prevents any further withdrawal of the control rods. Finally, when the water level reaches 88 gallons, the last four float switches and four delta pressure sensors actuate and cause the reactor to scram in a one-of-two, twice logic. From past experience, it is found that the float switches have a low failure rate, which is indicative of a reliable instrument. Also, the float switches are tested for operability through a 92 day functional test and an 18 month calibration test (Surveillance Requirement 4.3.1.1).

Surveillance Requirement 4.1.3.1.4.b ensures that the float switch ball floats are not crushed after a scram. However, design changes eliminated the high differential pressure experienced by the float switches after a scram and provide redundant level measuring instrumentation. The design changes consisted of repiping the float switches to the Scram Discharge Instrument Volume (SDIV) rather than directly to the vent and drain lines along with replacing the float switches with an improved model that is more difficult to crush. Differential pressure gauges were added to the SDIV to provide the RPS logic with a diverse and redundant means of measuring SDIV level. The changes have resulted in no crushed ball floats at SSES after a scram, thereby eliminating the need for Surveillance Requirement 4.1.3.1.4.b.

CONCLUSION

Extending the restoration time for Technical Specification 3.1.3.1.d to 7 days will not impact the safe operation of Susquehanna SES. Due to the redundancy that exists in vent and drain valve lines, isolation can still be achieved with one operable vent and/or drain valve, regardless of the position of the failed valve. Additional Technical Specification actions are in place in the event that both valves in a SDV vent or drain line are inoperable. Technical Specification 3.1.3.1.e allows for 8 hours to restore one of the inoperable valves to operable status or be in at least Hot Shutdown within the next 12 hours. This change is consistent with requirements found in Improved Technical Specifications, NUREG 1433; which state that in modes 1 and 2 with one or more SDV vent and drain lines having one valve inoperable, have the inoperable valve restored to operable status within 7 days.

Deleting the 50% or less rod density scram test requirement from Surveillance Requirement 4.1.3.1.4.a will not impact the safe operation of Susquehanna SES. This surveillance can be demonstrated during a scram initiated from shutdown conditions in either Operational Conditions 4 or 5 and its deletion will eliminate the possibility of experiencing plant scrams for the purpose of meeting this requirement. The NRC has recommended this change as a Line Item Improvement to Technical Specifications under Generic Letter 93-05.

Deleting Surveillance Requirement 4.1.3.1.4.b, float switch response, will not impact the safe operation of Susquehanna SES. Surveillance Requirement 4.3.1.1 verifies the float switches operability through a 92 day functional test and an 18 month calibration test. Also, design changes have resulted in highly reliable float switches and diverse and redundant level devices eliminating the need for Surveillance Requirement 4.1.3.1.4.b.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

I. This proposal does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed change to Technical Specification 3.1.3.1.d, which extends the restoration time for one inoperable vent and/or drain valve from 24 hours to 7 days, does not significantly increase the probability or consequences of an accident previously evaluated. A 7 day restoration time, as identified in NUREG 1433, is reasonable given the level of redundancy in the lines and the low probability of a scram occurring while the valve is inoperable and the line is not isolated. If the inoperable valve fails open, the redundant valve in the line allows for leakage from the CRD to be drained out and also allows for the line to be isolated if necessary. If the valve fails closed, the line becomes isolated. However, float switches and pressure sensors will notify operators of water buildup in the instrument volume. A review of the surveillance data indicates the vent and drain valves rarely fail the initial operability test and require rework. The low failure rate combined with the redundancy of the valves makes for a highly reliable system. Therefore, the proposed change does not significantly increase the probability or consequences of an accident previously evaluated.

Changing Surveillance Requirement 4.1.3.1.4.a from requiring demonstration of the SDV vent and drain valve operability during a scram at less than or equal to 50% rod density to a requirement to perform the testing at shutdown conditions does not significantly increase the probability or consequences of an accident previously evaluated. The purpose of the 50% rod density requirement is to provide a test environment having typical reactor coolant pressure and temperature conditions. However, the closure time of the vent and/or drain valves is not affected by pressure and any variations due to temperature are relatively insignificant. Therefore, testing from shutdown conditions ensures the safety functions of the vent and drain valves are met. Also, the proposed change does not affect system design or operation. Therefore, the proposed change does not significantly increase the probability or consequences of an accident previously evaluated.

The deletion of Surveillance Requirement 4.1.3.1.4.b, requiring proper float switch response by verifying float switch actuation after a scram, does not significantly increase the probability or consequences of an accident previously evaluated. Design changes eliminated the high differential pressure experienced by the float switches after a scram and provide redundant level measuring instrumentation. Differential pressure gauges were added in addition to the float switches to provide the RPS logic with a diverse and redundant means of measuring SDIV level. The changes have resulted in no crushed ball floats at SSES after a scram. The proposed change will have a negligible effect the reliability of the system and therefore, does not significantly increase the probability or consequences of an accident previously evaluated.

II. This proposal does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed change to Technical Specification 3.1.3.1.d, which extends the restoration time for one inoperable vent and/or one inoperable drain valve from 24 hours to 7 days, does not create the possibility of a new or different kind of accident from any accident previously evaluated. Extending the restoration time to 7 days does not change the design purpose or operation of the SDV valves. Therefore, the change is bounded by the existing accident analysis.

Changing Surveillance Requirement 4.1.3.1.4.a from requiring demonstration of the SDV vent and drain valve operability during a scram at less than or equal to 50% rod density to a requirement to perform the testing at shutdown conditions does not create the possibility of a new or different kind of accident from any accident previously evaluated. Performing the surveillance from shutdown conditions, as recommended in NUREG 1366, ensures that the operability of the SDV is maintained. No new failure modes are introduced by the change and the change is bounded by the existing accident analysis.

The deletion of Surveillance Requirement 4.1.3.1.4.b, requiring proper float switch response by verifying float switch actuation after a scram, does not create the possibility of a new or different kind of accident from any accident previously evaluated. The role of the ball floats to sense increases in SDV water level is not affected by the change. In the unlikely event that crushing of the ball float were to occur, redundant level measuring devices would maintain system function and the existing 92 day surveillance activity would identify a ball float failure.

III. This change does not involve a significant reduction in a margin of safety.

The proposed change to Technical Specification 3.1.3.1.d, which extends the restoration time for one inoperable vent and/or one inoperable drain valve from 24 hours to 7 days, does not involve a significant reduction in a margin of safety. A 7 day completion time, as identified in NUREG 1433, is reasonable given the level of redundancy in the lines and the low probability of a scram occurring while the valve is inoperable and the line is not isolated. Also, a separate Technical Specification (3.1.3.1.e) addresses the potential for two inoperable vent or drain valves in the same line.

Changing Surveillance Requirement 4.1.3.1.4.a from requiring demonstration of the SDV vent and drain valve operability during a scram at less than or equal to 50% rod density to a requirement to perform the testing at shutdown conditions does not involve a significant reduction in a margin of safety. The change maintains the intent of S.R. 4.1.3.1.4.a by performing equivalent testing at the same frequency. The change increases the margin of safety by eliminating potential future scrams taken to meet S.R. 4.1.3.1.4.a., thus reducing the potential for safety challenges.

The deletion of Surveillance Requirement 4.1.3.1.4.b, requiring proper float switch response by verifying float switch actuation after a scram does not involve a significant reduction in a margin of safety. Design changes have enhanced the SDV design and provide a redundant and diverse means of monitoring SDV level. Also, a 92 day surveillance (S.R. 4.3.1.1) ensures the operability of the float switch.

IMPLEMENTATION

It is requested that this change be approved as soon as possible but no later than February 10, 1995 with implementation within 30 days of the date of issuance.