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AUTH.NAME AUTHOR AFFILIATION
UHRIG,R.E. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Forwards justification for continued operation w/electrical equipment in Categories I.B & II.A of Franklin Research Ctr technical evaluation rept per NRC 821213 & 830329 & 31 ltrs.
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FLORIDA POWER & LIGHT COMPANY

May 4, 1983
L-83-281

Office of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Varga:

Re: Turkey Point Units 3 & 4
Docket Nos. 50-250 & 50-251
Environmental Qualification of
Safety-Related Electrical Equipment

In response to your letters dated December 13, 1982, March 29, 1983, and March 31, 1983, we have prepared information justifying continued operation with the electrical equipment in Categories I.B and II.A of the Franklin Research Center's Technical Evaluation Report. This information is attached.

Should you or your staff have any questions on this information, please contact us.

Very truly yours,

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/PLP/js

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CATEGORY I.B

Item No. 14

Component: Limit Switch

Identification No: Assoc. W/CV-3-200A (2 switches)
Assoc. W/CV-3-200B (2 switches)
Assoc. W/CV-3-200C (2 switches)
Assoc. W/CV-3-2819 (2 switches)
Assoc. W/CV-4-200A (2 switches)
Assoc. W/CV-4-200B (2 switches)
Assoc. W/CV-4-200C (2 switches)

Function: Provide position indication for CVCS letdown isolation valves and instrument air bleed isolation valve.

Analysis:

1) Loss of Coolant Accident

In the event of a loss of coolant accident, containment isolation is initiated upon receipt of a safety injection signal. The limit switches used on valves inside the containment serve to provide valve position indication during normal operation and verification of valve position following containment isolation. Their use in the control circuits is such that their failure modes are fail-safe.

The three RCS letdown isolation valves inside the containment are functionally parallel to each other, with two of the valves normally open. These valves will fail closed, and close upon receipt of a containment isolation signal.

A second isolation valve, located outside the containment, also closes upon receipt of a containment isolation signal. Therefore, a closed indication of the outside valve serves as a backup indication of containment isolation.

Following a loss of coolant accident, the CVCS letdown system is not required to cool down the reactor coolant system. Therefore repositioning of these valves, with attendant verification of valve position is not required.

The instrument air bleed isolation valve also fails closed and closes upon receipt of a containment isolation signal. A second isolation valve located outside the containment also closes upon receipt of a containment isolation signal. Therefore, as in the case of the letdown isolation valves, a closed indication of the outside valve serves as a backup indication of containment isolation.

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Item No. 14 (continued)

The instrument air bleed isolation valves are not required to cool down the reactor coolant system. Therefore, repositioning of these valves, with attendant verification of valve position is not required.

2) High Energy Line Break

In the event of a high energy line break, containment isolation is initiated upon receipt of a safety injection signal. The same rationale that applies to valve position limit switches during the loss of coolant accident likewise applies to the high energy line break accident.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing valve position limit switches is justified on the basis that these valves are:

a) Air operated, fail closed valves
b) Backed by position indication of redundant valves outside the containment
c) Not required to change position following an accident

CATEGORY I.B

Item No. 15

Component: Limit Switch

Identification No: Assoc. W/CV-3-310A (2 switches)
Assoc. W/CV-3-310B (2 switches)
Assoc. W/CV-4-310A (2 switches)
Assoc. W/CV-4-310B (2 switches)

Function: Provide position indication for RCS charging line valves

Analysis:

1) Loss of Coolant Accident

The charging line valves to two of the RCS loops are used following a loss of coolant accident for chemical addition to control the pH of the sump water, and do not provide containment isolation functions. The limit switches are not used for control, and valve position indication would be desirable only during chemical injection.

In the event that these switches failed following a loss of coolant accident, there are two flow transmitters outside the containment in the charging line which provide indication in the control room. This indication will serve as verification that either of the valves is open.

In addition, the Post Accident Sampling System may be aligned to monitor the pH of the containment sump fluid. This will provide positive verification of injection of the neutralizing agent.

2) High Energy Line Break

Control of sump pH is not required following a high energy line break.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing valve position limit switches is justified on the basis that flow indication provides positive indication that either or both of the valves are open following a LOCA, and that chemical injection can be verified by monitoring the containment sump fluid pH.

CATEGORY I.B

Item No. 18

Component: Limit Switch

Identification No: Assoc. W/PCV-3-455C (2 switches)
Assoc. W/PCV-3-456 (2 switches)
Assoc. W/PCV-4-455C (2 switches)
Assoc. W/PCV-4-456 (2 switches)

Function: Provide position indication for pressurizer power operated relief valves.

Analysis:

1) Loss of Coolant Accident

During and following a loss of coolant accident, emergency operating procedures require that the position of the pressurizer power operated relief valves (PORV) be monitored. If the limit switches fail, the position indication of the PORV may be in error, which could mislead the operator.

However, there is adequate qualified instrumentation available to enable the operator to make this determination. The accident of most concern is a small LOCA since a stuck open PORV may be the cause itself. Such a condition can be determined through the use of the qualified pressurizer pressure indication in conjunction with the qualified containment sump level indication. By closing the PORV block valves and monitoring pressurizer pressure and containment sump level, the operator can determine the effects of isolating each PORV. By this means, the operator can determine if the PORVs are open or closed.

2) High Energy Line Break

For a high energy line break, the same requirements for recovery from a LOCA apply and the rationale discussed for the LOCA applies equally to the high energy line break accident.

Conclusions:

Interim operation for Turkey Point Units 3 and 4 with existing position limit switches is justified because PORV position can be deduced by alternately closing the block valve associated with each PORV and monitoring changes in containment sump level and pressurizer pressure using qualified instrumentation.

CATEGORY I.B.

Item No. 19

Component: Limit Switch

Identification No: Assoc. W/POV-3-2601 (2 switches)
Assoc. W/POV-3-2603 (2 switches)
Assoc. W/POV-4-2601 (2 switches)
Assoc. W/POV-4-2603 (2 switches)
Assoc. W/POV-4-2819 (2 switches)

Function: Provide position indication for containment purge isolation valves and instrument air bleed isolation valve

Analysis:

1) Loss of Coolant Accident

The normally closed containment purge isolation valves are required to isolate the containment upon receipt of a high radiation or safety injection signal. FPL has committed on an interim basis to operate the purge system less than 200 hours per year.

In the unlikely event of a loss of coolant accident occurring when the purge valves are open, the valves will close within seconds.

The limit switches mounted on the containment purge isolation valves will provide information to the operator as soon as the valves have closed, before the harsh environment can have an adverse effect on them. As the solenoids are locked out by the containment isolation signal (they cannot cycle after isolation) and the actuators are spring loaded, once closed position is verified, the limit switch has completed its function.

In addition, the purge valves are spring loaded, fail closed valves, and are backed up by redundant valves outside the containment which close in the same time period upon receipt of the same isolation signal. The isolation valves outside the containment provide the operator with additional backup indication that the purge valves are closed.

The instrument air bleed isolation valve also fails closed and closes upon receipt of a containment isolation signal. A second isolation valve located outside the containment also closes upon receipt of a containment isolation signal. Therefore, as in the case of the containment purge isolation valves, a closed indication of the outside valve serves as a backup indication of containment isolation.

The instrument air bleed isolation valves are not required to cool down the reactor coolant system. Therefore, repositioning of these valves with attendant verification of valve position is not required.

2) High Energy Line Break

In the event of a high energy line break, the containment purge valves are required to isolate the containment upon receipt of a safety injection signal, which occurs within seconds following the start of the accident. The justifications outlined for the loss of coolant accident above also apply to the high energy line break accident.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing position limit switches is justified for the following reasons:

a) The limit switches will provide immediate indication to the operator that the purge valves have closed.
b) The purge valves are spring loaded, fail closed.
c) Backup isolation indication is provided by limit switches on redundant valves outside the containment.

CATEGORY I.B

Item No. 36

Component: T/C Reference Junction Box

Identification No: TB 3115 internals
TB 4115 internals

Function: Provide a signal to correct reference junctions of the charcoal filter thermocouples to 0°C.

Analysis:

1) Loss of Coolant Accident

The emergency containment filters are required to operate post-LOCA to filter airborne iodine out of the containment atmosphere. The thermocouple reference junction is an integral part of a system which monitors charcoal filter temperature. If the emergency containment filter fan motor should fail, and the temperature rises above 325°F, the operator is instructed to manually initiate dousing. The only postulated mechanism for a fire in the emergency filters is a total loss of air flow. Hence, should the reference junction fail, the air flow switches in the emergency filter air path will automatically initiate dousing on loss of air flow.

2) High Energy Line Break

The emergency containment filters and associated equipment are not required following a high energy line break.

Conclusions:

Interim operation of Turkey Point Unit 3 with the existing charcoal filter thermocouple reference junction is justified because the air flow switches in the emergency filter air path provide an alternate means of initiating dousing.

The charcoal filter thermocouple system for Turkey Point Unit 4 is currently being replaced by a fully qualified RTD system. The reference junction has been deleted as it is not required in an RTD system. The charcoal filter RTD system will be operational when the unit comes back on line.

CATEGORY I.B

Item No. 43

Component: Level Transmitter

Identification No: LT-3-459, LT-3-460, LT-3-461
LT-4-459, LT-4-460, LT-4-461

Function: Provide pressurizer level signal for normal operation and post accident monitoring

Analysis:

1) Loss of Coolant Accident

Following a loss of coolant accident, the pressurizer level transmitter permit the operator to monitor pressurizer level after the plant has become stabilized. These transmitters do not provide any automatic safety function.

The reason for monitoring pressurizer level following an accident is to ensure there is sufficient coolant inventory to maintain core cooling.

If the pressurizer level transmitters should fail, the subcooled margin monitor, which derives its information from reactor coolant temperature and pressure signals, provides the operator with an indication of adequate core cooling.

2) High Energy Line Break

The pressurizer level transmitters are not postulated to fail during or following a high energy line break accident for the following reasons:

a) Accident radiation exposure will not exist,
b) The transmitters will not be exposed to chemical spray,
c) The temperature excursion is of short duration,
d) Because of the thermal lag of the transmitters, the surface temperature will only rise to a value well below the qualification temperature.

Furthermore, the containment environmental parameters return to near normal in a relatively short time. Therefore, the transmitters are qualified to survive the high energy line break accident.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the present pressurizer level transmitters is justified since they are not required to initiate an automatic safety function and alternate instrumentation exists to ensure that the core is adequately cooled. In addition, they are qualified for operation during and following a high energy line break accident.

CATEGORY I.B

Item No. 44

Component: Level Switch

Identification No: LS-3-1570 LS-4-1570
LS-3-1571 LS-4-1571

Function: Provide backup level signal for containment sump

Analysis:

1) Loss of Coolant Accident

Following a loss of coolant accident, these level switches provide backup indication to the control room operator concerning containment recirculation sump level and net positive suction head (NPSH) availability. This information is required when post LOCA injection is to be terminated and recirculation initiated to preclude pump cavitation.

As part of TMI Lessons Learned, redundant qualified level transmitters have been added to the containment sump; therefore, level indication is available.

An additional secondary indication of NPSH is the refueling water storage tank level. If the sump level switches fail, the operator will be able to realign the system to the recirculation phase using the RWST level indication in accordance with Emergency Operating Procedures.

2) High Energy Line Break

Containment sump recirculation is not required for recovery from a high energy line break.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing sump level switches is justified because new redundant qualified level instruments have been installed and provide this indication. Also, sump level can be inferred by RWST level indication.

CATEGORY I.B

Item No. 48

Component: Pressure Transmitter

Identification No: PT-3-405, PT-4-405

Function: Provide low pressure permissive signal to the residual heat removal system isolation valves.

Analysis:

1) Loss of Coolant Accident

Following a loss of coolant accident, the residual heat removal system is not utilized to cool down the reactor coolant system. Therefore, the pressure transmitter that provides the low pressure permissive signal to the isolation valves need not function after this accident.

2) High Energy Line Break

Following a high energy line break, the reactor coolant system is aligned with the residual heat removal system and core cooling is completed with this forced flow cooling system. If a failure of the pressure transmitter precluded a permissive signal and thus blocked the opening of the residual heat removal system isolation valves, the valves can still be opened by overriding the permissive block in the control logic and opening the valve. Since the residual heat removal system is not required until a significant time after the event, the electrical relays performing the interlocking functions can be manually overridden at the control cabinet.

Conclusions:

Interim operation of Turkey Point Units No. 3 and No. 4 with the existing valve permissive pressure transmitter is justified because valve permissive may be established via operator action in a reasonable time to initiate long term recovery.

CATEGORY I.B

Item No. 80

Component: Solenoid Valve

Identification No:

SV-3-2601	SV-4-2601
SV-3-2603	SV-4-2603
SV-3-2804	SV-4-2804
SV-3-2806	SV-4-2806

Function: Control of air supply to operate containment purge valves

Analysis:

1) Loss of Coolant Accident

The normally closed containment purge valves are required to isolate the containment upon receipt of a high radiation or safety injection signal. FPL has committed on an interim basis to limit operation of the purge system to less than 200 hours per year. Hence, the valves are closed 97.7 percent of the time.

In the unlikely event of a loss of coolant accident occurring when the purge valves are open, the solenoids will receive the safety injection signal and close the control valves within seconds of the accident. The solenoids perform their safety function before the harsh environment can have an adverse effect on them.

There are two solenoid valves in series which regulate the air supply to each purge valve. Both solenoids must be open to supply air to the valves, and closure of either solenoid valve will dump air from the diaphragm. Even if one of the solenoid valves were to fail; the purge valve will close and provide containment isolation.

As these purge valves have spring loaded actuators, failure will result in containment isolation. Furthermore, potential modes of failure of the solenoid valve, including loss of air supply, electrical failure of the solenoid, environmentally caused degradation of the materials and plunger binding will not cause the isolation valve to open.

It should be noted that each purge valve is in series with a redundant isolation valve located outside containment.

2) High Energy Line Break

In the event of a high energy line break, the solenoid valves controlling the purge valves will receive a containment isolation signal and close the purge valves within seconds.

The justifications outlined above apply to both scenarios.

Item No. 80 (Continued)

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing solenoids to control the purge valves is justified for the following reasons:

a) The solenoids are required to operate only one time post-accident and that occurs within seconds of the accident
b) The purge valves are spring-loaded, fail closed
c) Redundant isolation valves are located outside containment.

CATEGORY I.B

Items No. 104, 107, 111 (Unit 3), 104, 105 (Unit 4)

Component: Solenoid Valve

Identification No:

SV-3-2819	SV-4-2819
SV-3-310A	SV-4-310A
SV-3-310B	SV-4-310B

Function: Provide control of air supply to operate instrument air bleed isolation valve and RCS charging line valves

Analysis:

1) Loss of Coolant Accident

The charging line valves to two of the RCS loops are used following a loss of coolant accident for chemical addition to control the pH of the sump water, and do not provide containment isolation functions. Both of these are fail open valves, with only one required for post LOCA chemical addition for pH control.

One of the valves is normally open, and is the normal charging path to the reactor coolant system. Since this valve is normally open, and fails open, there will be no need to operate this valve following a loss of coolant accident. Furthermore, potential modes of failure identified for a solenoid valve, such as loss of air supply, electrical failure of the solenoid including opens, shorts or grounds, environmentally caused degradation of materials of construction and plunger binding due to thermal expansion will not result in failure of the air operated line valve to the closed position.

The instrument air bleed isolation valve is a fail closed valve, and closes upon receipt of a containment isolation signal. The solenoid valve, which regulates the air supply to the containment isolation air operator, will close the isolation valve before the harsh environment can affect the internals. If the solenoid valve fails, it will fail closed, and the containment isolation air operator will close (and remain closed) in all postulated modes of solenoid valve failure. A redundant isolation valve outside the containment provides additional assurance that the containment will be isolated and remain isolated.

2) High Energy Line Break

In the event of a high energy line break, the charging line valves are not required to control sump pH. If it is required to charge the system through this line for other reasons, one of the valves is normally open, and will fail open for the reasons stated previously.

Items No. 104, 107, 111 (Unit 3), 104, 105 (Unit 4)

The instrument air bleed isolation valve will close upon receipt of a containment isolation signal before the harsh environment reaches the solenoid internals. If it does fail, it will fail closed and the containment isolation air operator will close (and remain closed) in all postulated modes of solenoid valve failure. A redundant isolation valve outside the containment provides additional assurance that the containment will be isolated and remain isolated.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing solenoid valves is justified on the following bases:

a) Charging line valves: one of the two valves is normally open, and will fail open, providing a path for chemical addition for sump pH control.

b) Instrument air isolation valve: The valve performs its safety function (isolates) prior to its postulated failure; its subsequent failure will not result in a change of the closed position of the isolation valve inside the containment; the safety function (isolation) is backed up by a redundant valve outside the containment.

CATEGORY I.B

Items No. 108 (Unit 3), 106 (Unit 4)

Component: Solenoid Valve

Identification No:

SV-3-200A	SV-4-200A
SV-3-200B	SV-4-200B
SV-3-200C	SV-4-200C

Function: Provide control of air supply to operate RCS letdown isolation valves.

Analysis:

1) Loss of Coolant Accident

In the event of a loss of coolant accident, the RCS letdown isolation valves are closed within seconds upon receipt of a containment isolation signal initiated by safety injection. These valves fail closed, and are operated by solenoid valves which regulate the air supply to the operator of the line valve. The solenoid valves perform their safety function prior to the degradation of the environment to the point of solenoid valve failure.

However, if the valve does fail, it fails in a manner which causes the isolation line valves to close. Furthermore, potential modes of failure of the solenoid valve, including loss of air supply, electrical failure of the solenoid and environmentally caused degradation of materials and plunger binding will not cause the isolation line valve to open.

The valves are not required to reopen following containment isolation, since the letdown system is not required to bring the plant to a safe shutdown condition, or to maintain a safe shutdown condition.

A redundant isolation valve outside the containment provides a backup method of containment isolation.

2) High Energy Line Break

In the event of a high energy line break, the RCS letdown isolation valves are closed within seconds upon receipt of a containment isolation signal derived from safety injection, as in the case of a loss of coolant accident, and the same rationale for containment isolation applies.

Also, as in the case of a loss of coolant accident, the repositioning of the letdown isolation valves is not required following containment isolation.

Items No. 108 (Unit 3), No. 106 (Unit 4) (Continued)

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing solenoid valves is justified because:

a) The valves perform their safety function before their postulated failure,
b) Failure of valves will not affect containment isolation,
c) A redundant isolation valve is provided outside the containment,
d) Subsequent operation is not required following containment isolation.

CATEGORY II.A

Item No. 1

Component: Motorized Valve Actuator

Identification No:

MOV-3-535	MOV-4-535
MOV-3-536	MOV-4-536
*MOV-3-866B	*MOV-4-866B

Function: Pressurizer Relief Isolation Valves and SI to RCS Hot Leg Isolation Valve

Analysis:

1) Loss of Coolant Accident

The pressurizer relief isolation valves are in series with the pressurizer relief valves. Hence, should the isolation valves fail during a LOCA, their isolation function would be performed by the relief valves themselves. Regardless, by definition, failure of these valves in series would be a LOCA, which is the design basis event for which the plant was designed. Hence failure of these actuators would not prevent recovery from a LOCA.

2) High Energy Line Break

The motorized valve actuator is in series with the pressurizer relief valve, and serves to isolate the pressurizer relief line should the relief valves stick open. Rapid depressurization and cooldown are associated with a high energy line break accident and it is not expected that the PORV would be challenged during this transient. Hence, the isolation valves are not expected to be needed during a HELB. Regardless, the environment affecting the actuator is such that the actuator would maintain its operability during the first two hours of the HELB. After this, actuator failure would have no consequences since there would not be any further cycling of the relief valves, thus no mechanism for a stuck open relief valve.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with existing motorized valve actuators is justified because actuator failure during a LOCA is within the plant's design basis. Actuator failure during a HELB would not occur until after the actuator's function is no longer needed.

*See Item No. 12 - Category II.A for JCO for these MOVs.

CATEGORY II.A

Item No. 3

Component: Motorized Valve Actuator

Identification No: MOV-3-750 MOV-4-750
MOV-3-751 MOV-4-751

Function: RCS to RHR Inlet Isolation Valves

Analysis:

1) Loss of Coolant Accident

Following a loss of coolant accident, the residual heat removal system is not utilized. Therefore, operation of these valves is not required following this accident. The valves are normally closed and their failure mode is fail-as-is.

2) High Energy Line Break

Following a high energy line break, the reactor coolant system is aligned with the residual heat removal system and core cooling is completed with this forced flow cooling system. If these valves fail following a high energy line break accident, the plant will be maintained in a stable hot shutdown condition until such time as containment entry can be accomplished, and the valves manually realigned for RHR system operation.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with existing motorized valve actuators is justified since failure of the actuator results in a fail-as-is (closed) position of the normally closed valve and containment isolation is not affected. The valves are not required for recovery from a loss of coolant accident, and if failure occurs following a high energy line break, the plant can be maintained in a stable, hot shutdown condition until such time as they can be manually realigned.

CATEGORY II.A

Item No. 12

Component: Motorized Valve Actuator

Identification No. MOV-3-866A MOV-4-866A
MOV-3-866B MOV-4-866B

Function: SI to RCS Hot Leg Isolation Valves

Analysis:

1) Loss of Coolant Accident

Upon receipt of a safety injection signal, the safety injection pumps are started, taking suction from the refueling water storage tank and discharging into the RCS cold legs via the boron injection tank.

In order to reduce boron precipitation buildup during injection into the RCS cold legs, it may be desirable to reverse loop flow by injecting into the hot legs via the SI to RCS hot leg isolation valves located inside the containment.

These valves are normally closed, motor operated valves whose operating power is normally locked out at their motor control centers. To operate these valves, an operator must first remove the power lockout. A redundant, motor operated isolation valve is provided outside the containment.

Although the SI/hot leg isolation valves are environmentally qualified, in the unlikely event that the motorized valve actuators should fail, such failure would only occur over a long term.

As already required by Turkey Point Emergency Operating Procedures, in order to assure a path for hot leg injection following a postulated failure of these valve actuators within two hours after an accident, the operator must remove the motor control center power lockout and open the SI/RCS hot leg isolation valves. When hot leg injection is required, the redundant isolation valve outside the containment is opened, establishing flow.

2) High Energy Line Break

Following a high energy line break, the safety injection system is required for accident mitigation, performing the same functions as for loss of coolant accident. The same rationale for system operation during a LOCA also applies to the high energy line break.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing SI/hot leg isolation valves is justified because the operator can re-align the system prior to a postulated failure such that a subsequent failure would not render the system inoperable.

CATEGORY II.A

Item No. 13

Component: Limit Switch

Identification No: Replacement Limit Switches Inside Containment

Function: Provide Position Indication

Analysis:

Limit switches evaluated on System Component Evaluation Worksheet No. 10-3 are scheduled replacements for existing NAMCo limit switches located inside containment. As these replacement limit switches are installed, they are being fitted with electric conductor seal assemblies (ECSA's) which provide an environmentally qualified seal to the limit switch internals.

The documentation originally referenced as evidence of qualification is an unnumbered test report published by Acme Cleveland (NAMCo Controls) and dated September, 1978. Although the report does address the Franklin identified deficiencies, the treatment is not as rigorous as it should be.

NAMCo Controls has since gone through a second generation qualification program and has issued a new report, QTR 105, Revision 3. As stated in the report, "This Qualification Test Report will extend the original qualification of the EA-180 series limit switch to include several product improvement changes". The report further states that it is applicable to all EA-180 series limit switches.

NAMCo has provided an in-depth study on thermal aging to determine qualified lifetimes and component replacement intervals for these devices. At the Turkey Point containment ambient temperature of 50°C, the elastomeric components have a qualified life of 7.6 years. These components are listed as maintenance items and will be periodically replaced to extend the qualified life of the switch to 40 years.

Conclusion:

The NAMCo Model EA-180 limit switches fitted with Conax ECSA's are fully qualified to remain functional through and following a loss of coolant accident or high energy line break postulated at the end of their 40 year life.

CATEGORY II.A

Item No. 16 and No. 107 (Unit 4)

Component: Limit Switch

Identification No: Assoc. W/POV-3-2604 (3 switches)
Assoc. W/POV-3-2605 (3 switches)
Assoc. W/POV-3-2606 (3 switches)
Assoc. W/POV-4-2604 (3 switches)
Assoc. W/POV-4-2606 (3 switches)

Function: Provide position indication for main steam isolation valves

Analysis:

1) Loss of Coolant Accident

In the event of a loss of coolant accident, the main steam isolation valves and associated limit switches would not be exposed to the harsh environment since they are located outside containment and their operation would not be affected.

2) High Energy Line Break

In the event of a high energy line break, valve closure is initiated upon receipt of a main steam isolation signal. This signal occurs within seconds of the accident.

The limit switches, mounted on the main steam isolation valves, will provide information to the operator as soon as the valves have closed, before the harsh environment can have an adverse effect on them. In addition, these are spring loaded, fail closed valves with a lock-out contact in the open circuit. Once position is verified closed, the valve will stay closed until the main steam isolation signal is reset.

Conclusions:

Interim operation of Turkey Point Units No. 3 and No. 4 with the existing limit switches is justified for the following reasons:

a) The limit switches will provide immediate indication to the operator that the valves have closed.

b) The valves are spring loaded, fail closed and will remain closed following an accident.

CATEGORY II.A

Item No. 17

Component: Limit Switch

Identification No: Assoc. W/HCV-3-121 (2 switches)
Assoc. W/HCV-4-121 (2 switches)

Function: Provide Position Indication for Letdown Charging Valve

Analysis:

The material breakdown provided by Namco in their April 21, 1980 letter to Florida Power and Light is for their Model D2400X (now called EA-170). As the material list notes, material changes and all organic materials are investigated; therefore, materials in these D2400X limit switches are included in the analysis.

1) Loss of Coolant Accident

These limit switches are located outside of the containment in a room where radiation from post-accident recirculation constitutes the only harsh environment. The devices have been qualified on a component basis for the radiation levels they will be exposed to in the event of a LOCA.

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for these devices. Namco Controls April 21, 1980 letter to Florida Power and Light identifies the age susceptible components in the device. Of the components fundamental to the operation of the device, only one material had a qualified life of less than 40 years. Utilizing Arrhenius techniques, it was determined that the subject Buna 'N' O-Rings and gaskets have a qualified life of 3.25 years. The results of this thermal aging study have been entered in the plant maintenance schedule.

The components are listed as maintenance items and will be replaced before their "end of life".

2) High Energy Line Break

The limit switches are not required for a high energy line break.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing limit switches is justified because these limit switches are covered in Namco's April 21, 1980 letter to FPL and are qualified for the accident environment in which they are required to function.

CATEGORY II.A

Item No. 20

Component: Limit Switch

Identification No:
Assoc. W/CV-3-2810 (2 switches)
Assoc. W/CV-3-2812 (2 switches)
Assoc. W/CV-3-2814 (2 switches)
Assoc. W/CV-4-2810 (2 switches)
Assoc. W/CV-4-2812 (2 switches)
Assoc. W/CV-4-2814 (2 switches)

Function: Provide position indication for emergency containment bypass control valves.

Analysis:

1) Loss of Coolant Accident

These limit switches are located outside of the containment in a room where radiation from post-accident recirculation constitutes the only harsh environment. The devices have been qualified on a component basis for the radiation levels they will be exposed to in the event of a LOCA.

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for these devices. Namco Controls April 21, 1980 letter to Florida Power and Light identifies the age susceptible components in the device. Of the components fundamental to the operation of the device, only one material had a qualified life of less than 40 years. Utilizing Arrhenius techniques, it was determined that the subject Buna 'N' O-Rings and gaskets have a qualified life of 3.25 years. The results of this thermal aging study have been entered in the plant maintenance schedule.

The components are listed as maintenance items and will be replaced before their "end of life".

2) High Energy Line Break

As the limit switches are located outside containment and are only required for emergency containment cooling for postulated high energy line breaks inside containment, they will not be exposed to an accident induced harsh environment, and their operation will not be affected.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing limit switches is justified because the only harsh environmental parameter the limit switches are exposed to is radiation and the devices are qualified for those radiation levels.

CATEGORY II.A

Item No. 21

Component: Electro Pneumatic Transducer

Identification No: Assoc. W/HCV-3-121
Assoc. W/HCV-4-121

Function: Convert an electronic input signal to a proportional pneumatic output signal to operate letdown charging valve.

Analysis:

1) Loss of Coolant Accident

The transducers are located outside the containment in a room where radiation from post-accident recirculation constitutes the only harsh environment. The devices have been qualified on a component basis for the radiation levels they will be exposed to in the event of a LOCA.

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for these devices. Fisher Controls Bulletin 13.1:546 identifies the materials of construction used in the device. Of the components fundamental to the operation of the device, only one had a qualified life of less than 40 years. Utilizing Arrhenius techniques, it was determined that the subject Nitrile relay diaphragm has a qualified life of 3.25 years. The results of this thermal aging study have been entered in the plant maintenance schedule.

The component is listed as a maintenance item and will be replaced before its "end of life".

2) High Energy Line Break

The transducers are not required for high energy line breaks.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing electro pneumatic transducers is justified because the only harsh environmental parameter the transducers are exposed to is radiation and the devices are qualified for those radiation levels.

CATEGORY II.A

Item No. 22

Component: Electric Motor

Identification No: 3P211A 4P211A
3P211B 4P211B
3P211C 4P221C

Function: Operate Component Cooling Water Pumps

Analysis:

1) Loss of Coolant Accident

The component cooling water pumps are located outside the containment and are not affected by the loss of coolant accident induced harsh environment inside the containment. It is anticipated that the pumps and motors could receive up to 7.5×10^5 rads gamma radiation during a loss of coolant accident due to post accident recirculation. However, the motors are qualified for up to 2×10^8 rads gamma and their operation would therefore be unaffected.

A thermal aging study was performed which determined that the qualified lifetime of the motor insulation system, including splices, is greater than 40 years.

2) High Energy Line Break

Since the pumps and motors are located outside the containment and away from postulated high energy line break areas, they will not be exposed to an accident induced harsh environment, and their operation will not be affected.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing component cooling water pump motors is justified because they are never exposed to a harsh environment except radiation, for which they are very conservatively qualified.

CATEGORY II.A

Item No. 23

Component: Electric Motor

Identification No:

3V3A	4V3A
3V3B	4V3B
3V3C	4V3C
3V30A	4V30A
3V30B	4V30B
3V30C	4V30C

Function: Drives Emergency Containment Filter Fans and Emergency Containment Cooling Fans

Analysis:

1) Loss of Coolant Accident

The emergency containment cooling system in each containment consists of three fan cooling units, each consisting of a motor, fan, and bare tube cooling coils. The emergency containment filtering system in each containment consists of three filter units through which air is forced by motor driven fans. The emergency fan cooling units and the emergency fan filter units are started upon receipt of a safety injection signal.

The fan motors are totally enclosed and are designed and constructed to have a useful life of forty years under normal containment service conditions. Internal heaters prevent moisture condensation when the motor is idle. The motor's insulation system is Class H, which is a high temperature, radiation resistant, epoxy based insulating material which is suitable for a LOCA produced harsh environment. The bearings are specially selected, conservatively rated ball bearings with clearances held to closer tolerances than standard bearings. The bearings are lubricated with a high temperature, radiation resistant grease.

Joy Manufacturing Company has issued a qualification test report, X-604, which fully qualifies these motors for the LOCA and post-LOCA environment.

2) High Energy Line Break

The same rationale for a loss of coolant accident also applies to a high energy line break accident.

Conclusions:

Interim (and permanent) operation of Turkey Point Units 3 and 4 with existing fan motors is justified because the motors have been designed and constructed to operate in the normal and accident environment, and have been qualified by the manufacturer for this service.

CATEGORY II.A

Item No. 24

Component: Electric Motor

Identification No: T206

Function: Operate Boric Acid Batch Tank Mixer

Analysis:

1) Loss of Coolant Accident

Devices associated with the Boric Acid Batching Tank are required for mixing a neutralizing agent post accident to neutralize the acidic fluids in the containment sump. The electric motor is used for mixing the contents of the tank to help dissolve the dry chemicals.

The mixing and addition of the neutralizing agent are manual operations which will not start until approximately 8 hours after the initiation of the accident and will last approximately 190 hours. Hence, the Batching Tank is located in an area which is accessible post accident. In the event the mixing motor did fail, adequate time is available to perform maintenance on the motor or replace it. Steam heating is also being performed simultaneously which will help dissolve the dry chemicals. Hence, post accident chemical injection can still be accomplished in the event the mixing motor fails.

2) High Energy Line Break

The functions provided by the Boric Acid Batching Tank are not needed to recover from a high energy line break.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing electric motor for the batching tank mixer is justified since in the event of its failure adequate time is available to fix or replace it and steam heating of the tank also provides a secondary means of dissolving the dry chemicals.

CATEGORY II.A

Item No. 25

Component: Electric Motor

Identification No: 3P203A 4P203A
3P203B

Function: Operate Boric Acid Transfer Pumps

Analysis:

1) Loss of Coolant Accident

The boric acid transfer pumps are located outside the containment and are not affected by the loss of coolant accident induced harsh environment, except for radiation due to post accident recirculation. The pumps originally listed in the 79-01B report have been replaced with qualified pumps.

2) High Energy Line Break

Since the pumps and motors are located outside the containment and away from postulated high energy line break areas, they will not be exposed to an accident induced harsh environment, and their operation will not be affected.

Conclusions:

The pumps have been replaced with qualified pumps. Therefore, no limitations on operation of Turkey Point Units 3 and 4 are warranted.

CATEGORY II.A

Item No. 26

Component: Electric Motor

Identification No: 3P215A 4P215A
3P215B 4P215B

Function: Operate Safety Injection Pumps

Analysis:

1) Loss of Coolant Accident

The safety injection pumps are located outside the containment and are not affected by the loss of coolant accident induced harsh environment inside the containment except radiation. It is anticipated that the pumps and motors could receive up to 7.5×10^5 rads gamma radiation during a loss of coolant accident. However, the motors are qualified for up to 2×10^8 rads gamma and their operation would therefore be unaffected.

A thermal aging study has been performed in which it was determined that the motor insulation system, including splice materials, has a qualified life in excess of 40 years.

2) High Energy Line Break

Since the pump and motor are located outside the containment and away from postulated high energy line break areas, they will not be exposed to an accident induced harsh environment, and their operation will not be affected.

Conclusions:

Interim operation of the Turkey Point Units 3 and 4 with the existing safety injection pump motors is justified because they are never exposed to a harsh environment except radiation, for which they are very conservatively qualified.

CATEGORY II.A

Item No. 27

Component: Electric Motor

Identification No: 3P210A 4P210A
3P210B 4P210B

Function: Operate Residual Heat Removal Pumps

Analysis:

1) Loss of Coolant Accident

The residual heat removal pumps are located outside the containment and are not affected by the loss of coolant accident induced harsh environment inside the containment except radiation. It is anticipated that the pumps and motors could receive up to 2.4×10^6 rads gamma radiation during a loss of coolant accident. However, the motors are qualified for up to 2×10^8 rads gamma and their operation would therefore be unaffected.

A thermal aging study has been performed in which it was determined that the motor insulation system, including splice materials, has a qualified life in excess of 40 years.

2) High Energy Line Break

Since the pumps and motors are located outside the containment and away from postulated high energy line break areas, they will not be exposed to an accident induced harsh environment, and their operation will not be affected.

Conclusions:

Interim operation of the Turkey Point Units 3 and 4 with the existing residual heat removal pump motors is justified because they are never exposed to a harsh environment except radiation, for which they are very conservatively qualified.

CATEGORY II.A

Item No. 28

Component: Electric Motor

Identification No: 3P201A 4P201A
3P201B 4P201B
3P201C 4P201C

Function: Operate Charging Pumps

Analysis:

1) Loss of Coolant Accident

The charging pumps are located outside the containment and are not affected by the loss of coolant accident induced harsh environment inside the containment except radiation. It is anticipated that the pumps and motors could receive up to 6.0×10^5 rads gamma radiation during a loss of coolant accident. However, the motors are qualified for up to 2×10^8 rads gamma and their operation would therefore be unaffected.

A thermal aging study has been performed in which it was determined that the motor insulation system, including splice materials, has a qualified life in excess of 40 years.

2) High Energy Line Break

Since the pumps and motors are located outside the containment and away from postulated high energy line break areas, they will not be exposed to an accident induced harsh environment, and their operation will not be affected.

Conclusions:

Interim operation of the Turkey Point Units 3 and 4 with the existing charging pump motors is justified because they are never exposed to a harsh environment except radiation, for which they are very conservatively qualified.

CATEGORY II.A

Item No. 29

Component: Electric Motor

Identification No: 3P214A 4P214A
3P214B 4P214B

Function: Operate Containment Spray Pumps

Analysis:

1) Loss of Coolant Accident

The containment spray pumps are located outside the containment and are not affected by the loss of coolant accident induced harsh environment inside the containment except radiation. It is anticipated that the pumps and motors could receive up to 5.0×10^5 rads gamma radiation during a loss of coolant accident. However, the motors are qualified for up to 2×10^6 rads gamma and their operation would therefore be unaffected.

A thermal aging study has been performed in which it was determined that the motor insulation system, including splice materials, has a qualified life in excess of 40 years.

2) High Energy Line Break

Since the pumps and motors are located outside the containment and away from postulated high energy line break areas, they will not be exposed to an accident induced harsh environment, and their operation will not be affected.

Conclusions:

Interim operation of the Turkey Point Units 3 and 4 with the existing containment spray pump motors is justified because they are never exposed to a harsh environment except radiation, for which they are very conservatively qualified.

CATEGORY II.A

Item No. 30

Component: Flow Switch

Identification No:

FS-3-1422	FS-4-1422
FS-3-1423	FS-4-1423
FS-3-1424	FS-4-1424
FS-3-1425	FS-4-1425
FS-3-1426	FS-4-1426
FS-3-1427	FS-4-1427

Function: Monitor Air Flow through Emergency Filter Units

Analysis:

1) Loss of Coolant Accident

The emergency containment filters operate post LOCA to filter airborne radioactive particulates (principally iodine) out of the containment atmosphere. A water dousing system is provided in case air flow is lost to the filter because of a concern that the decay heat of collected radioactive particles may ignite the charcoal. Each emergency filter has two air flow switches located in the airstream. During post LOCA conditions, the air flow switches alarm a loss of air flow in the filter. If an emergency containment filter fan motor should fail, resulting in loss of air flow, an interlock with the flow switches would initiate dousing of the charcoal filters following a time delay.

The primary means of initiating dousing are the emergency charcoal filter temperature elements. Each filter contains eight temperature elements. If any one of these indicates a temperature rise to 325°F, the operator is instructed to manually initiate dousing.

2) High Energy Line Break

The emergency containment filters and associated equipment are not required following a high energy line break.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing air flow switches is justified because the charcoal filter temperature elements provide the primary means of alerting the operator to initiate dousing of the charcoal filters.

See II.A, Item 32, for further justification based on the use of the temperature elements.

CATEGORY II.A

Item No. 31

Component: Radiation Detector

Identification No: RD-3-11 RD-4-11
RD-3-12 RD-4-12

Function: Monitor containment air particle activity and containment gas activity

Analysis:

1) Loss of Coolant Accident

The containment air particulate monitor and the containment radioactive gas monitor both monitor radiation levels inside containment. Each monitor has a different sensitivity range and alarm setpoint. The only safety function of these detectors is to provide a containment ventilation isolation signal to close the containment purge valves. Actuation of containment ventilation isolation occurs at extremely low radiation levels. As these detectors are no longer required for long term radiation monitoring, the specified operating time is reduced to one hour.

The only harsh environment these detectors will be exposed to is high radiation from recirculation fluids. The detectors are qualified with respect to radiation.

A thermal aging study was performed to determine qualified lives and component replacement intervals for these devices. In Nuclear Research Corporation's response to Bechtel's May 30, 1980, inquiry, Nuclear Research identified the age susceptible components in their detector system. Of the components fundamental to the operation of the device, only one had a qualified life of less than 40 years. Utilizing Arrhenius techniques it was determined that the Buna "N" O-Ring Seal has a qualified life of 3.25 years. The component is listed as a maintenance item and will be replaced before its "end of life".

The devices are qualified to the post-accident environment. Should the radiation detectors fail due to the accident environment, it would be at radiation levels reached after containment ventilation isolation was achieved.

2) High Energy Line Break

Operation and justifications outlined for the LOCA scenario apply equally to this accident.

Item No. 31 (Continued)

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing radiation detectors is justified for the following reasons:

a) The radiation detectors are qualified to the accident environment they will be exposed to.

b) Should the detectors fail, failure would occur after the detectors have performed their safety function.

c) The long term radiation monitoring function will be performed by the wide range radiation monitors.

CATEGORY II.A

Item No. 32

Component: Temperature Element

Identification No: TE-3-3449 through TE-3-3463
TE-4-3440 through TE-4-3463

Function: Monitor Charcoal Filter Temperature

Analysis

1) Loss of Coolant Accident

The emergency containment filters operate post-LOCA to filter airborne radioactive particulates (principally iodine) out of the containment atmosphere. Each emergency filter contains 8 temperature elements, 4 located in the charcoal beds and 4 in the air stream. The temperature elements are an integral part of a system which monitors charcoal filter temperature. If the emergency containment filter fan motor should fail and any of of eight temperature elements indicates a temperature rise to 325°F, the operator is instructured to manually initiate dousing of the charcoal filters.

Failure of any one of the eight temperature elements would be evident to the operator. In the event all eight temperature elements failed, the operator would monitor the fan indicating lights to assure the fan is running. In the event the fan isn't running, the operator would open the dousing valves as a precaution.

2) High Energy Line Break

The emergency containment filters and associated equipment are not required following a high energy line break.

Conclusions:

Interim operation of Turkey Point Unit 3 with the existing charcoal filter thermocouples is justified because the operator can determine when the temperature elements have failed. If the temperature elements fail in conjunction with a fan motor failure, dousing would be manually initiated.

The charcoal filter thermocouple system for Turkey Point Unit 4 is currently being replaced by a fully qualified RTD system. The charcoal filter RTD system will be operational when the unit comes back on line.

CATEGORY II.A

Item No. 33

Component: Resistance Temperature Detector (RTD)

Identification No:

TE-3-412B	TE-4-412B
TE-3-412D	TE-4-412D
TE-3-422B	TE-4-422B
TE-3-422D	TE-4-422D
TE-3-432B	TE-4-432B
TE-3-432D	TE-4-432D

Function: Provides Overtemperature ΔT Reactor Trip Signal

Analysis:

1) Loss of Coolant Accident

The overtemperature ΔT reactor trip is designed to protect the core from departure from nucleate boiling (DNB). This trips the reactor on coincidence of two out of three signals with one set of temperature measurements (hot leg and cold leg) per loop.

Failure of these RTDs during a large break loss of coolant accident could result in the loss of the Overtemperature ΔT trip protection, however, since the reactor has already been tripped by the safety injection resulting from the LOCA, the need for overtemperature trip protection no longer exists.

2) High Energy Line Break

During a high energy line break, the reactor will be tripped upon receipt of a safety injection signal. The same rational for overtemperature ΔT trip protection during a loss of coolant accident also applies to a high energy line break.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the installed RTDs is justified because the reactor has already been tripped following a large break LOCA or HELB obviating the need for overtemperature ΔT trip protection.

CATEGORY II.A

Item No. 34

Component: Resistance Temperature Detector (RTD)

Identification No:

TE-3-410	TE-4-410
TE-3-420	TE-4-420
TE-3-430	TE-4-430

Function: Monitor temperature in RCS Cold Legs A,B and C.

Analysis:

1) Loss of Coolant Accident

These RTDs provide temperature signals to the plant computer and a recorder in the control room. They do not provide any automatic safety function. If these RTDs fail during a loss of coolant accident, the subcooled margin monitor will provide information to the operator that the core is being adequately cooled.

2) High Energy Line Break

During a high energy line break, these RTDs perform the same function they do during a loss of coolant accident and the same rationale applies.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with existing cold leg RTDs is justified because they do not perform an automatic safety function, and the subcooled margin monitor will provide the operator with adequate information in regard to adequate core cooling.

CATEGORY II.A

Item No. 35

Component: Resistance Temperature Detector (RTD)

Identification No:

TE-3-433A	TE-4-433A
TE-3-433B	TE-4-433B
TE-3-423A	TE-4-423A
TE-3-423B	TE-4-423B
TE-3-413A	TE-4-413A
TE-3-413B	TE-4-413B

Function: Provide Temperature of RCS Hot Legs A, B & C to Subcooled Margin Monitor

Analysis:

The Isomedix Test Report identifies the Pyco RTD's tested as Part Number 22-4030. The RTD's installed at Turkey Point Units 3 and 4 are Pyco Part Number 122-4030-04-(4)-8-GS. The prefix '1' in the part number is the Pyco designation for nuclear grade. The suffix indicates a 3-wire duplex with a 4-inch nipple length, 8-inch immersion length and a ground screw. The 22-4030 indicates a nipple-union-nipple RTD. Although the exact Turkey Point configuration was not tested, the configurations tested are of the same basic construction as the ones installed. Turkey Point hot leg RTD's are similar to the RTD's tested in Pyco document No. 770831, August 31, 1977, "Qualification Test Report: Nuclear Power Plant Application".

In reference to in-leakage, Pyco's qualification report states that "all the units completed the loss-of-coolant accident (LOCA) test. An inspection of the units after the LOCA test indicated that the units were not completely sealed against the environment. However, their ability to perform their intended function was not adversely affected as evidenced by post-LOCA readings and calibration results". For added protection against leakage, the Unit 4 RTD's have been installed with Conax electric conductor seal assemblies.

The RTD's performed satisfactorily after being aged for 7 days at 121°C. This corresponds to a qualified life of 3 years at 50°C. Pyco has just completed a new test. The RTD's were aged at 120°C for 99.6 days. This corresponds to a 40-year life at 60°C. The report is scheduled for completion in April of 1983. The documented qualified lifetime of 3 years is sufficient to qualify the RTD's up to the time the new report is received and evaluated.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing qualification documentation is justified for the following reasons:

a) The qualified lifetime of three years covers the RTD's up to the time the revised test report becomes available.

b) The ability of the RTD to perform its intended function without a complete seal is evidenced by the test report results. (Unit 3)

c) Environmentally qualified electric conductor seal assemblies have been fitted to the Unit 4 RTD's.

CATEGORY II.A

Item No. 37

Component: Temperature Transmitter

Identification No: T1C-100

Function: Provide temperature signal for control for Solenoid SV-100.

Analysis:

1) Loss of Coolant Accident

Devices associated with the Boric Acid Batching Tank are required for mixing a neutralizing agent post accident to neutralize the acidic fluids in the containment sump. SV-100 is used to provide steam to the batching tank to facilitate mixing. Temperature transmitter T1C-100 controls the valve opening/closing cycles. The mixing and addition of the neutralizing agent are manual operations which will not start until approximately 8 hours after the initiation of the accident and will last approximately 190 hours. Hence, the Batching Tank is located in an area which is accessible post accident. In the event the temperature transmitter failed, an existing manual bypass valve can be opened to bypass SV-100. Therefore, chemical injection can be continued should this component fail.

2) High Energy Line Break

The functions provided by the Boric Acid Batching Tank are not needed to recover from a high energy line break.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with existing controller TIC-100 is justified because the solenoid valve which it controls has an accessible manual bypass valve which can be utilized to provide steam supply to the tank during a LOCA.

CATEGORY II.A

Item No. 38

Component: Flow Transmitter

Identification No: FT-3-613A FT-4-613A
FT-3-613B FT-4-613B

Function: Provide flow indication of CCW heat exchanger flow.

Analysis:

The flow transmitters above are Fischer & Porter Model No.'s 10B2495JBJS and 10B2495JBNS. These models belong to the 10B2495 series of differential pressure transmitters. This series measures flow with an input range of 0-20 to 0-200 inches of water and an output signal of 4-20 ma. The suffixes JBJS and JBNS refer to specific features of the transmitters such as no range suppression and a 316 stainless steel flange. The 10B2495 series is the same as the 10B2496 series tested in Westinghouse WCAP 9157 except for different input ranges. Both series of transmitters have identical electronic components. Because the differences outlined above are variations on the same basic transmitter, adequate similarity between the 10B2495 series of transmitter and the test specimen is established.

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for these devices. Bechtel Letters V-157 and V-168, dated June 5, 1980 and June 26, 1980, respectively, identify those components in the device susceptible to aging of the components fundamental to the operation of the device. None of these materials had a qualified life of less than 40 years.

Conclusions:

Interim operation of Turkey Point Units No. 3 and No. 4 with the existing flow transmitters is justified for the following reasons:

a) The transmitters' similarity to tested equipment has been established.
b) Aging degradation has been evaluated and all vital components are qualified for 40 years.

CATEGORY II.A

Item No.41

Component: Flow Transmitter

Identification No:

FT-3-122	FT-4-122
FT-3-605	FT-4-605
FT-3-940	FT-4-940
FT-3-943	FT-4-943

Function: Provide flow signal of charging pump discharge flow, RHR discharge flow, and SI pump discharge flow.

Analysis:

The flow transmitters identified above are Fischer & Porter Model No. 10B2496PB. This model belongs to the 10B2496 series of differential pressure transmitters. This series measures flow with an input range of 0-150 to 0-1500 inches of water and an output signal of 420 ma. The suffix PB refers to specific features of the transmitter such as no range suppression and A316 stainless steel flange. Because the differences outlined above are variations on the same basic transmitter tested in Westinghouse WCAP 9157 and referenced in Fischer & Porter Engineering Report DP-2224-1 Nos. 002 and 004, adequate similarity between the installed equipment and test specimen is established.

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for these devices. Bechtel letters V-157 and V-168, dated June 5, 1980 and June 26, 1980, respectively, identify those components in the device susceptible to aging. Of the components fundamental to the operation of the device, none of the materials had a qualified life of less than 40 years.

Conclusions

Interim operation of Turkey Point Units No. 3 and No. 4 with the existing flow transmitters is justified for the following reasons:

a) The transmitters' similarity to tested equipment has been established.

b) Aging degradation has been evaluated and all vital components are qualified for 40 years.

CATEGORY II.A

Item No. 49

Component: Pressure Transmitter

Identification No:

PT-3-464	PT-4-464
PT-3-466	PT-4-466
PT-3-468	PT-4-468
PT-3-474	PT-4-474
PT-3-475	PT-4-475
PT-3-476	PT-4-476
PT-3-484	PT-4-484
PT-3-485	PT-4-485
PT-3-486	PT-4-486
PT-3-494	PT-4-494
PT-3-495	PT-4-495
PT-3-496	PT-4-496

Function: Provide pressure indication of each steam generator and the steam header. Provide a safety injection signal.

Analysis:

1) Loss of Coolant Accident

In the event of a loss of coolant accident, the pressure transmitters on the main steam line will remain operable since the transmitters are outside containment and will not be exposed to the harsh environment.

2) High Energy Line Break

In the event of a high energy line break, the steam pressure transmitters provide a safety injection signal and monitor pressure. The associated pressure indicators will identify which of the three steam generators has a failed high energy line. The postulated high energy line break accident occurs very rapidly. The pressure transmitters will provide a safety injection signal before the environmental conditions can degrade the performance of the transmitter. In addition, there are three redundant pressure transmitters for each steam generator and the steam header which provide significant backup for the safety injection signal.

The pressure transmitters are required for monitoring during a high energy line break. However, these devices will not be exposed to harsh accident environment for more than 5 minutes. This is because the main steam isolation valves will mitigate the accident in a maximum time duration of 5 minutes.

Item No. 49 (Continued)

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing pressure transmitters is justified for the following reasons:

a) The transmitter will provide a safety injection signal in the first few seconds following accident conditions.

b) There are three redundant transmitters on each generator and steam header.

CATEGORY II.A

Item No. 53

Component: Pressure Switch

Identification No: PC-957A, PC-957B, PC-957C, PC-957D

Function: Input to Annunciator (low suction pressure to SI pumps)

Analysis:

These devices are pressure indicating controllers whose controller function is not utilized. Their only function is to input the annunciator. The operator depends upon the RWST and containment sump level indications to provide information in regard to adequate NPSH for pump operation. As these devices perform no safety function, they will be removed from the master list.

Conclusions:

These devices shall be removed from the master list as they perform no safety function.

CATEGORY II.A

Item No. 57

Component: Pressure Transmitter

Identification No: PT-3-940 PT-4-940
PT-3-943 PT-4-943

Function: Provide pressure indication of safety injection.

Analysis:

The pressure transmitters identified above are Fischer & Porter Model No. 50EP1041BCXANS. This 50EP1041 series is a gauge pressure transmitter with an input signal range of 0-350 to 0-3500 psi and an output signal of 4-20 ma. The suffix BCXANS refers to specific features of the transmitter such as mounting, enclosure, and process connection. This model, No. 50EP1041BCXANS, belongs to the same series of pressure transmitters (50EP1041 series) as those tested in Franklin Labs Final Report F-C2639, Appendix A, and is therefore similar to the tested equipment.

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for these devices. Bechtel letters V-157 and V-168, dated June 5, 1980 and June 26, 1980, respectively, identify those components in the device susceptible to aging. Of the components fundamental to the operation of the device, none of the materials had a qualified life of less than 40 years.

Conclusions:

Interim operation of Turkey Point Units No. 3 and No. 4 with the existing pressure transmitters is justified for the following reasons:

a) The transmitters similarity to tested equipment has been established.
b) Aging degradation has been evaluated and all vital components are qualified for 40 years.

CATEGORY II.A

Item No. 58

Component: Differential Pressure Switch

Identification No:

DPS-3-2900	DPS-4-2900
DPS-3-2901	DPS-4-2901
DPS-3-2902	DPS-4-2902

Function: Measure of pressure differential across the feedwater control valves.

Analysis:

1) Loss of Coolant Accident

These differential pressure switches are not required to operate during a loss of coolant accident.

2) High Energy Line Break

These differential pressure switches are used to detect and isolate a main feed line break by sensing the differential pressure across the main feed flow control valves. If a break should occur in the main feed line, the differential pressure across the feed flow control valve increases, causing the differential pressure switch to signal the air operated stop-check valve downstream of the main feed flow control valve to close.

These switches perform their safety function within seconds of the accident and their subsequent failure will not affect accident mitigation and recover.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with existing differential pressure switches is justified because the switches perform their safety function before they could be affected by the harsh environment caused by the accident.

CATEGORY II.A

ITEM No. 59

Component: Acoustic Monitor

Identification No:

ZT/ZS-3-6303A	ZT/ZS-4-6303A
ZT/ZS-3-6303B	ZT/ZS-4-6303B
ZT/ZS-3-6303C	ZT/ZS-4-6303C

Function: Monitor flow through the Code Safety Valves

Analysis:

Environmental qualification was initially reviewed against a now superseded revision of TEC Test Report No. 517-TR-03. TEC has subsequently issued Revision 2 to Report 517-TR-03. This issue is evaluated on Revision 2 of SCEW's 1-38, 1-40, 1-42, 1-44, 1-46 and 1-48. TEC, in their March 23, 1981 letter to Bechtel, recommended housing the charge converters inside transient shields. This modification has been implemented on both units and ensures that the charge converters can withstand peak accident temperatures inside containment. This modification, in conjunction with the revised test report, answers the concerns raised by Franklin Labs in their TER.

Conclusions:

Revision 2 of TEC Report No. 517-TR-03 and TEC March 23, 1981 letter to Bechtel document the environmental qualification of the acoustic monitors to IEEE 323-1974 (Turkey Point profile).

CATEGORY II.A

Item No. 60

Component: Control Station

Identification No: 3N1410 4N1412
3N1411
3N1412

Function: Provide local control of steam generator blowdown valves.

Analysis:

1) Loss of Coolant Accident

These control stations were originally associated with Limitorque motorized valve actuators for the steam generator blowdown valves. These valves have since been replaced with fully qualified air operated valves, and the control stations have been removed.

2) High Energy Line Break

As previously stated, the motorized valve actuators have been replaced with fully qualified air operated valves, controlled by environmentally qualified solenoid pilot valves. The local control stations associated with the motorized valve actuator are no longer used and have been removed.

Conclusions:

Interim (and permanent) operation of Turkey Point Units 3 and 4 is justified because the steam generator blowdown valves have been replaced with fully qualified components, and the control stations have been removed.

CATEGORY II.A

Item No. 73

Component: Terminal Block

Identification No: EB-5

Function: Provide Local Termination Facility

Analysis:

1) Loss of Coolant Accident

These terminal blocks are located outside the containment where the only harsh environmental parameter due to a loss of coolant accident is gamma radiation due to post accident recirculation. The maximum radiation level to which these terminal blocks will be exposed is 7.5×10^5 rads and their radiation tolerance level is 1.0×10^7 rads. Therefore, they will not be affected by a loss of coolant accident.

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for these devices. General Electric's May 16, 1980 letter to Bechtel identifies the age susceptible components in the device. Of the components fundamental to the operation of the device, none have a qualified life of less than 40 years.

2) High Energy Line Break

Operation, environment and justifications outlined for the LOCA scenario apply equally to this accident.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing terminal blocks is justified for the following reasons:

a) They are located outside the containment and are not exposed to in-containment accident environments except radiation,
b) The radiation tolerance of these terminal blocks is more than an order-of-magnitude above the maximum level to which they would be exposed.

CATEGORY II.A

Item No. 74

Component: Electrical Penetration

Identification No:

T3C11	T3I21	T4C11	T4P12
T3C12	T3I22	T4C12	T4P21
T3C13	T3I23	T4C13	T4P22
T3C21	T3I24	T4C21	T4P41
T3C22	T3P11	T4C23	T4P42
T3C23	T3P12	T4I12	T4P43
T3I11	T3P22	T4I14	T4P51
T3I13	T3P41	T4I15	T4P52
T3I14	T3P42	T4I21	
T3I15	T3P43	T4I22	
	T3P51		
	T3P53		

Function: Provide containment penetration for 600V power, control and instrumentation cable.

Analysis:

1) Loss of Coolant Accident

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for these penetrations. FPL Drawing No. 5610-E-54-1 (Redrawn from Crouse Hinds Drawing No. 0100445) identifies the age susceptible components in the penetration. None of the components fundamental to the satisfactory performance of the penetrations had a qualified life of less than 40 years.

The tests performed on the materials used in the penetration assemblies were related to their function performance. For example, insulation resistance and dielectric strength were used as pass-fail criteria following radiation testing of the polyplate insulating material. Similarly, the materials used in the composite seal assembly were also tested for physical properties relevant to their performance in the penetration.

The penetrations installed at Turkey Point were designed by Westinghouse and built by Crouse-Hinds. The similarity between the installed and tested units is established by Westinghouse letters dated June 1, 1979 and June 12, 1979. Materials used in Westinghouse penetrations for the Brunswick Station and Crouse-Hinds penetrations are the same.

The penetration assemblies were tested in a saturated steam environment more rigorous than the Turkey Point Profile. This test, in conjunction with the fact that the penetrations are installed above flood level is sufficient evidence that the Turkey Point penetrations are adequately sealed against moisture penetration. As there was no degradation in electrical properties after the steam test and the test is more rigorous than the specified profile, the steam test is extrapolated to cover the 31 day profile.

CATEGORY II.A

Item No. 74 (Continued)

2) High Energy Line Break

Operation, environment and justifications outlined for the LOCA scenario apply equally to this accident.

Conclusions:

Interim and permanent operation of Turkey Point Units 3 and 4 with the existing electrical penetration assemblies is justified for the following reasons:

a) Similarity between test specimen and installed units has been established.
b) A thermal aging study was performed and all materials are qualified for 40 years.
c) The tests performed on the materials used were related to their functional performance.

CATEGORY II.A

Item No. 75

Component: Solenoid Valve

Identification No: SV-3-2810 SV-4-2810
SV-3-2812 SV-4-2812
SV-3-2814 SV-4-2814

Function: Provide control of air supply to emergency containment cooler bypass control valves.

Analysis:

1) Loss of Coolant Accident

These solenoids are located outside of the containment in a room where radiation from post-accident recirculation constitutes the only harsh environment. The devices have been qualified on a component basis for the radiation levels they will be exposed to in the event of a LOCA.

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for these devices. ASCO Catalogs 29 and 30A, in conjunction with discussions with ASCO identify the materials of construction used in the device. Of the components fundamental to the operation of the device, only one material had a qualified life of less than 40 years. Utilizing Arrhenius techniques, it was determined that the subject Buna 'N' diaphragm, valve seat, seals and discs have a qualified life of 3.25 years. The results of this thermal aging study have been entered in the plant maintenance schedule.

The components are listed as maintenance items and will be replaced before their "end of life".

2) High Energy Line Break

As the solenoid valves are located outside of the containment and emergency containment cooling is only required for a postulated high energy line break inside containment, they will not be exposed to an accident induced harsh environment, and their operation will not be affected.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing solenoid valves is justified because the only harsh environmental parameter the solenoids are exposed to is radiation, and the devices are qualified to those radiation levels.

CATEGORY II.A

Item No. 76

Component: Solenoid Valve

Identification No:

SV-3-2920	SV-4-2920
SV-3-2921	SV-4-2921
SV-3-2922	SV-4-2922
SV-3-2923	SV-4-2923
SV-3-2924	SV-4-2924
SV-3-2925	SV-4-2925

Function: Provide Control of Air Supply to Emergency Containment Intake and Discharge Control Valves

Analysis:

1) Loss of Coolant Accident

These solenoid valves are located outside of the containment in a room where radiation from post-accident recirculation constitutes the only harsh environment. The devices have been qualified on a component basis for the radiation levels they will be exposed to in the event of a LOCA.

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for these devices. ASCO Catalogs 29 and 30A, in conjunction with discussions with ASCO, identify the materials of construction used in the device. Of the components fundamental to the operation of the device, only one material had a qualified life of less than 40 years. Utilizing Arrhenius techniques, it was determined that the subject Buna 'N' diaphragm, valve seat, seals and discs have a qualified life of 3.25 years. The results of this thermal aging study have been entered into the plant maintenance schedule.

The components are listed as maintenance items and will be replaced before their "end of life".

2) High Energy Line Break

As the solenoids are located outside containment and away from postulated high energy line break areas, they will not be exposed to an accident induced harsh environment, and their operation will not be affected.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing solenoid valves is justified because the only harsh environmental parameter the solenoid valves are exposed to is radiation and the devices are qualified to those radiation levels.

CATEGORY II.A

Item No. 79

Component: Solenoid Valve

Identification No:

SV-3-2604	SV-4-2604
SV-3-2605	SV-4-2605
SV-3-2609	SV-4-2609
SV-3-2610	SV-4-2610
SV-3-2615	SV-4-2615
SV-3-2900	SV-4-2900
SV-3-2902	SV-4-2902
SV-3-2904	SV-4-2904
	SV-4-2614

Function: Provide control of air supply to feedwater check control valves and main steam isolation valves.

Analysis:

1) Loss of Coolant Accident

These solenoid valves are not needed for recovery from a large break loss of coolant accident; they are located outside the containment and will not be exposed to a LOCA environment. Therefore, their safety function will not be affected.

2) High Energy Line Break

For a high energy line break inside the containment, the safety function of these valves will not be affected since they will not be exposed to a harsh environment.

For a high energy line break outside the containment, the most adverse environmental conditions which these valves would experience is saturated steam at atmospheric pressure, since these valves are in an open, outdoor area. These valves are qualified for temperatures up to 105°C, 100% RH and are capable of performing their safety function under this accident condition. In addition, failure of these valves would cause the feedwater and steam valves to go to their safe position.

Conclusion:

The valves will not be affected by either a loss of coolant accident or a high energy line break inside the containment since they will not be exposed to the accident environment, and they will not be adversely affected by environmental extremes of a main steam line/feed line break outside the containment. In addition their failure would result in allowing their safety functions to be accomplished. Therefore, no restrictions to operation due to these valves are warranted.

CATEGORY II.A

Item No. 81

Component: Solenoid Valve

Identification No: SV-3-2919

SV-4-2914
SV-4-2915
SV-4-2916
SV-4-2917
SV-4-2919

Function: Provide Control of Air Supply to Auxiliary Feedwater Control Valves

Analysis:

1) Loss of Coolant Accident

These solenoid valves are not needed for recovery from a large break loss of coolant accident. In addition, they are located outside the containment and will not be exposed to a LOCA environment.

2) High Energy Line Break

For a high energy line break inside the containment, the safety function of these valves will not be affected since they will not be exposed to a harsh environment.

For a high energy line break outside the containment, the most adverse environmental conditions which these valves would experience is saturated steam at atmospheric pressure, since these valves are in an open, outdoor area. These valves are qualified for temperatures up to 105°C, 100% RH and are capable of performing their safety function under this accident condition. In addition, failure of these valves would cause the feedwater control valves to open, therefore allowing their safety function to be accomplished.

Conclusions:

The valves will not be affected by either a loss of coolant accident or a high energy line break inside the containment since they will not be exposed to the accident environment, and they will not be adversely affected by environmental extremes of a main steam line/feed line break outside the containment. In addition, their failure would result in allowing their safety functions to be accomplished. Therefore, no restrictions to operation due to these valves are warranted.

CATEGORY II.A

Item No. 82 and No. 106 (Unit 3)

Component: Solenoid Valve

Identification No:

SV-3-2905	SV-4-2905
SV-3-2906	SV-4-2906
SV-3-2907	SV-4-2907
SV-3-2908	SV-4-2908
SV-3-2909	SV-4-2909
SV-3-2910	SV-4-2910

Function: Charcoal Filter Spray Dousing Valves for Emergency Containment Cooling Filters

Analysis:

1) Loss of Coolant Accident

The emergency containment filters operate post LOCA to filter airborne radioactive iodine out of the containment atmosphere. Each emergency filter is served by two redundant dousing valves on separate piping. One dousing valve is powered and routed Channel A and the other Channel B. Failure of one channel will not jeopardize operability of the system.

A thermal aging study was performed to determine qualified lives and maintenance schedules for devices in the scope of 79-01B. The organic components of the dousing valves were provided by ASCO in their April 21, 1980 letter to Florida Power and Light. Of the components listed, only the 'Buna N' diaphragm, valve seat, seals and discs have a qualified life of less than 40 years. These components are included on the plant maintenance schedule. Aging and qualified life limitations have been identified and addressed. Also, failure of the valve is in the safe position (open); therefore the safety function would be accomplished.

2) High Energy Line Break

The emergency containment filters and associated equipment including the dousing valves are not required following a high energy line break.

Conclusions:

Interim operation of Turkey Point Unit 3 with the existing charcoal filter dousing valves is justified because each filter is served by redundant solenoids. Failure of one channel will not jeopardize operability of the system.

In addition the failure mode of the valve is in the safe position and the safety function would be accomplished.

The charcoal filter dousing valves for Turkey Point Unit 4 are presently being replaced with Target Rock solenoids with internal limit switches fully qualified to IEEE 323-1974. The replacement solenoids will be operational when Unit 4 goes back on line.

CATEGORY II.A

Item No. 86

Component: Electrical Insulating Sleeve

Identification No: N/A

Function: Provide protection for field interface of cables at electrical penetrations.

Analysis:

The heat shrinkable insulating sleeves are located in the electrical penetration rooms. They provide protection for field interface of cables outside containment. The sleeves were identified as being manufactured by AMP/Raychem and are composed of cross-linked polyethylene.

Conclusions:

These electrical insulating sleeves are located in a mild environment. They were incorrectly included in the scope of the response and will be removed from the master list.

CATEGORY II.A

Item No. 89

Component: Electrical Power and Control Cable

Identification No: Cable Codes N47, N50, N52, 53, 54, 55, 56

Function: 600 V Power and Control Cable

Analysis:

1) Loss of Coolant Accident

Power and control cable, as well as other types of cable, are required to remain functional during and following a loss of coolant accident, both for accident mitigation and post accident monitoring.

The elastomeric insulating system used in the construction of Okonite 600 V power and control cable is fully capable of meeting all aging, moisture, and flame test requirements of IEEE 383-1974 and the radiation and loss of coolant accident requirements of IEEE 323-1974. The qualification testing that was performed is summarized in Okonite's Report N-1 dated July 3, 1978, and applies to all of the nuclear grade cable manufactured by Okonite.

2) High Energy Line Break

As with a loss of coolant accident, power and control cables are required to remain functional during and following a high energy line break both for accident mitigation and post accident monitoring. The same rationale that applies to a loss of coolant accident also applies to a high energy line break.

Conclusions:

Interim (and permanent) operation of Turkey Point Units 3 and 4 with the existing Okonite cable is justified because newer test reports establish qualification of the cable to the requirements of IEEE 383-1974 and IEEE 323-1974.

CATEGORY II.A

Item No. 95

Component: Electrical Instrument Cable

Identification No: Cable Code L1P

Function: 600 V Instrumentation Cable

Analysis:

This instrument cable is required to operate 31 days following a loss of coolant accident or a high energy line break. The cable was purchased from Mississippi Power and Light's Grand Gulf Station. Records obtained from Grand Gulf tie the equipment to the test specimen.

In Eaton Corporation's letter dated September 19, 1978 (Addendum to June 1978 Report), the thermal aging data is clarified. The cable was thermally aged for 168 hours at 249.8°F. Reading from the Arrhenius plot this corresponds to a qualified life of 40 years at 127°F (52°C).

Conclusions:

Documentations is available which ties the instrument cable to the Samuel Moore Company's June 1978 Report; Qualification Test of Electric Cables Under a Simulated LOCA/DBE. The cable has a qualified life of 40 years at 52°C and is fully qualified to IEEE 383-1974. Therefore, no restrictions to operation due to this cable are warranted.

CATEGORY II.A

Item No. 97

Component: Electrical Thermocouple Cable

Identification No: Cable Code N77

Function: 600 V Thermocouple Extension Cable for Charcoal Filter Thermocouples

Analysis:

1) Loss of Coolant Accident

The emergency containment filters are operated post LOCA to filter airborne radioactive particulates out of the containment atmosphere. The thermocouple extension cable brings signals from 24 thermocouples back to a common reference junction point. The thermocouple extension cable is an integral part of a system which monitors charcoal filter temperature. If the filter fan motor should fail and the temperature rise to 325°F, the operator is instructed to initiate dousing of the charcoal filters.

Should the thermocouple extension cable fail, it would become evident to the operator that the thermocouple had failed. In this event, the operator would monitor the fan indicating lights to assure the fan is running. In the event the fan isn't running, the operator would open the dousing valves as a precaution.

2) High Energy Line Break

The emergency containment filters and associated equipment are not required following a high energy line break.

Conclusions:

Interim operation of Turkey Point Unit 3 with the existing thermocouple extension cable is justified because the operator would be able to determine the status of the fans, and if they weren't running could manually initiate the dousing system.

The charcoal filter thermocouple system for Turkey Point Unit 4 is currently being replaced by a fully qualified RTD system. The thermocouple cable has already been replaced with fully qualified instrument cable. The charcoal filter RTD system will be operational when the unit comes back on line.

CATEGORY II.A

Item No. 98

Component: Electrical Instrument Cable

Identification No: Cable Code 61

Function: 600V Instrumentation Cable

Analysis:

1) Loss of Coolant Accident

Cable Code 61 is a 4/C No. 16 AWG 600 V instrumentation cable insulated with CC-2200 cross-linked polyethylene and has a CC-2010 PVC jacket. This cable is required to function throughout the 30 day post-LOCA profile.

Post-LOCA condition test results are contained in Continental Wire and Cable Test Report. This test simulated severe LOCA conditions. The cable was tested to temperatures and pressures which exceed those of the specified containment temperature and pressure envelopes. Continental Wire and Cable stated in a letter to Florida Power and Light, dated May 12, 1980, that based on the test data the cable would function as intended in the post-LOCA environment specified.

A thermal aging study was performed to determine qualified lifetimes and replacement intervals for this table. The Continental Wire and Cable catalog identifies the age susceptible components in the cable. Of the components fundamental to the operation of the cable, none had qualified lives of less than 40 years.

2) High Energy Line Break

As with a loss of coolant accident, the instrumentation cable is required to remain functional during and following a high energy line break for accident mitigation and post accident monitoring. The same rationale that applies to a loss of coolant accident also applies to a high energy line break.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing instrument cable is justified on the basis that the cable is qualified by the Continental Wire and Cable Tests.

CATEGORY II.A

Item No. 99

Component: Electrical Instrument Cable

Identification No: Cable Codes 60 and 61

Function: 600 V Instrumentation Cable

Analysis

1) Loss of Coolant Accident

This instrumentation cable is required to remain functional throughout the 31 day post-LOCA profile. General Electric's May 30, 1979 letter to Bechtel identifies the cable configurations installed at Turkey Point Units 3 and 4. Items A1 and A2 (Vulkene insulation with PVC jacket) are installed inside containment and evaluated on System Component Evaluation Worksheets 13-8 and 13-9, respectively. The vulkene mineral sample exposed in the test was 71C No. 14 with 30 mil walls, whereas the configurations installed are 2 and 4 conductor No. 16 with 25 mil walls. Although the smaller AWG size has 5 mils thinner insulation, the same materials and processes are used in construction.

The above referenced General Electric letter links these cables to the test report, "A Status Report on the G.E. Wire and Cable Department Comprehensive Testing Program", and establishes adequate similarity between the installed cable and the test specimen.

The General Electric Test Report shows evidence that the instrument cable will remain functional throughout the test profile. The test profile is more severe than, and is extrapolated to envelop the Turkey Point post accident profile.

A thermal aging study was performed to determine qualified lifetimes and replacement intervals for the cables. General Electric's May 30, 1979 letter to Bechtel identifies the age susceptible materials. Utilizing Arrhenius techniques, it was determined that all components fundamental to proper operation of the General Electric Instrument Cable have a qualified life of 40 years.

2) High Energy Line Break

As with a loss of coolant accident, the instrumentation cable is required to remain functional during and following a high energy line break for accident mitigation and post accident monitoring. The same rationale that applies to a loss of coolant accident also applies to a high energy line break.

CATEGORY II.A

Item No. 99 (Continued)

Conclusions:

Interim and permanent operation of Turkey Point Units 3 and 4 with the existing General Electric instrument cable is justified for the following reasons:

a) The cable is qualified by the G.E. test report.
b) Adequate similarity between the installed cable and the test specimen has been established.

CATEGORY II. A

Item No. 101

Component: Electrical Instrument Cable

Identification No: Cable Code LT1

Function: 600V Instrument Cable

Analysis:

Loss of coolant accident and high energy line break.

The referenced test report documents that Rockbestos Firewall III cable is qualified to operate through a LOCA following 40 years of operation. Rockbestos letter to Bechtel dated October 23, 1981, certifies that the Rockbestos test report is applicable to the cable supplied to Florida Power and Light and used at Turkey Point Units 3 and 4.

Conclusions:

The cable is qualified to IEEE 383-1974. Adequate similarity between cable used and cable test specimens is established as both utilize the same materials and manufacturing process. Therefore, no restrictions to full-term operation due to this cable exist.

CATEGORY II.A

Item No. 103

Component: Flow Transmitter

Identification No: FT-3-110 FT-4-110

Function: Provide Flow Signal on Flow from Boric Acid Transfer Pumps to Charging Pump Suction

Analysis:

1) Loss of Coolant Accident

Following a loss of coolant accident, monitoring the flow from the boric acid transfer pumps to the charging pump suction is required. This flow verifies the chemical injection of a neutralizing agent to the RCS loops to control the pH of the containment sump fluid. The transmitter is located inside the auxiliary building and is therefore not affected by the adverse environmental conditions inside containment except for radiation due to post accident recirculation. The transmitters are fully qualified to these radiation levels.

In addition, the Post Accident Sampling System may be aligned to monitor the pH of the containment sump fluid. This will provide positive verification of injection of the neutralizing agent.

2) High Energy Line Break

Control of sump pH is not required following a high energy line break.

Conclusions:

Interim operation of Turkey Point Units No. 3 and No. 4 with the existing flow transmitter is justified because chemical injection can be verified by monitoring the containment pump fluid pH via the Post Accident Sampling System.

CATEGORY II.A

ITEM No. 105

Component: Solenoid Valve

Identification No: SV-3-2914
SV-3-2916

Function: Provide control of air supply to auxiliary feedwater control valves and containment instrument air bleed isolation valve.

Analysis:

1) Loss of Coolant Accident

The auxiliary feedwater control valves are not needed for recovery from a large break loss of coolant accident.

The instrument air bleed isolation valve is a fail closed valve and closes upon receipt of a containment isolation signal. The solenoid valve, which regulates the air supply to the containment isolation air operator will close the isolation valve before the harsh environment can affect the internals. If the solenoid valve fails, it will fail closed, and the containment isolation air operator will close (and remain closed) in all postulated modes of solenoid valve failure. A redundant isolation valve outside the containment provides additional assurance that the containment will be isolated and remain isolated

2) High Energy Line Break

For a high energy line break inside the containment, the safety function of these valves will not be affected since they will not be exposed to a harsh environment.

For a high energy line break outside the containment, the most adverse environmental conditions which these valves would experience is saturated steam at atmospheric pressure, since these valves are in an open, outdoor area. These valves are qualified for temperatures up to 105°C, 100% RH and are capable of performing their safety function under this accident condition. In addition, failure of these valves would cause the auxiliary feedwater control valves to open, allowing the safety function to be accomplished.

The instrument air bleed isolation valve will close upon receipt of a containment isolation signal before the harsh environment can affect the solenoid internals. If it does fail, it will fail closed and the containment isolation air operator will close (and remain closed) in all postulated modes of solenoid valve failure. A redundant isolation valve outside the containment provides additional assurance that the containment will be isolated and remain isolated.

CATEGORY II.A

ITEM No. 105 (Continued)

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing solenoid valves is justified because the valves will not be affected by either a loss of coolant accident or a high energy line break inside the containment since they will not be exposed to the accident environment and they will not be adversely affected by environmental extremes of a main steam line/feed line break outside the containment. In addition their failure would result in allowing their safety function to be accomplished. Therefore, no restrictions to operation due to these valves are warranted.

The instrumental air isolation valve - The valve performs its safety function (isolates) prior to its postulated failure. Its subsequent failure will not result in a change of the closed position of the isolation valve inside the containment, the safety function (isolation) is backed up by a redundant valve outside the containment.

CATEGORY II.A

Item No. 109 (Unit 3 only)

Component: Solenoid Valve

Identification No: SV-3-2917
SV-3-2915

Function: Provide Control of Air Supply to Auxiliary Feedwater Control Valves

Analysis:

1) Loss of Coolant Accident

These solenoid valves are not needed for recovery from a large break loss of coolant accident. In addition, they are located outside the containment and will not be exposed to a LOCA environment.

2) High Energy Line Break

For a high energy line break inside the containment, the safety function of these valves will not be affected since they will not be exposed to a harsh environment.

For a high energy line break outside the containment, the most adverse environmental conditions which these valves would experience is saturated steam at atmospheric pressure, since these valves are in an open, outdoor area. These valves are qualified for temperatures up to 105°C, 100% RH and are capable of performing their safety function under this accident condition. In addition, failure of these valves would cause the auxiliary feedwater control valves to open, therefore allowing the safety function to be accomplished.

Conclusions

The valves will not be affected by either a loss of coolant accident or a high energy line break inside the containment since they will not be exposed to the accident environment, and they will not be adversely affected by environmental extremes of a main steam line/feed line break outside the containment. In addition, their failure would result in allowing their safety functions to be accomplished. Therefore, no restrictions to operation due to these valves are warranted.

Item No. 109 (Unit 3 only, continued)

Component: Solenoid Valve

Identification No: SV-3-2912

Function: Containment Isolation Air Sample Valve

Analysis:

1) Loss of Coolant Accident

The sampling line solenoid is required for long term monitoring of the containment atmosphere. The solenoid is located outside containment and the only harsh environment it will be exposed to is post-accident radiation levels up to 7.5×10^5 rads. The device has been qualified on a component basis for radiation levels of 1×16^6 rads.

A thermal aging study was performed to determine qualified lifetimes and component replacement intervals for this device. ASCO Catalogs 29 and 30A, in conjunction with discussions with ASCO, identify the materials of construction used in the device. Of the components fundamental to the operation of the device, only one material had a qualified life of less than 40 years. Utilizing Arrhenius techniques, it was determined that the subject Buna 'N' diaphragm, valve seat, seals and discs have a qualified life of 3.25 years. The results of this thermal aging study have been entered into the plant maintenance schedule.

The components are listed as maintenance items and will be replaced before their "end of life".

2) High Energy Line Break

As the solenoid is located outside containment and away from postulated high energy line break areas, it will not be exposed to an accident induced harsh environment, and its operation will not be affected.

Conclusions:

Interim operation of Turkey Point Units 3 and 4 with the existing solenoid valve is justified because the only harsh environmental parameter the solenoid valve is exposed to is radiation, and the device is qualified to the appropriate radiation level.