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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED THIRD TEN-YEAR INSERVICE
TESTING PROGRAM PLANS FOR
SUSQUEHANNA SES UNITS 1&2 **Docket Nos. 50-387**
PLA-5746 **and 50-388**

In accordance with Title 10, Code of Federal Regulations, Part 50, Section 55a, Paragraph f, Subparagraph (4)(ii) [10 CFR 50.55a(f)(4)(ii)], PPL Susquehanna, LLC (PPL) has updated the Susquehanna Steam Electric Station (SSES), Units 1 and 2 Inservice Testing (IST) Program Plans for the Third Ten-Year Interval.

In accordance with 10 CFR 50.55a(f), PPL is required to update the IST programs for SSES once every ten years or 120-month interval. The IST Programs are required by 10 CFR 50.55a(f)(4)(ii) to comply with the latest edition and addenda of the Code incorporated by reference in 10 CFR 50.55a(b) one year prior to the start of the interval. The next interval for SSES Units 1 and 2 is currently scheduled to commence on June 1, 2004 and be completed by May 31, 2014. Accordingly, the ASME OM Code-1998 Edition through the Omb 2000 Addenda is the Code that SSES must meet for the third ten-year interval IST programs.

PPL is submitting for review the attached Third Ten-Year Interval Inservice Testing Program Plans for SSES Units 1 and 2. The Program Plans for both units are the same except that common equipment is included in the Unit 1 Program Plan only. The key features of the SSES IST Program Plans are the Introduction (Section 1), Inservice Testing Plans for Pumps (Section 2), Inservice Testing Plans for Valves (Section 3), SSES Drawings (Section 4), Testing Justifications (Section 5), and Relief Requests (Section 6). The listings of pumps and valves have not been included with this submittal. Also, not included in this submittal are the Cold Shutdown Justifications and Refueling Outage Justifications, which are not required to be approved by NRC, but are subject to inspection.

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Where alternatives to Code requirements are being proposed or the implementation of certain Code requirements has been determined to be impractical because of configuration of components, radiation level, or other valid reasons, specific relief requests have been included in Section 6 of the Third Ten-Year Interval IST Program Plans.

We request that the Third Ten-Year Interval IST Program Plans for Susquehanna SES Units 1 and 2 be approved by January 1, 2005.

Should you have any questions, please contact C. T. Coddington at (610) 774-4019.

Sincerely,

B. L. Shriver

Attachments:
Attachment 1 - Susquehanna Steam Electric Station Unit 1 Proposed Third Ten-Year Interval Inservice Testing Program Plan
Attachment 2 - Susquehanna Steam Electric Station Unit 2 Proposed Third Ten-Year Interval Inservice Testing Program Plan

Copy: Regional Administrator – Region I
Mr. S. L. Hansell, NRC Sr. Resident Inspector
Mr. R. V. Guzman, NRC Project Manager
Mr. R. Janati, DEP/BRP

Attachment No. 1 to PLA-5746

Susquehanna SES Unit 1

Proposed Third Ten-Year Interval

Inservice Testing Program Plan

SUSQUEHANNA STEAM ELECTRIC STATION

UNIT 1

INSERVICE TESTING PROGRAM PLAN

Rev.	Description	Prepared by:	Approved by:	Date
0	Initial Issue - Third Ten Year Update	R.E. Shirk		3/21/04

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1. INTRODUCTION

This document is the Third Ten-year Interval Program Plan for Inservice Testing (IST) of Pumps and Valves at the Susquehanna Steam Electric Station (SSES) Unit 1 in compliance with the requirements of 10 CFR 50.55a(f) and Station Technical Specifications. The third ten-year interval is applicable from June 1, 2004 to May 31, 2014. This Program plan was prepared in accordance with the rules of the ASME Code for Operation and Maintenance of Nuclear Power Plants, ASME OM Code –1998, through the ASME OMb Code-2000 Addenda (OM-1998 through OMb-2000 referred to as "The Code").

Administrative and implementing procedures, reference values, test results, and other records required to define and execute the IST Program are retained at SSES.

1.1 Purpose

The Third Interval SSES Unit 1 IST Pump and Valve Program establishes testing requirements to assess the operational readiness of certain ASME Safety Class 1, 2, and 3 pumps and valves that are required to:

a. Shut down the reactor to the safe shutdown condition,
b. Maintain the reactor in the safe shutdown condition, or
c. Mitigate the consequences of an accident.

This Program Plan describes the SSES Unit 1 testing requirements and commitments for testing those ASME Code Class 1, 2, and 3 components that meet the criteria for inclusion into the IST Pump and Valve Program.

1.2 Regulatory Bases and Scope

Inservice tests to verify operational readiness of pumps and valves, whose function is required for safety, conducted during successive 120-month intervals must comply with the requirements of the latest edition and addenda of the Code incorporated by reference in paragraph (b) of 10 CFR 50.55a 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed in paragraph (b) of this section.

The SSES Unit 1 third ten-year interval starts on June 1, 2004. The Code edition in effect as of June 1, 2003 was the OM-1998 Edition through OMb-2000 Addenda which was endorsed in the Federal Register on September 26, 2002 (Vol. 67, No. 187).

Limitations and modifications applicable to the OM-1998 Edition through OMb-2000 Addenda are:

a. Quality Assurance

When applying editions and addenda of the OM Code, the requirements of NQA-1, "Quality Assurance Requirements for Nuclear Facilities," 1979 Addenda, are acceptable as permitted by ISTA 1.4 of the OM Code, provided the licensee uses its 10 CFR part 50, Appendix B, quality assurance program in conjunction with the OM Code requirements. Commitments contained in the licensee's quality assurance program description that are more stringent than those contained in NQA-1 govern OM Code activities. If NQA-1 and the OM Code do not address the commitments contained in the licensee's Appendix B quality assurance program description, the commitments must be applied to OM Code activities.

SSES applies the requirements of 10 CFR 50 Appendix B to the IST Pump and Valve Program.

b. Motor-Operated Valve Testing

Licensees shall comply with the provisions for testing motor-operated valves in OM Code ISTC 4.2, 1995 Edition with the 1996 and 1997 Addenda, or ISTC-3500, 1998 Edition through the latest edition and addenda incorporated by reference in paragraph (b)(3) of this section, and shall establish a program to ensure that motor-operated valves continue to be capable of performing their design basis safety functions.

SSES complies with the motor-operated valve testing in OM Code ISTC-3500, 1998 Edition through the 2000 Addenda and has a program to respond to the requirements of NRC Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance" up to and including Supplement 7 and Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves."

c. Code Case OMN-1

As an alternative to paragraph (b)(3)(ii) of this section, licensees may use Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Certain Electric Motor-Operated Valve Assemblies in Light Water Reactor Power Plants," Revision 0, in conjunction with ISTC 4.3, 1995 Edition with the 1996 and 1997 Addenda, or ISTC-3600, 1998 Edition through the latest edition and addenda incorporated by reference in paragraph (b)(3) of this section. Licensees choosing to apply the Code Case shall apply all of its provisions.

(a) The adequacy of the diagnostic test interval for each valve must be evaluated and adjusted as necessary but not later than 5 years or three refueling outages (whichever is longer) from initial implementation of ASME Code Case OMN-1.

(b) When extending exercise test intervals for high risk motor-operated valves beyond a quarterly frequency, licensees shall ensure that the potential increase in core damage frequency and risk associated with the extension is small and consistent with the intent of the Commission's Safety Goal Policy Statement.

SSES has not implemented Code Case OMN-1.

d. Appendix II

Licensees applying Appendix II, "Check Valve Condition Monitoring Program," of the OM Code, 1995 Edition with the 1996 and 1997 Addenda, shall satisfy the requirements of paragraphs (b)(3)(iv)(A), (b)(3)(iv)(B), and (b)(3)(iv)(C) of this section. Licensees applying Appendix II, 1998 Edition through the latest edition and addenda incorporated by reference in paragraph (b)(3) of this section, shall satisfy the requirements of paragraphs (b)(3)(iv)(A), (b)(3)(iv)(B), and (b)(3)(iv)(D) of this section.

(a) Valve opening and closing functions must be demonstrated when flow testing or examination methods (nonintrusive, or disassembly and inspection) are used;

(b) The initial interval for tests and associated examinations may not exceed two fuel cycles or 3 years, whichever is longer; any extension of this interval may not exceed one fuel cycle per extension with the maximum interval not to exceed 10 years; trending and evaluation of existing data must be used to reduce or extend the time interval between tests.

(c) If the Appendix II condition monitoring program is discontinued, then the requirements of ISTC 4.5.1 through 4.5.4 must be implemented.

(d) The provisions of ISTC-3510, ISTC-3520, and ISTC-3540 in addition to ISTC-5221 must be implemented if the Appendix II condition monitoring program is discontinued.

SSES, at the present time, is not applying Appendix II, "Check Valve Condition Monitoring Program."

e. Exercise Interval for Manual Valves

Manual valves must be exercised on a 2-year interval rather that the 5-year interval specified in paragraph ISTC-3540 of the 1999 Addenda through the latest edition and addenda incorporated by reference in paragraph (b)(3) of this section, provided that adverse conditions do not require more frequent testing.

SSES complies with the 10 CFR 50.55a 2-year limitation on exercising manual valves.

1.3 Testing Scope

1.3.1 Pump Testing

The scope of pump testing is to assess the operational readiness of certain ASME Class 1, 2, and 3 centrifugal and positive displacement pumps, provided with an emergency power source, that are required to:

a. Shut down the reactor to the safe shutdown condition,

b. Maintain the reactor in the safe shutdown condition, or

c. Mitigate the consequences of an accident.

1.3.2 Pump Testing Exclusions

Excluded from the above are:

a. Drivers, except where the pump and driver form an integral unit and the pump bearings are in the driver

b. Pumps that are provided with emergency power solely for operating convenience

c. Skid-mounted pumps that are adequately tested as part of the major component

1.3.3 Valve Testing

The scope of valve testing is to assess the operational readiness of certain active and passive ASME Class 1, 2, and 3 valves, including their actuating and position indicating system, that are required to:

a. Shut down the reactor to the safe shutdown condition,

b. Maintain the reactor in the safe shutdown condition, or

c. Mitigate the consequences of an accident.

1.3.4 Pressure Relief Valve Testing

The scope of pressure relief valve testing are those ASME Class 1, 2, and 3 pressure relief devices included in ASME Boiler & Pressure Vessel Code Section III for protecting systems or portions of systems, including their actuating and position indicating system, that are required to:

a. Shut down the reactor to the safe shutdown condition,

b. Maintain the reactor in the safe shutdown condition, or

c. Mitigate the consequences of an accident.

1.3.5 Valve Testing Exclusions

Excluded from Code testing, provided they are not required to perform a specific function as specified above are:

a. Valves used only for operating convenience such as vent, drain, instrument, and test valves

b. Valves used only for system control, such as pressure regulating valves

c. Valves used only for system or component maintenance

d. Skid-mounted valves that are adequately tested as part of the major component

e. External control and protection systems responsible for sensing plant conditions and providing signals for valve operation

f. Category A and B safety and relief valves from the requirements of ISTC-3700, Valve Position Verification, and ISTC-3500, Valve Testing Requirements

1.4 Technical Positions

1.4.1 Categories of Valves (ISTC-1300)

Valves within the scope of the Code shall be placed in one or more of the following categories. When one or more distinguishing category characteristic is applicable, all requirements of each of the individual categories are applicable, although duplication or repetition of common testing requirements is not necessary.

- Category A: Category A Valves are valves for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their required function.
- Category B: Category B Valves are valves for which seat leakage in the closed position is inconsequential for fulfillment of the required function.
- Category C: Category C Valves are valves that are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves) for fulfillment of their required function.
- Category D: Category D Valves are valves that are actuated by an energy source capable of only one operation, such as rupture discs or explosively actuated valves.

The SSES position is that if an individual valve has a specific seat leakage limit, it is a Category A valve. If the leakage of a valve is limited to overall system leakage, or a limit to preclude diversion of flow, Category A does not apply, although the valve is tested for the capability to close to prevent such system leakage or diversion of flow.

This position is supported by two Task Interface Agreements (TIA) that were performed for NRC Regional Offices by the NRC Headquarters staff. The first is Region I TIA, dated July 5, 1994, for Potential Secondary Bypass Leakage, Susquehanna Steam Electric Station TAAC Number M-86276. The second is Task Interface Agreement 94-22, dated May 15, 1995 for Testing Emergency Core Cooling Suction-Side Components, H. B. Robinson Steam Electric Plant, Unit No. 2 (TC No. M89905)

1.4.2 Pump Groups (ISTB-2000)

Pumps within the scope of the Code shall be placed in one of the following categories. A pump that meets both Group A and Group B definitions shall be categorized as a Group A pump.

Group A: Group A Pumps are pumps that are operated continuously or routinely during normal operation, cold shutdown, or refueling operations.

At SSES Unit 1, the following pumps are considered Group A pumps:

0P504A	Emergency Service Water Pump A
0P504B	Emergency Service Water Pump B
0P504C	Emergency Service Water Pump C
0P504D	Emergency Service Water Pump D
1P212A	Residual Heat Removal Pump A
1P212B	Residual Heat Removal Pump B
1P212C	Residual Heat Removal Pump C
1P212D	Residual Heat Removal Pump D
1P516A	RHR Service Water Pump A
1P516B	RHR Service Water Pump B

Group B: Group B Pumps are pumps in standby systems that are not operated routinely except for testing.

At SSES Unit 1, the following pumps are considered Group B pumps:

0P171A	Control Structure Chilled Water Condensing Pump A
0P171B	Control Structure Chilled Water Condensing Pump B
1P203	Reactor Core Isolation Cooling Pump
1P204/209	High Pressure Coolant Injection Main Pump/Booster Pump
1P206A	Core Spray Pump A
1P206B	Core Spray Pump B
1P206C	Core Spray Pump C
1P206D	Core Spray Pump D
1P208A	Standby Liquid Control Pump A
1P208B	Standby Liquid Control Pump B

1.4.3 Pump Design Flow

Pump design flow at SSES Unit 1 is based on one of the following:

a. Pump design flow as determined by engineering analysis

b. Licensing basis flow as determined by UFSAR or Technical Specifications

c. Flow corresponding to the pump best efficiency point (BEP) on the manufacturer's pump curve

1.4.4 Active Valve

Active valves are valves that are required to change obturator position to accomplish their safety function. In accordance with NUREG-1482, Section 2.4.2, a valve need not be considered active if it is only temporarily removed from service or from its safety position for as short period of time, such as manually opening a sample valve to take a sample while maintaining administrative control over the valve.

1.4.5 Passive Valves

Passive valves that have remote position indication or that are classified as Category A are included in the IST Program with the appropriate test requirements. Valves that are locked or de-energized in their required positions, or are only repositioned from their safety position for performance of surveillance procedures are considered passive. Check valves that have flow secured by an in-line closed manual valve are considered passive.

1.4.6 Skid Mounted Components

Diesel Fuel Oil Transfer Pumps (0P514A through E)

Diesel Fuel Oil Transfer Pump Discharge Check Valves (020007, 020009, 020012, 020015, and 020300)

High Pressure Coolant Injection Turbine Stop Valve (FV15612)

ASME OM Code 1998 Edition through 2000 Addenda, Section ISTA-2000, defines skid mounted pumps and valves as follows:

"pumps and valves integral to or that support operation of major components, even though these components may not be located directly on the skid. In general, these pumps and valves are supplied by the manufacturer of the major component. Examples include:

(a) diesel fuel oil pumps and valves;

(b) steam admission and trip throttle valves for high-pressure coolant injection pumps;

(c) steam admission and trip throttle valves for auxiliary feedwater turbine driven pumps;

(d) solenoid-operated valves provided to control an air-operated valve."

Testing of the major component is an acceptable means for verifying the operational readiness of the skid-mounted and component subassemblies if the licensee documents this approach in the IST Program. This is acceptable for both Code class components and non-Code class components tested and tracked by the IST Program.

Four of the Diesel Fuel Oil Transfer Pumps (0P514 A through D) are sealed unit submersible type with the entire unit submerged in the Diesel Oil Storage Tanks. None of the pumps include any provisions for flowrate , inlet pressure or vibration indication or measurement. The SSES Technical Specification require at least a monthly functional test of these pumps and discharge check valves. This test verifies fuel oil flow from the storage tank to each diesel's skid-mounted day tank. Similarly, the diesel oil firing pumps are tested during the diesel functional tests. These pumps take suction from the day tanks and supply the diesel cylinders.

The actual flow rate for the diesel fuel oil transfer pumps is over five times the required diesel engine fuel usage at rated conditions. Even a large reduction in pump flow will not affect system operability.

The High Pressure Coolant Injection Turbine Stop Valve (FV15612) has a design closure stroke time of 0.5 seconds. This rapid closure is accomplished by spring force. As a rapid acting valve, closure of this valve cannot be timed accurately nor trended from test-to-test. In contrast, opening is accomplished hydraulically by oil pressure working against spring force. The valve has no independent manual control, but rather is controlled only by HPCI turbine oil pressure. The turbine stop valve is a skid-mounted component of the HPCI turbine and structurally integrated with the turbine.

SSES considers these components to be skid mounted and adequately tested with the major piece of equipment in accordance with ISTB-1200c.

1.4.7 Fail Safe Testing

For those valves in the SSES Unit 1 Valve Table that are designated with a fail-safe test, the fail-safe test will be conducted using the valve control switch in conjunction with the stroke time testing of the valve. Utilizing the valve control switch is equivalent to removing control power fuses, opening power supply breakers, or isolating air supplies. Verifying the fail-safe function of valves via normal valve operation is sufficient to demonstrate proper valve operability on loss of electrical power or loss of air.

The MSIV actuator is different from most air to open, spring to close valves. In the typical air to open, spring to close valve, a loss of air caused by de-energizing the solenoid valve, causes the air to exhaust and the spring to close the valve. With the MSIVs, de-energizing the solenoid, causes the air under the cylinder to exhaust and the air is redirected to the top of the cylinder. The MSIVs will be fail-safe tested by using a springs-only closure.

1.4.8 Check Valves Demonstrated Open During Normal Plant Operations

In accordance with ISTC-5221(a)(3), check valves that have a safety function in only the close direction shall be exercised by initiating flow and observing that the obturator has traveled to at least the partially open position. ISTC-3522 states the following:

(a) Open and close tests need only be performed at an interval when it is practicable to perform both tests.

(b) Test order shall be determined by the Owner

(c) Open and close tests are not required to be performed at the same time if they are both performed within the same interval.

The following check valves have only a closed safety function:

(a) HV141F032A/B - Feedwater Supply to Reactor Stop Check Valves
(b) 141F039A/B – Reactor Water Cleanup Return Check Valves
(c) 086241/086341 – Emergency Service Water Keep Fill Check Valves
(d) 151F089A/B – Residual Heat Removal Keep Fill Check Valves
(e) 151F0909A/B – Residual Heat Removal Keep Fill Check Valves

(f) 149015 – Reactor Core Isolation Cooling Keep Fill Check Valve
(g) 155012 – High Pressure Core Injection Keep Fill Check Valve
(h) 143F013A/B – Reactor Recirc Pump Seal Injection Check Valves
(i) XV143F017A/B - Reactor Recirc Pump Seal Injection Check Valves
(j) 146026/146027 – Control Rod Drive Seismic Island Check Valves

These check valves have flow through them during normal plant operations. If the check valve is not open to pass flow, alarms or indications would identify the problem to an Operator who is trained to respond to such situations and take appropriate actions. Condition Reports are written for abnormal plant conditions attributable to conditions such as check valve failures. The observation and analysis of the non-safety open position of these check valves is satisfied by operator reviews and no specific surveillance procedure will be developed to document the non-safety related open function of these check valves.

Verifying that the system is full is also an industry accepted means for verifying that keepfill check valves are capable of opening to provide flow when necessary.

The following check valves have both open and close safety functions:

(a) 141F010A/B – Feedwater Supply to Reactor Check Valve
(b) 141818A/B - Feedwater Supply to Reactor Check Valve

ISTC-5221(a)(1) states that check valves that have a safety function in both the open and close direction shall be exercised by initiating flow and observing that the obturator has traveled to either the full open or to the position required to perform its intended function(s) and verify on cessation of flow or reversal of flow, the obturator has traveled back to the seat.

These check valves are open during normal plant operation to supply feedwater flow to the reactor and have an open safety function during an accident to allow Reactor Core Isolation Cooling (RCIC) flow (Feedwater Loop A) or High Pressure Coolant Injection (HPCI) flow (Feedwater Loop B) to the reactor. The maximum required accident flow for RCIC is 600 gpm and for HPCI is 5,000 gpm. During normal plant operation, the feedwater flow through these valves is approximately 16,000 gpm in each loop at 100% reactor power.

2. INSERVICE TESTING PLANS FOR PUMPS

The pumps included in the SSES Unit 1 Inservice Testing Program are listed on the attached Pump Table (Attachment 1). Pumps that are common to both Unit 1 and 2 are included in the SSES Unit 1 Inservice Testing Program. The column headings for the Pump Table are delineated below with an explanation of the content of each column.

System – Three digit number designating the system in which the pump is located

Pump Number – Unique NIMS component identification number

Noun Name – Unique NIMS noun name for the pump

P&ID/Coord. – P&ID number and coordinates on the P&ID at which each pump is located

ASME Class – ASME Code Class of the pump. "S" signifies that the pump is a safety-related non-ASME Code Class pump.

Orientation – Designates the orientation of the axis of the impeller. "H" is horizontal and "V" is vertical.

Pump Type/ Group – Indicates whether the pump is a centrifugal pump or a positive displacement pump. The Group designation, "A" or "B" indicates the grouping as defined by ASME OM Code 1998 Edition, through 2000 Addenda, ISTB-2000. Group A pumps are pumps that are operated continuously or routinely during normal operations, cold shutdown, or refueling operations. Group B pumps are pumps in standby systems that are not operated routinely except for testing.

Driver Type/ Speed – Type of driver associated with the pump (motor or steam turbine) and whether the pump is a fixed speed or variable speed pump.

M – Motor Driven
ST- Steam Turbine Driven
F – Fixed Speed
V – Variable Speed

Group/Comprehensive Test Parameters Required/Performed

ΔP – Differential pressure across the pump

Q – Pump flow rate

V_v – Vibration velocity amplitude

S – Rotational speed (required for variable speed pumps only)

P – Discharge pressure (required for positive displacement pumps)

Group/Comprehensive Test Frequency

M3 – Test performed once every 92 days (quarterly)

R – Test performed once every refueling outage

Relief Requests – Relief Requests (RR) for pumps that cannot be tested per Code requirements. The appropriate RR number is provided.

Remarks - Any appropriate reference or explanatory information

3. INSERVICE TESTING PLANS FOR VALVES

The valves included in the SSES Unit 1 Inservice Testing Program are listed on the attached Valve Tables (Attachment 2). Valves that are common to both Unit 1 and 2 are included in the SSES Unit 1 Inservice Testing Program. The column headings for the Valve Tables are delineated below with an explanation of the content of each column.

Valve Number – Unique NIMS component identification number

P&ID/Coord. – P&ID coordinates at which each valve is located

ASME Class – ASME Code Class of the valve. "S" signifies that the valve is a safety-related non-ASME Code Class valve.

ASME Category – Valve category as defined by ASME OM Code, 1998 Edition through 2000 Addenda, ISTC-1300

Category A – Valves for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their safety function(s)

Category B – Valves for which seat leakage in the closed position is inconsequential for fulfillment of their safety function(s)

Category C – Valves which are self-actuating in response to some system characteristic such as pressure (safety and relief valves) or flow direction (check valves) for fulfillment their safety function(s)

Category D – Valves which are actuated by an energy source capable of only one operation, such as rupture discs or explosive-actuated valves

Active/Passive – Designated by "A" for active and "P" for passive

Active – required to change position to accomplish safety function(s)

Passive – maintain position and not required to change position to accomplish safety function(s)

Valve Size – Size of valve in inches

Valve Type – Type of valve according to the following abbreviations

BA – Ball
BF – Butterfly
CK – Check
GT – Gate
GB – Globe
RD – Rupture Disk
RV – Relief
SC – Stop Check
XC – Excess Flow Check

Actuator Type – Type of actuator for each valve according to following abbreviations

AO – Air Operator
EX - Explosive
HO – Hydraulic Operator
MA – Manual
MO – Motor Operator
SA – Self Actuated
SO – Solenoid Operator

Safety Position – Position the valve is required to be in to perform its safety function

O – Open
C – Closed
O/C – Open and Closed

Tests Required/Performed

FSO – Full Stroke Open
FSC – Full Stroke Closed
PSO – Part Stroke Open
STO – Stroke Time Open
STC – Stroke Time Closed
RPI – Remote Position Indication
FTO – Fail-safe Test Open

FTC – Fail-safe Test Closed
D&E – Disassembly & Examine
RVT – Relief Valve Test
EXT – Explosive Valve Test
LTJ – Seat leakage test required by 10 CFR 50 Appendix J
LTO – Seat leakage test required for other Category A Valves by OM Code 1998 Edition
LTP – Seat leakage test required for Pressure Isolation Valves by OM Code 1998 Edition

Test Frequency

M3 – Once every 92 days (Quarterly)

R – Once every refueling outage (for check valves, in accordance with check valve sample disassembly and examination program)

C – Continuous during plant operations

CS – Once every cold shutdown but not more frequent than once every 92 days

OC – Once per operating cycle or operating cycle combination in accordance with check valve sample disassembly and examination program

AJ - In accordance with the Owner's 10CFR50 Appendix J Program (ISTC-3620)

2Y – Once every two years

4Y – Once every four years

5Y – Class 1 pressure relief valves are required to be tested at least once every 5 years with a minimum of 20% of the valves tested within any 24 months. Class 1, 2, & 3 non-reclosing pressure relief devices are to be replaced every 5 years.

6Y – Class 1 pressure relief valves are tested at least once every 6 years with a minimum of 20% of the valves tested within any 24 months. (Relief Request RR02)

10Y – Class 2 & 3 pressure relief valves are required to be tested at least once every 10 years with a minimum of 20% of the valves tested within any 48 months. Excess flow check valves are tested on a sampling basis in accordance with Technical Specification Surveillance Requirement SR 3.6.1.3.9 over a 10-year interval.

CJ/RJ Justification – Cold Shutdown Justification (CJ) and Refueling Outage Justification (RJ) for valves that cannot be tested at the frequency specified in the Code. The appropriate CJ or RJ number is provided.

Relief Requests – Relief Requests (RR) for valves that cannot be tested per Code requirements. The appropriate RR number is provided.

Remarks – Any explanatory notes required.

4. SSES UNIT 1 DRAWINGS

PPL DWG NUMBER	AE DWG NUMBER	SHEET	TITLE
E106205	M-100	1-4	P&ID Legend & Symbols
E106206	M-101	1-3	P&ID Main Steam
E106214	M-109	2	P&ID Service Water
E106215	M-110	1	P&ID Service Water
E106216	M-111	1-4	P&ID Emergency Service Water System
E106217	M-112	1-2	P&ID RHR Service Water System
E106218	M-113	1	P&ID Reactor Building Closed Cooling Water
E106225	M-120	1-2	P&ID Units 1 & 2 Diesel Oil Storage & Transfer
E106231	M-126	1-2	P&ID Containment Instrument Gas
E106239	M-134	1-7	P&ID "A-D" Diesel Auxiliaries (Fuel Oil, Lube Oil, Air Intake & Exhaust & Jacket Water Cooling Systems)
E106246	M-141	1-2	P&ID Nuclear Boiler
E106247	M-142	1-2	P&ID Nuclear Boiler Vessel Instrumentation
E106248	M-143	1-2	P&ID Reactor Recirculation
E106249	M-144	1-2	P&ID Reactor Water Cleanup
E106251	M-146	1	P&ID Unit 1 Control Rod Drive Part A
E106252	M-147	1-2	P&ID Control Rod Drive Part B
E106253	M-148	1	P&ID Standby Liquid Control
E106254	M-149	1	P&ID Reactor Core Isolation Cooling
E106255	M-150	1	P&ID R.C.I.C. Turbine-Pump
E106256	M-151	1-4	P&ID Residual Heat Removal
E106257	M-152	1	P&ID Core Spray
E106258	M-153	1	P&ID Fuel Pool Cooling & Clean-Up
E106260	M-155	1	P&ID High Pressure Coolant Injection
E106261	M-156	1-2	P&ID H.P.C.I. Turbine-Pump
E106262	M-157	1-7	P&ID Containment Atmos. Control
E106266	M-161	1	P&ID Liquid Radwaste Collection
E106291	M-186	1-4	P&ID Control Structure Chilled Water System
E106292	M-187	2	P&ID Reactor Building Chilled Water

5. TESTING JUSTIFICATIONS

Cold Shutdown Justifications (CJ) and Refueling Outage Justifications (RJ) for valves that cannot be tested at the frequency specified in the Code are located in Attachments 3 and 4 respectively.

6. RELIEF REQUESTS

Relief Requests (RR) for pumps and valves that cannot be tested per Code requirements are located in Attachment 5.

ATTACHMENT 5

RELIEF REQUESTS

RELIEF REQUEST RR01

Relief in accordance with 10 CFR 50.55a (a)(3)(i)

Alternative Provides Acceptable Level of Quality and Safety

1.0 <u>ASME Code Component(s) Affected</u>

Valve Number	System	Cat.	Safety Class
Check Valve Group CV02			
011033	Emergency Service Water	C	3
011034	Emergency Service Water	C	3
011035	Emergency Service Water	C	3
011036	Emergency Service Water	C	3
011037	Emergency Service Water	C	3
011038	Emergency Service Water	C	3
011039	Emergency Service Water	C	3
011040	Emergency Service Water	C	3
Check Valve Group CV03			
011513	Emergency Service Water	C	3
011514	Emergency Service Water	C	3

<u>Function</u>

These check valves are in the cooling water lines to the Emergency Diesel Generators. They have an open safety function to provide Emergency Service Water to the Emergency Diesel Generators jacket water coolers, lube oil coolers and intercoolers. They have a closed safety function to prevent backflow when the cooling is being supplied by the opposite loop of Emergency Service Water. These valves have no containment isolation function. The open and close safety functions of these valves are currently verified by valve disassembly. These valves are part stroked open during quarterly Emergency Service Water flow verification (inservice pump test).

Valve Number	System	Cat.	Safety Class
Check Valve Group CV05			
149F011	Reactor Core Isolation Cooling	C	2
149F030	Reactor Core Isolation Cooling	C	2

<u>Function</u>

These check valves are in the Reactor Core Isolation Cooling (RCIC) pump suction lines. They have an open safety function to provide a flow path for the RCIC pump while taking suction from the condensate storage tank (149F011) or the suppression pool (149F030). They have a closed safety to prevent diversion of RCIC flow when the alternate suction path is being used. These valves have no containment isolation function. The open and close safety functions of these valves are currently verified by valve disassembly.

RELIEF REQUEST RR01 (CONTINUED)

Valve Number	System	Cat.	Safety Class
Check Valve Group CV09			
149F021	Reactor Core Isolation Cooling	C	2

Function

This check valve is in the Reactor Core Isolation Cooling (RCIC) pump minimum flow line. It has an open safety function to provide a minimum flow path for protection of the pump. This valve has a containment isolation function although it is not Appendix J tested. This line terminates below the minimum suppression pool level, which provides a water seal. The open and close safety function of these valves is currently verified by valve disassembly. This valve is part stroked open during the quarterly Reactor Core Isolation Cooling flow verification (inservice pump test).

Valve Number	System	Cat.	Safety Class
Check Valve Group CV24			
150F047	Reactor Core Isolation Cooling	C	2
156F052	High Pressure Coolant Injection	C	2

Function

These check valves are located in the discharge of the Reactor Core Isolation Cooling (RCIC) and High Pressure Coolant Injection (HPCI) vacuum condenser pumps and provide the ASME Code boundary between the RCIC/HPCI pump suction and the discharge of the vacuum tank condenser pump. They have a closed safety function to maintain RCIC/HPCI water inventory in the event of a line break of the non Code piping. Under ISTC-5221(a)(3), it is required that these check valves also be verified to partially open. These valves have no containment isolation function. The close safety function of these valves is currently verified by valve disassembly.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV08			
151F046A	Residual Heat Removal	C	2
151F046B	Residual Heat Removal	C	2
151F046C	Residual Heat Removal	C	2
151F046D	Residual Heat Removal	C	2

RELIEF REQUEST RR01
(CONTINUED)

Function

These check valves are in the Residual Heat Removal pump minimum flow lines. They have an open safety function to provide a minimum flow path for pump protection. Under ISTC-5221(a)(2), it is required that these check valves also be verified for closure. These valves have no containment isolation function. The open safety function of these valves is currently verified by valve disassembly. These valves are part stroked open during the quarterly Residual Heat Removal flow verification (inservice pump test).

Valve Number	System	Cat.	Safety Class
Check Valve Group CV10			
152005	Core Spray	C	2

Function

This check valve is located in the suppression pool fill line. It has a safety function to close if the line is being used for filling the suppression pool (manual upstream valve 152028 open) to maintain Core Spray water inventory. This valve has no containment isolation function. The close safety function of this valve is currently verified by valve disassembly.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV22			
152F029A	Core Spray	C	2
152F029B	Core Spray	C	2
152F030A	Core Spray	C	2
152F030B	Core Spray	C	2

Function

These check valves are in the keep fill lines for the Core Spray system. They have a closed safety function to prevent loss of inventory during Core Spray system operation. Under ISTC-5221(a)(3), it is required that these check valves also be verified to partially open. These valves have no containment isolation function. The close safety function of these valves is currently verified by valve disassembly. The open function of these valves is continually verified during plant operation by proper operation of the keep fill system.

RELIEF REQUEST RR01
(CONTINUED)

Valve Number	System	Cat.	Safety Class
Check Valve Group CV11			
152F036A	Core Spray	C	2
152F036B	Core Spray	C	2
152F036C	Core Spray	C	2
152F036D	Core Spray	C	2

<u>Function</u>

These check valves are in the Core Spray pump minimum flow lines. They have an open safety function to provide a minimum flow path for pump protection. Under ISTC-5221(a)(2), it is required that these check valves also be verified for closure. These valves have no containment isolation function. The open safety function of these valves is currently verified by valve disassembly. These valves are part stroked open during the quarterly Core Spray flow verification (inservice pump test).

Valve Number	System	Cat.	Safety Class
Check Valve Group CV14			
153071A	Fuel Pool Cooling & Cleanup	C	3
153071B	Fuel Pool Cooling & Cleanup	C	3

<u>Function</u>

These check valves are in the alternate flow path to the fuel storage pool. They have an open safety function to provide fuel storage pool cooling. Under ISTC-5221(a)(2), it is required that these check valves also be verified for closure. These valves have no containment isolation function. The open safety function of these valves is currently verified by valve disassembly. These valves are part stroked open during periodic pressure testing required by ASME Boiler & Pressure Vessel Code, Section XI.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV06			
155F019	High Pressure Coolant Injection	C	2
155F045	High Pressure Coolant Injection	C	2

RELIEF REQUEST RR01
(CONTINUED)

Function

These check valves are in the High Pressure Coolant Injection (HPCI) pump suction lines. They have an open safety function to provide a flow path for the HPCI pump while taking suction from the condensate storage tank (155F019) or the suppression pool (155F045). They have a closed safety to prevent diversion of HPCI flow when the alternate suction path is being used. These valves have no containment isolation function. The open and close safety functions of these valves are currently verified by valve disassembly.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV13			
155F046	High Pressure Coolant Injection	C	2

Function

This check valve is in the High Pressure Coolant Injection (HPCI) pump minimum flow line. It has an open safety function to provide a minimum flow path for protection of the pump. This valve has a containment isolation function although it is not Appendix J tested. This line terminates below the minimum suppression pool level, which provides a water seal. The open and close safety function of this valve is currently verified by valve disassembly. This valve is part stroked open during the quarterly High Pressure Coolant Injection flow verification (inservice pump test).

2. **Applicable Code Requirement**

ASME OM Code 1998 Edition through OMb-2000 Addenda

ISTC-5221(c)(3), "Valve Obturator Movement"

"At least one valve from each group shall be disassembled and examined at each refueling outage; all valves in each group shall be disassembled and examined at least once every 8 years."

3. **Basis for Relief**

Pursuant to 10CFR 50.55a, "Codes and Standards," paragraph (a)(3), relief is requested from the requirements of ASME OM Code ISTC-5221(c)(3). The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

**RELIEF REQUEST RR01
(CONTINUED)**

The components listed above are check valves with no external means for exercising and no external position indication. Due to a lack of installed flow or pressure indication and a lack of test connections, it is not possible to use other means to verify the open and/or close exercising of these check valves. Disassembly of the valves is the most feasible method to verify operability and can be accomplished during system outages, which may be conducted on line. The check valves have been grouped by valve manufacturer, design, service, size, materials of construction, and orientation as required by ASME OM Code 1998 thorough 2000 Addenda, Section ISTC-5221(c)(1).

Prior to performing a system outage on-line, its effect on risk is evaluated in accordance with requirements of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear power Plants." This requirement states in part that "Before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities."

SSES complies with the requirements of 10 CFR 50.65(a)(4) via application of a program governing maintenance scheduling. The program dictates the requirements for risk evaluations as well as the necessary levels of action required for risk management in each case. The program also controls operation of the on-line risk monitor system, which is based on probabilistic risk assessment (PRA). With the use of risk evaluation for various aspects of plant operations, SSES has initiated efforts to perform additional maintenance, surveillance, and testing activities during normal operation. Planned activities are evaluated utilizing risk insights to determine the impact on safe operation of the plant and the ability to maintain associated safety margins. Individual system components, a system train, or a complete system may be planned to be out of service to allow maintenance, or other activities, during normal operation.

Disassembly and inspection may involve a system breach. However, the valves are isolated and the associated section of piping drained during disassembly. Thus, the system breach does not increase the risk due to internal flooding or internal system loss-of-coolant accident. The risk associated with these activities would be bounded by the risk experienced due to the system outage. Therefore, disassembly and testing of these valves during scheduled system outages while on-line would have no additional impact on core damage frequency.

RELIEF REQUEST RR01
(CONTINUED)

As more system outages are performed on-line, it is evident that selected refueling outage inservice testing activities, (e.g., valve exercising and disassembly) could be performed during these system outage windows (SOW) without sacrificing the level of quality or safety. Inservice testing performed on a refueling outage frequency is currently acceptable in accordance with ASME OM Code, 1998 Edition through 2000 Addenda. By specifying testing activities on a frequency commensurate with each refueling outage, ASME OM Code, 1998 Edition through 2000 Addenda, establishes an acceptable time period between testing. Historically, the refueling outage has provided a convenient and defined time period in which testing activities could be safety and efficiently performed. However, an acceptable testing frequency can be maintained separately without being tied directly to a refueling outage. Inservice testing performed on a frequency that maintains the acceptable time period between testing activities during the operating cycle is consistent with the intent of ASME OM Code, 1998 Edition through 2000 Addenda.

Over time, approximately the same number of test will be performed using the proposed operating cycle frequency as would be performed using the current refueling outage frequency. Thus, inservice testing activities performed during the proposed operating cycle test frequency provide an equivalent level of quality and safety.

4. **Proposed Alternate Testing**

Pursuant to 10 CFR 50.55a(a)(3)(i), SSES proposes an alternative testing frequency for performing inservice testing of the valves identified above. At least one valve from each group will be tested on a frequency of once each operating cycle in lieu of once each refueling outage as currently allowed by ASME OM Code, 1998 Edition through 2000 Addenda, ISTC-5221(c)(3), "Valve Obturator Movement." All valves in each group will be tested at least once every 8 years as required by ASME OM Code, 1998 Edition through 2000 Addenda, ISTC-5221(c)(3).

Check valve groups CV09, CV10, CV13, CV14, and CV24 include identical Unit 2 valves. For these check valve groups, one valve from each group will be tested each outage cycle combination. An outage cycle combination is defined as the start of Unit 1 operating cycle to the completion of Unit 2 operating cycle.

Similar relief has been approved for Entergy's Grand Gulf Nuclear Station, Unit 1 (TAC No. MB6900).

5. **Duration of Relief Request**

This proposed alternative is requested for the duration of the 3rd Ten-Year Interval Susquehanna Steam Electric Station Unit 1 IST program (June 1, 2004 through May 31, 2014).

RELIEF REQUEST RR02

Relief in accordance with 10 CFR 50.55a (a)(3)(i)

Alternative Provides Acceptable Level of Quality and Safety

1. **ASME Code Component(s) Affected**

Valve	System	Category	Class
PSV141F013A	Nuclear Boiler	C	1
PSV141F013B	Nuclear Boiler	C	1
PSV141F013C	Nuclear Boiler	C	1
PSV141F013D	Nuclear Boiler	C	1
PSV141F013E	Nuclear Boiler	C	1
PSV141F013F	Nuclear Boiler	C	1
PSV141F013G	Nuclear Boiler	C	1
PSV141F013H	Nuclear Boiler	C	1
PSV141F013J	Nuclear Boiler	C	1
PSV141F013K	Nuclear Boiler	C	1
PSV141F013L	Nuclear Boiler	C	1
PSV141F013M	Nuclear Boiler	C	1
PSV141F013N	Nuclear Boiler	C	1
PSV141F013P	Nuclear Boiler	C	1
PSV141F013R	Nuclear Boiler	C	1
PSV141F013S	Nuclear Boiler	C	1

These valves are Main Steam Safety/Relief Valves. They provide overpressure protection for the reactor coolant pressure boundary to prevent unacceptable radioactive release and exposure to plant personnel.

2. **Applicable Code Requirement**

ASME OM Code 1998 Edition through OMb-2000 Addenda

I-1330(a), "Test Frequencies, Class 1 Pressure Relief Valves

"Class 1 pressure relief valves shall be tested at least once every 5 years, starting with initial electric power generation."

RELIEF REQUEST RR02
(CONTINUED)

3. **Basis for Relief**

Pursuant to 10CFR 50.55a, "Codes and Standards," paragraph (a)(3), relief is requested from the requirements of ASME OM Code, Appendix I, I-1330(a). The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

During the second ten-year interval, Susquehanna removed and tested 8 of the 16 Main Steam Safety/Relief Valves (MSRV) during each refueling outage. This methodology meets the Code criteria of testing previously untested valves and permits the removal and replacement of weeping valves detected during the previous operating cycle. Weeping MSRVs are detected by monitoring tailpipe temperatures. If the tailpipe temperature exceeds 200 degrees Fahrenheit, then the relief valve is viewed as a weeper.

Without Code relief for 24-month fuel cycles, strict Code compliance would restrict Susquehanna's operating philosophy to not operate with weeping MSRVs as Code testing would be required to be completed within 5 years. This testing strategy does not account for any leaking valves that may need to be refurbished. Since Susquehanna's philosophy is to share spare valves between both units, (the valves that are removed from one unit are installed in the other unit's next refueling outage), this testing strategy is less than adequate. This strategy could only be accomplished if a large population of MSRVs are tested each outage or additional spare valves are purchased. More than 8 valves would need to be sent to the offsite testing facility during a refueling outage. The testing and return of these valves would have to be completed expeditiously in order to not impact the refuel outage schedule duration. For this reason, additional expenditures would be incurred to purchase and test a greater number of valves each outage. Without Code relief, the additional outage work would be contrary to the principles of ALARA and could compromise radiation safety. Because of the location of certain MSRVs in the containment, interferences exist that would require the removal of more valves and piping for those valves that must be removed for the sample testing. This results in more radiation exposure to the maintenance personnel than is desirable.

With Code relief, the 16 MSRVs per unit can be tested within 6 years to complete the Code required testing for the total population and accommodate any weeping MSRVs. The increased testing over only 2 refuel cycles would result in no additional safety benefit to the plant. Susquehanna has had excellent performance with MSRVs over the last 10 years. Since 1987, Susquehanna has imposed a more conservative as-left leakage criterion on the testing facility than was specified in the General Electric Specification and incorporated in the PPL Specification for testing Crosby style relief valves. The criterion imposed on the test lab is 0 ml/5 minutes (via the purchase order) compared to a GE Specification "as-left" leakage criterion of 38 ml/5 minutes.

**RELIEF REQUEST RR02
(CONTINUED)**

Additionally, a review of the set point testing results (for both units) for the time period from initial operation to the present (March 2004), which comprises 255 data points shows that the average of the set point drift percentages is -0.705%. This indicates that, in general, the MSRVs tend to drift slightly downward, not upward. The calculated standard deviation from the average for the data was determined to be 1.43%.

Also, the testing history shows that since commercial operation, Susquehanna has had only two "as-found" set pressure test acceptance criteria failures (above +3%) of the tested valves, which required additional MSRVs to be tested.

4. **Proposed Alternate Testing**

For the third ten-year interval, Susquehanna proposes to remove at least 20% of the 16 Main Steam Safety/Relief Valves (MSRV) plus weeping valves detected during the previous operating cycle and any valves required to be removed to access scheduled or weeping valves up to a maximum of 8 valves during each refueling outage.

Additional valves above the Code required minimum 20% will be tested if the as-found setpoint exceeds +3% of the nameplate. No additional valves will be tested if the as-found setpoint is below the nameplate setpoint. The additional valves tested will be from the initial population removed that are in excess of the 20% Code required minimum. If one of these valves fail, then all the MSRVs would be removed and tested.

Completion of Code testing will be accomplished over a period of 3 refuel cycles or 6 years. This approach results in maintenance and operational flexibility with the following benefits:

- Provides the ability to both test the Code required valves out of the population not yet tested and replace any weeping MSRVs.
- Maintains relatively leak-free MSRVs, thus minimizing the necessary run time of ECCS systems that provide suppression pool cooling.
- Consistent application of ALARA principles.
- Enhances equipment reliability.
- Results in minimal impact on outage durations.

The MSRVs will be tested such that a minimum of 20% of the valves (previously untested, if they exist) are tested every 24 months, such that all the valves will be tested within 3 refuel cycles. This proposal utilizes the same maintenance and testing approach that was applied in 18-month refuel cycles. This alternative frequency will continue to provide assurance of the valve operational readiness and provides an acceptable level of quality and safety.

RELIEF REQUEST RR02
(CONTINUED)

Additionally, any failures, either seat leakage or pressure set point, occurring at the test facility, as well as weeping MSRVs that develop during the operating cycle will be documented by the corrective action program, evaluated and dispositioned accordingly.

5. **Duration of Relief Request**

This proposed alternative is requested for the duration of the 3rd Ten-Year Interval Susquehanna Steam Electric Station Unit 1 IST program (June 1, 2004 through May 31, 2014). This is similar to the relief request approved for the 2nd Ten-Year Interval Susquehanna Steam Electric Station Unit 1 IST Program (reference TAC No. MA0127, dated April 7, 1998).

RELIEF REQUEST RR03

Relief in accordance with 10 CFR 50.55a (a)(3)(i)

Alternative Provides Acceptable Level of Quality and Safety

1. <u>ASME Code Component(S) Affected</u>

Valve	System	Cat	Class
XV141F009	Nuclear Boiler	C	1
XV141F070A	Nuclear Boiler	C	1
XV141F070B	Nuclear Boiler	C	1
XV141F070C	Nuclear Boiler	C	1
XV141F070D	Nuclear Boiler	C	1
XV141F071A	Nuclear Boiler	C	1
XV141F071B	Nuclear Boiler	C	1
XV141F071C	Nuclear Boiler	C	1
XV141F071D	Nuclear Boiler	C	1
XV141F072A	Nuclear Boiler	C	1
XV141F072B	Nuclear Boiler	C	1
XV141F072C	Nuclear Boiler	C	1
XV141F072D	Nuclear Boiler	C	1
XV141F073A	Nuclear Boiler	C	1
XV141F073B	Nuclear Boiler	C	1
XV141F073C	Nuclear Boiler	C	1
XV141F073D	Nuclear Boiler	C	1
XV14201	Nuclear Boiler	C	1
XV14202	Nuclear Boiler	C	1
XV142F041	Nuclear Boiler	C	1
XV142F043A	Nuclear Boiler	C	1
XV142F043B	Nuclear Boiler	C	1
XV142F045A	Nuclear Boiler	C	1
XV142F045B	Nuclear Boiler	C	1
XV142F047A	Nuclear Boiler	C	1
XV142F047B	Nuclear Boiler	C	1
XV142F051A	Nuclear Boiler	C	1
XV142F051B	Nuclear Boiler	C	1
XV142F051C	Nuclear Boiler	C	1
XV142F051D	Nuclear Boiler	C	1
XV142F053A	Nuclear Boiler	C	1
XV142F053B	Nuclear Boiler	C	1
XV142F053C	Nuclear Boiler	C	1
XV142F053D	Nuclear Boiler	C	1
XV142F055	Nuclear Boiler	C	2
XV142F057	Nuclear Boiler	C	2
XV142F059A	Nuclear Boiler	C	1
XV142F059B	Nuclear Boiler	C	1
XV142F059C	Nuclear Boiler	C	1
XV142F059D	Nuclear Boiler	C	1
XV142F059E	Nuclear Boiler	C	1
XV142F059F	Nuclear Boiler	C	1
XV142F059G	Nuclear Boiler	C	1
XV142F059H	Nuclear Boiler	C	1
XV142F059L	Nuclear Boiler	C	1
XV142F059M	Nuclear Boiler	C	1
XV142F059N	Nuclear Boiler	C	1
XV142F059P	Nuclear Boiler	C	1
XV142F059R	Nuclear Boiler	C	1
XV142F059S	Nuclear Boiler	C	1
XV142F059T	Nuclear Boiler	C	1
XV142F059U	Nuclear Boiler	C	1
XV142F061	Nuclear Boiler	C	1
XV143F003A	Reactor Recirculation	C	1
XV143F003B	Reactor Recirculation	C	1
XV143F004A	Reactor Recirculation	C	1
XV143F004B	Reactor Recirculation	C	1
XV143F009A	Reactor Recirculation	C	1
XV143F009B	Reactor Recirculation	C	1
XV143F009C	Reactor Recirculation	C	1
XV143F009D	Reactor Recirculation	C	1
XV143F010A	Reactor Recirculation	C	1
XV143F010B	Reactor Recirculation	C	1
XV143F010C	Reactor Recirculation	C	1
XV143F010D	Reactor Recirculation	C	1
XV143F011A	Reactor Recirculation	C	1
XV143F011B	Reactor Recirculation	C	1
XV143F011C	Reactor Recirculation	C	1
XV143F011D	Reactor Recirculation	C	1
XV143F012A	Reactor Recirculation	C	1
XV143F012B	Reactor Recirculation	C	1
XV143F012C	Reactor Recirculation	C	1
XV143F012D	Reactor Recirculation	C	1
XV143F040A	Reactor Recirculation	C	1
XV143F040B	Reactor Recirculation	C	1

RELIEF REQUEST RR03 (CONTINUED)

Valve	System	Cat	Class
XV143F040C	Reactor Recirculation	C	1
XV143F040D	Reactor Recirculation	C	1
XV143F057A	Reactor Recirculation	C	1
XV143F057B	Reactor Recirculation	C	1
XV14411A	Reactor Water Cleanup	C	1
XV14411B	Reactor Water Cleanup	C	1
XV14411C	Reactor Water Cleanup	C	1
XV14411D	Reactor Water Cleanup	C	1
XV144F046	Reactor Water Cleanup	C	1
XV149F044A	Reactor Core Isolation Cooling	C	1
XV149F044B	Reactor Core Isolation Cooling	C	1

Valve	System	Cat	Class
XV149F044C	Reactor Core Isolation Cooling	C	1
XV149F044D	Reactor Core Isolation Cooling	C	1
XV155F024A	High Pressure Coolant Injection	C	1
XV155F024B	High Pressure Coolant Injection	C	1
XV155F024C	High Pressure Coolant Injection	C	1
XV155F024D	High Pressure Coolant Injection	C	1
XV15109A	Residual Heat Removal	C	1
XV15109B	Residual Heat Removal	C	1
XV15109C	Residual Heat Removal	C	1
XV15109D	Residual Heat Removal	C	1
XV152F018A	Core Spray	C	1
XV152F018B	Core Spray	C	1

These valves are instrumentation line excess flow check valves (EFCVs) provided in each instrument line process line that penetrates primary containment in accordance with Regulatory Guide 1.11. The EFCVs are designed to close upon rupture of the instrument line downstream of the EFCV and otherwise remain open. The lines are sized and/or orificed such that off-site dose will be substantially below 10 CFR 100 limits in the event of a rupture.

2. **Applicable Code Requirement**

ASME OM Code 1998 Edition through OMb-2000 Addenda

ISTC-3522(c), "Category C Check Valves"

"If exercising is not practicable during operation at power and cold shutdown, it shall be performed during refueling outages."

ISTC- 3700, "Position Verification Testing"

"Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve operation is accurately indicated."

RELIEF REQUEST RR03
(CONTINUED)

3. **Basis for Relief**

Pursuant to 10CFR 50.55a, "Codes and Standards," paragraph (a)(3), relief is requested from the requirements of ASME OM Code ISTC-3522(c) and ISTC-3700. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

Testing the subject valves quarterly or during cold shutdown is not practicable, based on plant conditions. These valves have been successfully tested throughout the life of the Susquehanna Steam Electric Station Unit 1 and they have shown no degradation or other signs of aging.

The technology for testing these valves is simple and has been demonstrated effectively during the operating history of Susquehanna Steam Electric Station Unit 1. The basis for this alternative is that testing a sample of EFCVs each refueling outage provides a level of safety and quality equivalent to that of the Code-required testing.

Excess flow check valves are required to be tested in accordance with ISTC-3522, which requires exercising check valves nominally every three months to the positions required to perform their safety functions. ISTC-3522(c) permits deferral of this requirement to every reactor refueling outage. Excess flow check valves are also required to be tested in accordance with ISTC-3700, which requires remote position verification at least once every 2 years.

The EFCVs are classified as ASME Code Category C and are also containment isolation valves. However, these valves are excluded from 10 CFR 50 Appendix J Type C leak rate testing, due to the size of the instrument lines and upstream orificing. Therefore, they have no safety-related seat leakage criterion.

The excess flow check valve is a simple device. The major components are a poppet and spring. The spring holds the poppet open under static conditions. The valve will close upon sufficient differential pressure across the poppet. Functional testing of the valve is accomplished by venting the instrument side of the valve. The resultant increase in flow imposes a differential pressure across the poppet, which compresses the spring and decreases flow through the valve.

Functional testing is required by Technical Specification Surveillance Requirement 3.6.1.3.9. System design does not include test taps upstream of the EFCV. For this reason, the EFCVs cannot be isolated and tested using a pressure source other than reactor pressure.

The testing described above requires removal of the associated instrument or instruments from service. Since these instruments are in use during plant operation, removal of any of these instruments from service may cause a spurious signal, which could result in a plant trip or an unnecessary challenge to safety systems. Additionally, process liquid will be contaminated to some degree, requiring special measures to collect flow from the vented instrument side and also will contribute to an increase in personnel radiation exposure.

**RELIEF REQUEST RR03
(CONTINUED)**

Industry experience as documented in NEDO-32977-A, indicates the ECFVs have a very low failure rate. At Susquehanna, the failure rate has been approximately 1%. Only half of these failures have resulted in replacement of the EFCV. The Susquehanna test history shows no evidence of common mode failure. This Susquehanna test experience is consistent with the findings of NEDO. The NEDO indicates similarly that many reported test failures at other plants were related to test methodologies and not actual EFCV failures. Thus, the ECFVs at Susquehanna, consistent with the industry, have exhibited a high degree of reliability, availability, and provide an acceptable level of quality and safety.

Testing on a cold shutdown frequency is impractical considering the large number of valves to be tested and the condition that reactor pressure greater than 500 psig is needed for testing. In this instance, considering the number of valves to be tested and the conditions required for testing, it is also a hardship to test all these valves during refueling outages. Recent improvements in refueling outage schedules minimized the time that is planned for refueling and testing activities during the outages.

The appropriate time for performing excess flow check valve test is during refueling outages in conjunction with vessel hydrostatic testing. As a result of shortened outages, decay heat levels during hydrostatic tests are higher than in the past. If the hydrostatic test were extended to test all EFCVs, the vessel could require depressurization several times to avoid exceeding the maximum bulk coolant temperature limit. This is an evolution that challenges the reactor operators and thermally cycles the reactor vessel. This evolution should be avoided if possible. Also, based on past experience, excess flow check valve testing during hydrostatic testing becomes the outage critical path and could possibly extend the outage by two days if all EFCVs were to be tested during this time frame.

4. <u>Proposed Alternate Testing</u>

As an alternative to testing all EFCVs during the refueling outage, a sampling plan will be implemented. This plan will test certain excess flow check valves immediately preceding the refueling outage while the reactor is at power, while also instituting the appropriate conditions for testing (reactor press > 500 psig). This alternative provides an acceptable level of quality and safety. Performance of this excess flow check valve testing prior to the outage will be scheduled such that, in the event of a failure, the resulting action statement and limiting condition of operation will encompass the planned shutdown for the refueling outage. Using this strategy, unplanned, unnecessary plant shutdowns as a result of excess flow cheek valve testing will be avoided.

Functional testing with verification that flow is checked will be performed per Technical Specification 3.6.1.3.9, either immediately preceding a planned refueling outage or during the refueling outage for certain EFCVs. For those valves tested prior to the refueling outage, appropriate administrative and scheduling controls will be established.

Surveillance Requirement 3.6.1.3.9 allows a "representative sample" of EFCVs to be tested every 24 months, such that each EFCV will be tested at least once every ten years (nominal).

**RELIEF REQUEST RR03
(CONTINUED)**

The EFCVs have position indication in the control room. Check valve remote position indication is excluded from Regulatory Guide 1.97 as a required parameter for evaluating containment isolation. The remote position indication will be verified in the closed direction at the same frequency as the exercise test, which will be performed at the frequency prescribed in Technical Specification Surveillance Requirement 3.6.1.3.9. After the close position test, the valve will be reset, and the remote open position indication will be verified. Although inadvertent actuation of an EFCV during operation is highly unlikely due to the spring poppet design, Susquehanna verifies the EFCVs indicate open in the control room at a frequency greater than once every two years.

In summary, considering the extremely low failure rate along with personnel and plant safety concerns to perform testing, the alternative sampling plan proposed provides an acceptable level of quality and safety.

5. <u>Duration of Relief Request</u>

This proposed alternative is requested for the duration of the 3rd Ten-Year Interval Susquehanna Steam Electric Station Unit 1 IST program (June 1, 2004 through May 31, 2014). This is similar to the relief request approved for the 2nd Ten-Year Interval Susquehanna Steam Electric Station Unit 1 IST Program (reference TAC No. MA0127, dated April 7, 1998).

RELIEF REQUEST RR04

Relief in accordance with 10 CFR 50.55a (a)(3)(i)

Alternative Provides Acceptable Level of Quality and Safety

1. **ASME Code Component(s) Affected**

Component Number	System	Code Class
0P504A	Emergency Service Water	3
0P504B	Emergency Service Water	3
0P504C	Emergency Service Water	3
0P504D	Emergency Service Water	3
1P202A	Residual Heat Removal	2
1P202B	Residual Heat Removal	2
1P202C	Residual Heat Removal	2
1P202D	Residual Heat Removal	2
1P506A	RHR Service Water	3
1P506B	RHR Service Water	3

2. **Applicable Code Requirement**

ASME OM Code 1998 Edition through OMb-2000 Addenda

ISTB-5123 - Comprehensive Test Procedure

Comprehensive tests shall be conducted with the pump operating at a specified reference point.

3. **Basis for Relief**

Pursuant to 10CFR 50.55a(a)(3)(i), relief is requested from the requirement of ASME OM Code ISTB-5123. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

The subject pumps are all categorized as Group A pumps. These pumps are operated routinely during normal plant operations. Each pump is tested in accordance with its associated Group A procedure. All of these pumps are operated at conditions within ± 20% of the design flow rate when tested each quarter. All of the required Code parameters are measured and compared to their respective reference values.

The intent of the Code required Comprehensive Test is to test the pump at substantial flow (biennially) such that pump degradation may be easily detected on the portion of the pump curve which is well sloped. SSES tests each of these pumps at substantial flow (± 20% of design) each quarter.

**RELIEF REQUEST RR04
(CONTINUED)**

4. **Proposed Alternate Testing**

As an alternative to performing Comprehensive Pump tests biennially, the subject pumps will be tested each quarter at ± 20% of the design flow rate. The required inservice test parameters of Table ISTB-3000-1 based on pump type will be measured and compared to their reference values. The Group A pump test acceptance criteria will be applied. Additionally, once every two years, full spectrum analysis will be performed above the Code required vibration measurements.

Based on the full spectrum analysis, and continued quarterly Group A testing at ± 20% of design pump flow, an accurate assessment of pump health and operational readiness is determined on a quarterly frequency.

This alternative provides an acceptable level of quality and safety.

5. **Duration of Relief Request**

This proposed alternative is requested for the duration of the 3rd Ten-Year Interval Susquehanna Steam Electric Station Unit 1 IST program (June 1, 2004 through May 31, 2014).

Attachment No. 2 to PLA-5746

Susquehanna SES Unit 2

Proposed Third Ten-Year Interval

Inservice Testing Program Plan

SUS-ISTPLN-200.0

SUSQUEHANNA STEAM ELECTRIC STATION

UNIT 2

INSERVICE TESTING PROGRAM PLAN

Rev.	Description	Prepared by:	Approved by:	Date
0	Initial Issue - Third Ten Year Update	R.E. Shirk R.E. Shirk	[signature]	3/21/04

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1. INTRODUCTION

This document is the Third Ten-year Interval Program Plan for Inservice Testing (IST) of Pumps and Valves at the Susquehanna Steam Electric Station (SSES) Unit 2 in compliance with the requirements of 10 CFR 50.55a(f) and Station Technical Specifications. The third ten-year interval is applicable from June 1, 2004 to May 31, 2014. This Program plan was prepared in accordance with the rules of the ASME Code for Operation and Maintenance of Nuclear Power Plants, ASME OM Code –1998, through the ASME OMb Code-2000 Addenda (OM-1998 through OMb-2000 referred to as "The Code").

Administrative and implementing procedures, reference values, test results, and other records required to define and execute the IST Program are retained at SSES.

1.1 Purpose

The Third Interval SSES Unit 2 IST Pump and Valve Program establishes testing requirements to assess the operational readiness of certain ASME Safety Class 1, 2, and 3 pumps and valves that are required to:

a. Shut down the reactor to the safe shutdown condition,
b. Maintain the reactor in the safe shutdown condition, or
c. Mitigate the consequences of an accident.

This Program Plan describes the SSES Unit 2 testing requirements and commitments for testing those ASME Code Class 1, 2, and 3 components that meet the criteria for inclusion into the IST Pump and Valve Program.

1.2 Regulatory Bases and Scope

Inservice tests to verify operational readiness of pumps and valves, whose function is required for safety, conducted during successive 120-month intervals must comply with the requirements of the latest edition and addenda of the Code incorporated by reference in paragraph (b) of 10 CFR 50.55a 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed in paragraph (b) of this section.

The SSES Unit 2 third ten-year interval starts on June 1, 2004. The Code edition in effect as of June 1, 2003 was the OM-1998 Edition through OMb-2000 Addenda which was endorsed in the Federal Register on September 26, 2002 (Vol. 67, No. 187).

Limitations and modifications applicable to the OM-1998 Edition through OMb-2000 Addenda are:

a. Quality Assurance

When applying editions and addenda of the OM Code, the requirements of NQA-1, "Quality Assurance Requirements for Nuclear Facilities," 1979 Addenda, are acceptable as permitted by ISTA 1.4 of the OM Code, provided the licensee uses its 10 CFR part 50, Appendix B, quality assurance program in conjunction with the OM Code requirements. Commitments contained in the licensee's quality assurance program description that are more stringent than those contained in NQA-1 govern OM Code activities. If NQA-1 and the OM Code do not address the commitments contained in the licensee's Appendix B quality assurance program description, the commitments must be applied to OM Code activities.

SSES applies the requirements of 10 CFR 50 Appendix B to the IST Pump and Valve Program.

b. Motor-Operated Valve Testing

Licensees shall comply with the provisions for testing motor-operated valves in OM Code ISTC 4.2, 1995 Edition with the 1996 and 1997 Addenda, or ISTC-3500, 1998 Edition through the latest edition and addenda incorporated by reference in paragraph (b)(3) of this section, and shall establish a program to ensure that motor-operated valves continue to be capable of performing their design basis safety functions.

SSES complies with the motor-operated valve testing in OM Code ISTC-3500, 1998 Edition through the 2000 Addenda and has a program to respond to the requirements of NRC Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance" up to and including Supplement 7 and Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves."

c. Code Case OMN-1

As an alternative to paragraph (b)(3)(ii) of this section, licensees may use Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Certain Electric Motor-Operated Valve Assemblies in Light Water Reactor Power Plants," Revision 0, in conjunction with ISTC 4.3, 1995 Edition with the 1996 and 1997 Addenda, or ISTC-3600, 1998 Edition through the latest edition and addenda incorporated by reference in paragraph (b)(3) of this section. Licensees choosing to apply the Code Case shall apply all of its provisions.

(a) The adequacy of the diagnostic test interval for each valve must be evaluated and adjusted as necessary but not later than 5 years or three refueling outages (whichever is longer) from initial implementation of ASME Code Case OMN-1.

(b) When extending exercise test intervals for high risk motor-operated valves beyond a quarterly frequency, licensees shall ensure that the potential increase in core damage frequency and risk associated with the extension is small and consistent with the intent of the Commission's Safety Goal Policy Statement.

SSES has not implemented Code Case OMN-1.

d. Appendix II

Licensees applying Appendix II, "Check Valve Condition Monitoring Program," of the OM Code, 1995 Edition with the 1996 and 1997 Addenda, shall satisfy the requirements of paragraphs (b)(3)(iv)(A), (b)(3)(iv)(B), and (b)(3)(iv)(C) of this section. Licensees applying Appendix II, 1998 Edition through the latest edition and addenda incorporated by reference in paragraph (b)(3) of this section, shall satisfy the requirements of paragraphs (b)(3)(iv)(A), (b)(3)(iv)(B), and (b)(3)(iv)(D) of this section.

(a) Valve opening and closing functions must be demonstrated when flow testing or examination methods (nonintrusive, or disassembly and inspection) are used;

(b) The initial interval for tests and associated examinations may not exceed two fuel cycles or 3 years, whichever is longer; any extension of this interval may not exceed one fuel cycle per extension with the maximum interval not to exceed 10 years; trending and evaluation of existing data must be used to reduce or extend the time interval between tests.

(c) If the Appendix II condition monitoring program is discontinued, then the requirements of ISTC 4.5.1 through 4.5.4 must be implemented.

(d) The provisions of ISTC-3510, ISTC-3520, and ISTC-3540 in addition to ISTC-5221 must be implemented if the Appendix II condition monitoring program is discontinued.

SSES, at the present time, is not applying Appendix II, "Check Valve Condition Monitoring Program."

e. Exercise Interval for Manual Valves

Manual valves must be exercised on a 2-year interval rather that the 5-year interval specified in paragraph ISTC-3540 of the 1999 Addenda through the latest edition and addenda incorporated by reference in paragraph (b)(3) of this section, provided that adverse conditions do not require more frequent testing.

SSES complies with the 10 CFR 50.55a 2-year limitation on exercising manual valves.

1.3 Testing Scope

1.3.1 Pump Testing

The scope of pump testing is to assess the operational readiness of certain ASME Class 1, 2, and 3 centrifugal and positive displacement pumps, provided with an emergency power source, that are required to:

a. Shut down the reactor to the safe shutdown condition,

b. Maintain the reactor in the safe shutdown condition, or

c. Mitigate the consequences of an accident.

1.3.2 Pump Testing Exclusions

Excluded from the above are:

a. Drivers, except where the pump and driver form an integral unit and the pump bearings are in the driver

b. Pumps that are provided with emergency power solely for operating convenience

c. Skid-mounted pumps that are adequately tested as part of the major component

1.3.3 Valve Testing

The scope of valve testing is to assess the operational readiness of certain active and passive ASME Class 1, 2, and 3 valves, including their actuating and position indicating system, that are required to:

a. Shut down the reactor to the safe shutdown condition,

b. Maintain the reactor in the safe shutdown condition, or

c. Mitigate the consequences of an accident.

1.3.4 Pressure Relief Valve Testing

The scope of pressure relief valve testing are those ASME Class 1, 2, and 3 pressure relief devices included in ASME Boiler & Pressure Vessel Code Section III for protecting systems or portions of systems, including their actuating and position indicating system, that are required to:

a. Shut down the reactor to the safe shutdown condition,

b. Maintain the reactor in the safe shutdown condition, or

c. Mitigate the consequences of an accident.

1.3.5 Valve Testing Exclusions

Excluded from Code testing, provided they are not required to perform a specific function as specified above are:

a. Valves used only for operating convenience such as vent, drain, instrument, and test valves

b. Valves used only for system control, such as pressure regulating valves

c. Valves used only for system or component maintenance

d. Skid-mounted valves that are adequately tested as part of the major component

e. External control and protection systems responsible for sensing plant conditions and providing signals for valve operation

f. Category A and B safety and relief valves from the requirements of ISTC-3700, Valve Position Verification, and ISTC-3500, Valve Testing Requirements

1.4 Technical Positions

1.4.1 Categories of Valves (ISTC-1300)

Valves within the scope of the Code shall be placed in one or more of the following categories. When one or more distinguishing category characteristic is applicable, all requirements of each of the individual categories are applicable, although duplication or repetition of common testing requirements is not necessary.

- Category A: Category A Valves are valves for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their required function.
- Category B: Category B Valves are valves for which seat leakage in the closed position is inconsequential for fulfillment of the required function.
- Category C: Category C Valves are valves that are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves) for fulfillment of their required function.
- Category D: Category D Valves are valves that are actuated by an energy source capable of only one operation, such as rupture discs or explosively actuated valves.

The SSES position is that if an individual valve has a specific seat leakage limit, it is a Category A valve. If the leakage of a valve is limited to overall system leakage, or a limit to preclude diversion of flow, Category A does not apply, although the valve is tested for the capability to close to prevent such system leakage or diversion of flow.

This position is supported by two Task Interface Agreements (TIA) that were performed for NRC Regional Offices by the NRC Headquarters staff. The first is Region I TIA, dated July 5, 1994, for Potential Secondary Bypass Leakage, Susquehanna Steam Electric Station TAAC Number M-86276. The second is Task Interface Agreement 94-22, dated May 15, 1995 for Testing Emergency Core Cooling Suction-Side Components, H. B. Robinson Steam Electric Plant, Unit No. 2 (TC No. M89905)

1.4.2 Pump Groups (ISTB-2000)

Pumps within the scope of the Code shall be placed in one of the following categories. A pump that meets both Group A and Group B definitions shall be categorized as a Group A pump.

Group A: Group A Pumps are pumps that are operated continuously or routinely during normal operation, cold shutdown, or refueling operations.

At SSES Unit 2, the following pumps are considered Group A pumps:

2P212A	Residual Heat Removal Pump A
2P212B	Residual Heat Removal Pump B
2P212C	Residual Heat Removal Pump C
2P212D	Residual Heat Removal Pump D
2P516A	RHR Service Water Pump A
2P516B	RHR Service Water Pump B

Group B: Group B Pumps are pumps in standby systems that are not operated routinely except for testing.

At SSES Unit 2, the following pumps are considered Group B pumps:

2P203	Reactor Core Isolation Cooling Pump
2P204/209	High Pressure Coolant Injection Main Pump/Booster Pump
2P206A	Core Spray Pump A
2P206B	Core Spray Pump B
2P206C	Core Spray Pump C
2P206D	Core Spray Pump D
2P208A	Standby Liquid Control Pump A
2P208B	Standby Liquid Control Pump B

1.4.3 Pump Design Flow

Pump design flow at SSES Unit 2 is based on one of the following:

a. Pump design flow as determined by engineering analysis

b. Licensing basis flow as determined by UFSAR or Technical Specifications

c. Flow corresponding to the pump best efficiency point (BEP) on the manufacturer's pump curve

1.4.4 Active Valve

Active valves are valves that are required to change obturator position to accomplish their safety function. In accordance with NUREG-1482, Section 2.4.2, a valve need not be considered active if it is only temporarily removed from service or from its safety position for as short period of time, such as manually opening a sample valve to take a sample while maintaining administrative control over the valve.

1.4.5 Passive Valves

Passive valves that have remote position indication or that are classified as Category A are included in the IST Program with the appropriate test requirements. Valves that are locked or de-energized in their required positions, or are only repositioned from their safety position for performance of surveillance procedures are considered passive. Check valves that have flow secured by an in-line closed manual valve are considered passive.

1.4.6 Skid Mounted Components

High Pressure Coolant Injection Turbine Stop Valve (FV25612)

ASME OM Code 1998 Edition through 2000 Addenda, Section ISTA-2000, defines skid mounted pumps and valves as follows:

"pumps and valves integral to or that support operation of major components, even though these components may not be located directly on the skid. In general, these pumps and valves are supplied by the manufacturer of the major component. Examples include:

(a) diesel fuel oil pumps and valves;
(b) steam admission and trip throttle valves for high-pressure coolant injection pumps;
(c) steam admission and trip throttle valves for auxiliary feedwater turbine driven pumps;
(d) solenoid-operated valves provided to control an air-operated valve."

Testing of the major component is an acceptable means for verifying the operational readiness of the skid-mounted and component subassemblies if the licensee documents this approach in the IST Program. This is acceptable for both Code class components and non-Code class components tested and tracked by the IST Program.

The High Pressure Coolant Injection Turbine Stop Valve (FV25612) has a design closure stroke time of 0.5 seconds. This rapid closure is accomplished by spring force. As a rapid acting valve, closure of this valve cannot be timed accurately nor trended from test-to-test. In contrast, opening is accomplished hydraulically by oil pressure working against spring force. The valve has no independent manual control, but rather is controlled only by HPCI turbine oil pressure. The turbine stop valve is a skid-mounted component of the HPCI turbine and structurally integrated with the turbine.

SSES considers these components to be skid mounted and adequately tested with the major piece of equipment in accordance with ISTB-1200c.

1.4.7 Fail Safe Testing

For those valves in the SSES Unit 2 Valve Table that are designated with a fail-safe test, the fail-safe test will be conducted using the valve control switch in conjunction with the stroke time testing of the valve. Utilizing the valve control switch is equivalent to removing control power fuses, opening power supply breakers, or isolating air supplies. Verifying the fail-safe function of valves via normal valve operation is sufficient to demonstrate proper valve operability on loss of electrical power or loss of air.

The MSIV actuator is different from most air to open, spring to close valves. In the typical air to open, spring to close valve, a loss of air caused by de-energizing the solenoid valve, causes the air to exhaust and the spring to close the valve. With the MSIVs, de-energizing the solenoid, causes the air under the cylinder to exhaust and the air is redirected to the top of the cylinder. The MSIVs will be fail-safe tested by using a springs-only closure.

1.4.8 Check Valves Demonstrated Open During Normal Plant Operations

In accordance with ISTC-5221(a)(3), check valves that have a safety function in only the close direction shall be exercised by initiating flow and observing that the obturator has traveled to at least the partially open position. ISTC-3522 states the following:

(a) Open and close tests need only be performed at an interval when it is practicable to perform both tests.

(b) Test order shall be determined by the Owner

(c) Open and close tests are not required to be performed at the same time if they are both performed within the same interval.

The following check valves have only a closed safety function:

(a) HV241F032A/B - Feedwater Supply to Reactor Stop Check Valves
(b) 241F039A/B – Reactor Water Cleanup Return Check Valves
(c) 211165A/B – Emergency Service Water Keep Fill Check Valves
(d) 251F089A/B – Residual Heat Removal Keep Fill Check Valves
(e) 251F0909A/B – Residual Heat Removal Keep Fill Check Valves
(f) 249015 – Reactor Core Isolation Cooling Keep Fill Check Valve
(g) 255012 – High Pressure Core Injection Keep Fill Check Valve
(h) 243F013A/B – Reactor Recirc Pump Seal Injection Check Valves
(i) XV243F017A/B - Reactor Recirc Pump Seal Injection Check Valves
(j) 246027/246028 – Control Rod Drive Seismic Island Check Valves

These check valves have flow through them during normal plant operations. If the check valve is not open to pass flow, alarms or indications would identify the problem to an Operator who is trained to respond to such situations and take appropriate actions. Condition Reports are written for abnormal plant conditions attributable to conditions such as check valve failures. The observation and analysis of the non-safety open position of these check valves is satisfied by operator reviews and no specific surveillance procedure will be developed to document the non-safety related open function of these check valves.

Verifying that the system is full is also an industry accepted means for verifying that keepfill check valves are capable of opening to provide flow when necessary.

The following check valves have both open and close safety functions:

(a) 241F010A/B – Feedwater Supply to Reactor Check Valve
(b) 241818A/B - Feedwater Supply to Reactor Check Valve

ISTC-5221(a)(1) states that check valves that have a safety function in both the open and close direction shall be exercised by initiating flow and observing that the obturator has traveled to either the full open or to the position required to perform its intended function(s) and verify on cessation of flow or reversal of flow, the obturator has traveled back to the seat.

These check valves are open during normal plant operation to supply feedwater flow to the reactor and have an open safety function during an accident to allow Reactor Core Isolation Cooling (RCIC) flow (Feedwater Loop A) or High Pressure Coolant Injection (HPCI) flow (Feedwater Loop B) to the reactor. The maximum required accident flow for RCIC is 600 gpm and for HPCI is 5,000 gpm. During normal plant operation, the feedwater flow through these valves is approximately 16,000 gpm in each loop at 100% reactor power.

2. INSERVICE TESTING PLANS FOR PUMPS

The pumps included in the SSES Unit 2 Inservice Testing Program are listed on the attached Pump Table (Attachment 1). Pumps that are common to both Unit 1 and 2 are included in the SSES Unit 1 Inservice Testing Program. The column headings for the Pump Table are delineated below with an explanation of the content of each column.

System –	Three digit number designating the system in which the pump is located
Pump Number –	Unique NIMS component identification number
Noun Name –	Unique NIMS noun name for the pump
P&ID/Coord. –	P&ID number and coordinates on the P&ID at which each pump is located
ASME Class –	ASME Code Class of the pump. "S" signifies that the pump is a safety-related non-ASME Code Class pump.
Orientation –	Designates the orientation of the axis of the impeller. "H" is horizontal and "V" is vertical.
Pump Type/ Group –	Indicates whether the pump is a centrifugal pump or a positive displacement pump. The Group designation, "A" or "B" indicates the grouping as defined by ASME OM Code 1998 Edition, through 2000 Addenda, ISTB-2000. Group A pumps are pumps that are operated continuously or routinely during normal operations, cold shutdown, or refueling operations. Group B pumps are pumps in standby systems that are not operated routinely except for testing.

Driver Type/ Speed – Type of driver associated with the pump (motor or steam turbine) and whether the pump is a fixed speed or variable speed pump.

M – Motor Driven
ST- Steam Turbine Driven
F – Fixed Speed
V – Variable Speed

Group/Comprehensive Test Parameters Required/Performed

ΔP – Differential pressure across the pump

Q – Pump flow rate

V_v – Vibration velocity amplitude

S – Rotational speed (required for variable speed pumps only)

P – Discharge pressure (required for positive displacement pumps)

Group/Comprehensive Test Frequency

M3 – Test performed once every 92 days (quarterly)

R – Test performed once every refueling outage

Relief Requests – Relief Requests (RR) for pumps that cannot be tested per Code requirements. The appropriate RR number is provided.

Remarks - Any appropriate reference or explanatory information

3. INSERVICE TESTING PLANS FOR VALVES

The valves included in the SSES Unit 2 Inservice Testing Program are listed on the attached Valve Tables (Attachment 2). Valves that are common to both Unit 1 and 2 are included in the SSES Unit 1 Inservice Testing Program. The column headings for the Valve Tables are delineated below with an explanation of the content of each column.

Valve Number – Unique NIMS component identification number

P&ID/Coord. – P&ID coordinates at which each valve is located

ASME Class – ASME Code Class of the valve. "S" signifies that the valve is a safety-related non-ASME Code Class valve.

ASME Category – Valve category as defined by ASME OM Code, 1998 Edition through 2000 Addenda, ISTC-1300

Category A – Valves for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their safety function(s)

Category B – Valves for which seat leakage in the closed position is inconsequential for fulfillment of their safety function(s)

Category C – Valves which are self-actuating in response to some system characteristic such as pressure (safety and relief valves) or flow direction (check valves) for fulfillment their safety function(s)

Category D – Valves which are actuated by an energy source capable of only one operation, such as rupture discs or explosive-actuated valves

Active/Passive – Designated by "A" for active and "P" for passive

Active – required to change position to accomplish safety function(s)

Passive – maintain position and not required to change position to accomplish safety function(s)

Valve Size – Size of valve in inches

Valve Type – Type of valve according to the following abbreviations

BA – Ball
BF – Butterfly
CK – Check
GT – Gate
GB – Globe
RD – Rupture Disk
RV – Relief
SC – Stop Check
XC – Excess Flow Check

Actuator Type – Type of actuator for each valve according to following abbreviations

AO – Air Operator
EX - Explosive
HO – Hydraulic Operator
MA – Manual
MO – Motor Operator
SA – Self Actuated
SO – Solenoid Operator

Safety Position – Position the valve is required to be in to perform its safety function

O – Open
C – Closed
O/C – Open and Closed

Tests Required/Performed

FSO – Full Stroke Open
FSC – Full Stroke Closed
PSO – Part Stroke Open
STO – Stroke Time Open
STC – Stroke Time Closed
RPI – Remote Position Indication
FTO – Fail-safe Test Open
FTC – Fail-safe Test Closed
D&E – Disassembly & Examine
RVT – Relief Valve Test
EXT – Explosive Valve Test
LTJ – Seat leakage test required by 10 CFR 50 Appendix J
LTO – Seat leakage test required for other Category A Valves by OM Code 1998 Edition
LTP – Seat leakage test required for Pressure Isolation Valves by OM Code 1998 Edition

Test Frequency

M3 – Once every 92 days (Quarterly)

R – Once every refueling outage (for check valves, in accordance with check valve sample disassembly and examination program)

C – Continuous during plant operations

CS – Once every cold shutdown but not more frequent than once every 92 days

OC – Once per operating cycle or operating cycle combination in accordance with check valve sample disassembly and examination program

AJ - In accordance with the Owner's 10CFR50 Appendix J Program (ISTC-3620)

2Y – Once every two years

4Y – Once every four years

5Y – Class 1 pressure relief valves are required to be tested at least once every 5 years with a minimum of 20% of the valves tested within any 24 months. Class 1, 2, & 3 non-reclosing pressure relief devices are to be replaced every 5 years.

6Y – Class 1 pressure relief valves are tested at least once every 6 years with a minimum of 20% of the valves tested within any 24 months. (Relief Request RR02)

10Y – Class 2 & 3 pressure relief valves are required to be tested at least once every 10 years with a minimum of 20% of the valves tested within any 48 months. Excess flow check valves are tested on a sampling basis in accordance with Technical Specification Surveillance Requirement SR 3.6.1.3.9 over a 10-year interval.

CJ/RJ Justification – Cold Shutdown Justification (CJ) and Refueling Outage Justification (RJ) for valves that cannot be tested at the frequency specified in the Code. The appropriate CJ or RJ number is provided.

Relief Requests – Relief Requests (RR) for valves that cannot be tested per Code requirements. The appropriate RR number is provided.

Remarks – Any explanatory notes required.

4. SSES UNIT 2 DRAWINGS

PPL DWG NUMBER	AE DWG NUMBER	SHEET	TITLE
E106205	M-100	1-4	P&ID Legend & Symbols
E162638	M-2109	2	P&ID Service Water
E162639	M-2110	1	P&ID Service Water
E162640	M-2111	1-2	P&ID Emergency Service Water System
E162641	M-2112	1	P&ID RHR Service Water System
E162642	M-2113	1	P&ID Reactor Building Closed Cooling Water
E162798	M-2126	1-2	P&ID Containment Instrument Gas
E105941	M-2141	1-2	P&ID Nuclear Boiler
E105942	M-2142	1-2	P&ID Nuclear Boiler Vessel Instrumentation
E105943	M-2143	1-2	P&ID Reactor Recirculation
E105944	M-2144	1-2	P&ID Reactor Water Cleanup
E105946	M-2146	1	P&ID Control Rod Drive Part A
E105947	M-2147	1-2	P&ID Control Rod Drive Part B
E105948	M-2148	1	P&ID Standby Liquid Control
E105949	M-2149	1	P&ID Reactor Core Isolation Cooling
E105950	M-2150	1	R.C.I.C. Turbine-Pump
E105951	M-2151	1-4	P&ID Residual Heat Removal
E105952	M-2152	1	P&ID Core Spray
E105953	M-2153	1	P&ID Fuel Pool Cooling & Clean-Up
E105955	M-2155	1	P&ID High Pressure Coolant Injection
E105956	M-2156	1-2	P&ID H.P.C.I. Turbine-Pump
E105957	M-2157	1-7	P&ID Containment Atmos. Control
E105961	M-2161	1	P&ID Liquid Radwaste Collection
E177255	M-2172	1	P&ID Emergency Switchgear Room Cooling System
E105987	M-2187	2	P&ID Reactor Building Chilled Water

5. TESTING JUSTIFICATIONS

Cold Shutdown Justifications (CJ) and Refueling Outage Justifications (RJ) for valves that cannot be tested at the frequency specified in the Code are located in Attachments 3 and 4 respectively.

6. RELIEF REQUESTS

Relief Requests (RR) for pumps and valves that cannot be tested per Code requirements are located in Attachment 5.

ATTACHMENT 5

RELIEF REQUESTS

RELIEF REQUEST RR01

Relief in accordance with 10 CFR 50.55a (a)(3)(i)

Alternative Provides Acceptable Level of Quality and Safety

1. <u>ASME Code Component(s) Affected</u>

Valve Number	System	Cat.	Safety Class
Check Valve Group CV17			
249F011	Reactor Core Isolation Cooling	C	2
249F030	Reactor Core Isolation Cooling	C	2

<u>Function</u>

These check valves are in the Reactor Core Isolation Cooling (RCIC) pump suction lines. They have an open safety function to provide a flow path for the RCIC pump while taking suction from the condensate storage tank (249F011) or the suppression pool (249F030). They have a closed safety to prevent diversion of RCIC flow when the alternate suction path is being used. These valves have no containment isolation function. The open and close safety functions of these valves are currently verified by valve disassembly.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV09			
249F021	Reactor Core Isolation Cooling	C	2

<u>Function</u>

This check valve is in the Reactor Core Isolation Cooling (RCIC) pump minimum flow line. It has an open safety function to provide a minimum flow path for protection of the pump. This valve has a containment isolation function although it is not Appendix J tested. This line terminates below the minimum suppression pool level, which provides a water seal. The open and close safety function of these valves is currently verified by valve disassembly. This valve is part stroked open during the quarterly Reactor Core Isolation Cooling flow verification (inservice pump test).

RELIEF REQUEST RR01 (CONTINUED)

Valve Number	System	Cat.	Safety Class
Check Valve Group CV24			
250F047	Reactor Core Isolation Cooling	C	2
256F052	High Pressure Coolant Injection	C	2

Function

These check valves are located in the discharge of the Reactor Core Isolation Cooling (RCIC) and High Pressure Coolant Injection (HPCI) vacuum condenser pumps and provide the ASME Code boundary between the RCIC/HPCI pump suction and the discharge of the vacuum tank condenser pump. They have a closed safety function to maintain RCIC/HPCI water inventory in the event of a line break of the non Code piping. Under ISTC-5221(a)(3), it is required that these check valves also be verified to partially open. These valves have no containment isolation function. The close safety function of these valves is currently verified by valve disassembly.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV15			
251F046A	Residual Heat Removal	C	2
251F046B	Residual Heat Removal	C	2
251F046C	Residual Heat Removal	C	2
251F046D	Residual Heat Removal	C	2

Function

These check valves are in the Residual Heat Removal pump minimum flow lines. They have an open safety function to provide a minimum flow path for pump protection. Under ISTC-5221(a)(2), it is required that these check valves also be verified for closure. These valves have no containment isolation function. The open safety function of these valves is currently verified by valve disassembly. These valves are part stroked open during the quarterly Residual Heat Removal flow verification (inservice pump test).

Valve Number	System	Cat.	Safety Class
Check Valve Group CV10			
252005	Core Spray	C	2

**RELIEF REQUEST RR01
(CONTINUED)**

Function

This check valve is located in the suppression pool fill line. It has a safety function to close if the line is being used for filling the suppression pool (manual upstream valve 252028 open) to maintain Core Spray water inventory. This valve has no containment isolation function. The close safety function of this valve is currently verified by valve disassembly.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV23			
252F029A	Core Spray	C	2
252F029B	Core Spray	C	2
252F030A	Core Spray	C	2
252F030B	Core Spray	C	2

Function

These check valves are in the keep fill lines for the Core Spray system. They have a closed safety function to prevent loss of inventory during Core Spray system operation. Under ISTC-5221(a)(3), it is required that these check valves also be verified to partially open. These valves have no containment isolation function. The close safety function of these valves is currently verified by valve disassembly. The open function of these valves is continually verified during plant operation by proper operation of the keep fill system.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV16			
252F036A	Core Spray	C	2
252F036B	Core Spray	C	2
252F036C	Core Spray	C	2
252F036D	Core Spray	C	2

**RELIEF REQUEST RR01
(CONTINUED)**

Function

These check valves are in the Core Spray pump minimum flow lines. They have an open safety function to provide a minimum flow path for pump protection. Under ISTC-5221(a)(2), it is required that these check valves also be verified for closure. These valves have no containment isolation function. The open safety function of these valves is currently verified by valve disassembly. These valves are part stroked open during the quarterly Core Spray flow verification (inservice pump test).

Valve Number	System	Cat.	Safety Class
Check Valve Group CV14			
253071A	Fuel Pool Cooling & Cleanup	C	3
253071B	Fuel Pool Cooling & Cleanup	C	3

Function

These check valves are in the alternate flow path to the fuel storage pool. They have an open safety function to provide fuel storage pool cooling. Under ISTC-5221(a)(2), it is required that these check valves also be verified for closure. These valves have no containment isolation function. The open safety function of these valves is currently verified by valve disassembly. These valves are part stroked open during periodic pressure testing required by ASME Boiler & Pressure Vessel Code, Section XI.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV19			
255F019	High Pressure Coolant Injection	C	2
255F045	High Pressure Coolant Injection	C	2

RELIEF REQUEST RR01
(CONTINUED)

Function

These check valves are in the High Pressure Coolant Injection (HPCI) pump suction lines. They have an open safety function to provide a flow path for the HPCI pump while taking suction from the condensate storage tank (255F019) or the suppression pool (255F045). They have a closed safety to prevent diversion of HPCI flow when the alternate suction path is being used. These valves have no containment isolation function. The open and close safety functions of these valves are currently verified by valve disassembly.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV13			
255F046	High Pressure Coolant Injection	C	2

Function

This check valve is in the High Pressure Coolant Injection (HPCI) pump minimum flow line. It has an open safety function to provide a minimum flow path for protection of the pump. This valve has a containment isolation function although it is not Appendix J tested. This line terminates below the minimum suppression pool level, which provides a water seal. The open and close safety function of this valve is currently verified by valve disassembly. This valve is part stroked open during the quarterly High Pressure Coolant Injection flow verification (inservice pump test).

Valve Number	System	Cat.	Safety Class
Check Valve Group CV20			
211132	Emergency Service Water	C	3
211134	Emergency Service Water	C	3

Function

Check valve 211132 is in the Emergency Service Water (ESW) supply line to the Emergency Switchgear and Load Center Room "A" Cooler. Check valve 211134 is in the Emergency Service Water (ESW) supply line to the Emergency Switchgear and Load Center Room "B" Cooler. The open safety function of these valves is currently verified by valve disassembly.

Valve Number	System	Cat.	Safety Class
Check Valve Group CV21			
211133	Emergency Service Water	C	3
211135	Emergency Service Water	C	3

**RELIEF REQUEST RR01
(CONTINUED)**

Function

Check valve 211133 is in the Emergency Service Water (ESW) return line from the Emergency Switchgear and Load Center Room "A" Cooler. Check valve 211135 is in the Emergency Service Water (ESW) return line from the Emergency Switchgear and Load Center Room "B" Cooler. The open safety function of these valves is currently verified by valve disassembly.

2. **Applicable Code Requirement**

ASME OM Code 1998 Edition through OMb-2000 Addenda

ISTC-5221(c)(3), "Valve Obturator Movement"

"At least one valve from each group shall be disassembled and examined at each refueling outage; all valves in each group shall be disassembled and examined at least once every 8 years."

3. **Basis for Relief**

Pursuant to 10CFR 50.55a, "Codes and Standards," paragraph (a)(3), relief is requested from the requirements of ASME OM Code ISTC-5221(c)(3). The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

The components listed above are check valves with no external means for exercising and no external position indication. Due to a lack of installed flow or pressure indication and a lack of test connections, it is not possible to use other means to verify the open and/or close exercising of these check valves. Disassembly of the valves is the most feasible method to verify operability and can be accomplished during system outages, which may be conducted on line. The check valves have been grouped by valve manufacturer, design, service, size, materials of construction, and orientation as required by ASME OM Code 1998 thorough 2000 Addenda, Section ISTC-5221(c)(1).

Prior to performing a system outage on-line, its effect on risk is evaluated in accordance with requirements of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear power Plants." This requirement states in part that "Before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities."

RELIEF REQUEST RR01
(CONTINUED)

SSES complies with the requirements of 10 CFR 50.65(a)(4) via application of a program governing maintenance scheduling. The program dictates the requirements for risk evaluations as well as the necessary levels of action required for risk management in each case. The program also controls operation of the on-line risk monitor system, which is based on probabilistic risk assessment (PRA). With the use of risk evaluation for various aspects of plant operations, SSES has initiated efforts to perform additional maintenance, surveillance, and testing activities during normal operation. Planned activities are evaluated utilizing risk insights to determine the impact on safe operation of the plant and the ability to maintain associated safety margins. Individual system components, a system train, or a complete system may be planned to be out of service to allow maintenance, or other activities, during normal operation.

Disassembly and inspection may involve a system breach. However, the valves are isolated and the associated section of piping drained during disassembly. Thus, the system breach does not increase the risk due to internal flooding or internal system loss-of-coolant accident. The risk associated with these activities would be bounded by the risk experienced due to the system outage. Therefore, disassembly and testing of these valves during scheduled system outages while on-line would have no additional impact on core damage frequency.

As more system outages are performed on-line, it is evident that selected refueling outage inservice testing activities, (e.g., valve exercising and disassembly) could be performed during these system outage windows (SOW) without sacrificing the level of quality or safety. Inservice testing performed on a refueling outage frequency is currently acceptable in accordance with ASME OM Code, 1998 Edition through 2000 Addenda. By specifying testing activities on a frequency commensurate with each refueling outage, ASME OM Code, 1998 Edition through 2000 Addenda, establishes an acceptable time period between testing. Historically, the refueling outage has provided a convenient and defined time period in which testing activities could be safety and efficiently performed. However, an acceptable testing frequency can be maintained separately without being tied directly to a refueling outage. Inservice testing performed on a frequency that maintains the acceptable time period between testing activities during the operating cycle is consistent with the intent of ASME OM Code, 1998 Edition through 2000 Addenda.

Over time, approximately the same number of test will be performed using the proposed operating cycle frequency as would be performed using the current refueling outage frequency. Thus, inservice testing activities performed during the proposed operating cycle test frequency provide an equivalent level of quality and safety.

**RELIEF REQUEST RR01
(CONTINUED)**

4. **Proposed Alternate Testing**

Pursuant to 10 CFR 50.55a(a)(3)(i), SSES proposes an alternative testing frequency for performing inservice testing of the valves identified above. At least one valve from each group will be tested on a frequency of once each operating cycle in lieu of once each refueling outage as currently allowed by ASME OM Code, 1998 Edition through 2000 Addenda, ISTC-5221(c)(3), "Valve Obturator Movement." All valves in each group will be tested at least once every 8 years as required by ASME OM Code, 1998 Edition through 2000 Addenda, ISTC-5221(c)(3).

Check valve groups CV09, CV10, CV13, CV14, and CV24 include identical Unit 2 valves. For these check valve groups, one valve from each group will be tested each outage cycle combination. An outage cycle combination is defined as the start of Unit 1 operating cycle to the completion of Unit 2 operating cycle.

Similar relief has been approved for Entergy's Grand Gulf Nuclear Station, Unit 1 (TAC No. MB6900).

5. **Duration of Relief Request**

This proposed alternative is requested for the duration of the 3rd Ten-Year Interval Susquehanna Steam Electric Station Unit 2 IST program (June 1, 2004 through May 31, 2014).

RELIEF REQUEST RR02

Relief in accordance with 10 CFR 50.55a (a)(3)(i)

Alternative Provides Acceptable Level of Quality and Safety

1. **ASME Code Component(s) Affected**

Valve	System	Category	Class
PSV241F013A	Nuclear Boiler	C	1
PSV241F013B	Nuclear Boiler	C	1
PSV241F013C	Nuclear Boiler	C	1
PSV241F013D	Nuclear Boiler	C	1
PSV241F013E	Nuclear Boiler	C	1
PSV241F013F	Nuclear Boiler	C	1
PSV241F013G	Nuclear Boiler	C	1
PSV241F013H	Nuclear Boiler	C	1
PSV241F013J	Nuclear Boiler	C	1
PSV241F013K	Nuclear Boiler	C	1
PSV241F013L	Nuclear Boiler	C	1
PSV241F013M	Nuclear Boiler	C	1
PSV241F013N	Nuclear Boiler	C	1
PSV241F013P	Nuclear Boiler	C	1
PSV241F013R	Nuclear Boiler	C	1
PSV241F013S	Nuclear Boiler	C	1

These valves are Main Steam Safety/Relief Valves. They provide overpressure protection for the reactor coolant pressure boundary to prevent unacceptable radioactive release and exposure to plant personnel.

2. **Applicable Code Requirement**

ASME OM Code 1998 Edition through OMb-2000 Addenda

I-1330(a), "Test Frequencies, Class 1 Pressure Relief Valves

"Class 1 pressure relief valves shall be tested at least once every 5 years, starting with initial electric power generation."

RELIEF REQUEST RR02
(CONTINUED)

3. **Basis for Relief**

Pursuant to 10CFR 50.55a, "Codes and Standards," paragraph (a)(3), relief is requested from the requirements of ASME OM Code, Appendix I, I-1330(a). The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

During the second ten-year interval, Susquehanna removed and tested 8 of the 16 Main Steam Safety/Relief Valves (MSRV) during each refueling outage. This methodology meets the Code criteria of testing previously untested valves and permits the removal and replacement of weeping valves detected during the previous operating cycle. Weeping MSRVs are detected by monitoring tailpipe temperatures. If the tailpipe temperature exceeds 200 degrees Fahrenheit, then the relief valve is viewed as a weeper.

Without Code relief for 24-month fuel cycles, strict Code compliance would restrict Susquehanna's operating philosophy to not operate with weeping MSRVs as Code testing would be required to be completed within 5 years. This testing strategy does not account for any leaking valves that may need to be refurbished. Since Susquehanna's philosophy is to share spare valves between both units, (the valves that are removed from one unit are installed in the other unit's next refueling outage), this testing strategy is less than adequate. This strategy could only be accomplished if a large population of MSRVs are tested each outage or additional spare valves are purchased. More than 8 valves would need to be sent to the offsite testing facility during a refueling outage. The testing and return of these valves would have to be completed expeditiously in order to not impact the refuel outage schedule duration. For this reason, additional expenditures would be incurred to purchase and test a greater number of valves each outage. Without Code relief, the additional outage work would be contrary to the principles of ALARA and could compromise radiation safety. Because of the location of certain MSRVs in the containment, interferences exist that would require the removal of more valves and piping for those valves that must be removed for the sample testing. This results in more radiation exposure to the maintenance personnel than is desirable.

With Code relief, the 16 MSRVs per unit can be tested within 6 years to complete the Code required testing for the total population and accommodate any weeping MSRVs. The increased testing over only 2 refuel cycles would result in no additional safety benefit to the plant. Susquehanna has had excellent performance with MSRVs over the last 10 years. Since 1987, Susquehanna has imposed a more conservative as-left leakage criterion on the testing facility than was specified in the General Electric Specification and incorporated in the PPL Specification for testing Crosby style relief valves. The criterion imposed on the test lab is 0 ml/5 minutes (via the purchase order) compared to a GE Specification "as-left" leakage criterion of 38 ml/5 minutes.

**RELIEF REQUEST RR02
(CONTINUED)**

Additionally, a review of the set point testing results (for both units) for the time period from initial operation to the present (March 2004), which comprises 255 data points shows that the average of the set point drift percentages is -0.705%. This indicates that, in general, the MSRVs tend to drift slightly downward, not upward. The calculated standard deviation from the average for the data was determined to be 1.43%.

Also, the testing history shows that since commercial operation, Susquehanna has had only two "as-found" set pressure test acceptance criteria failures (above +3%) of the tested valves, which required additional MSRVs to be tested.

4. <u>Proposed Alternate Testing</u>

For the third ten-year interval, Susquehanna proposes to remove at least 20% of the 16 Main Steam Safety/Relief Valves (MSRV) plus weeping valves detected during the previous operating cycle and any valves required to be removed to access scheduled or weeping valves up to a maximum of 8 valves during each refueling outage.

Additional valves above the Code required minimum 20% will be tested if the as-found setpoint exceeds +3% of the nameplate. No additional valves will be tested if the as-found setpoint is below the nameplate setpoint. The additional valves tested will be from the initial population removed that are in excess of the 20% Code required minimum. If one of these valves fail, then all the MSRVs would be removed and tested.

Completion of Code testing will be accomplished over a period of 3 refuel cycles or 6 years. This approach results in maintenance and operational flexibility with the following benefits:

- Provides the ability to both test the Code required valves out of the population not yet tested and replace any weeping MSRVs.
- Maintains relatively leak-free MSRVs, thus minimizing the necessary run time of ECCS systems that provide suppression pool cooling.
- Consistent application of ALARA principles.
- Enhances equipment reliability.
- Results in minimal impact on outage durations.

The MSRVs will be tested such that a minimum of 20% of the valves (previously untested, if they exist) are tested every 24 months, such that all the valves will be tested within 3 refuel cycles. This proposal utilizes the same maintenance and testing approach that was applied in 18-month refuel cycles. This alternative frequency will continue to provide assurance of the valve operational readiness and provides an acceptable level of quality and safety.

RELIEF REQUEST RR02
(CONTINUED)

Additionally, any failures, either seat leakage or pressure set point, occurring at the test facility, as well as weeping MSRVs that develop during the operating cycle will be documented by the corrective action program, evaluated and dispositioned accordingly.

5. **Duration of Relief Request**

This proposed alternative is requested for the duration of the 3rd Ten-Year Interval Susquehanna Steam Electric Station Unit 2 IST program (June 1, 2004 through May 31, 2014). This is similar to the relief request approved for the 2nd Ten-Year Interval Susquehanna Steam Electric Station Unit 2 IST Program (reference TAC No. MA0127, dated April 7, 1998).

RELIEF REQUEST RR03

Relief in accordance with 10 CFR 50.55a (a)(3)(i)

Alternative Provides Acceptable Level of Quality and Safety

1. ASME Code Component(s) Affected

Valve	System	Cat	Class
XV241F009	Nuclear Boiler	C	1
XV241F070A	Nuclear Boiler	C	1
XV241F070B	Nuclear Boiler	C	1
XV241F070C	Nuclear Boiler	C	1
XV241F070D	Nuclear Boiler	C	1
XV241F071A	Nuclear Boiler	C	1
XV241F071B	Nuclear Boiler	C	1
XV241F071C	Nuclear Boiler	C	1
XV241F071D	Nuclear Boiler	C	1
XV241F072A	Nuclear Boiler	C	1
XV241F072B	Nuclear Boiler	C	1
XV241F072C	Nuclear Boiler	C	1
XV241F072D	Nuclear Boiler	C	1
XV241F073A	Nuclear Boiler	C	1
XV241F073B	Nuclear Boiler	C	1
XV241F073C	Nuclear Boiler	C	1
XV241F073D	Nuclear Boiler	C	1
XV24201	Nuclear Boiler	C	1
XV24202	Nuclear Boiler	C	1
XV242F041	Nuclear Boiler	C	1
XV242F043A	Nuclear Boiler	C	1
XV242F043B	Nuclear Boiler	C	1
XV242F045A	Nuclear Boiler	C	1
XV242F045B	Nuclear Boiler	C	1
XV242F047A	Nuclear Boiler	C	1
XV242F047B	Nuclear Boiler	C	1
XV242F051A	Nuclear Boiler	C	1
XV242F051B	Nuclear Boiler	C	1
XV242F051C	Nuclear Boiler	C	1
XV242F051D	Nuclear Boiler	C	1
XV242F053A	Nuclear Boiler	C	1
XV242F053B	Nuclear Boiler	C	1
XV242F053C	Nuclear Boiler	C	1
XV242F053D	Nuclear Boiler	C	1
XV242F055	Nuclear Boiler	C	2
XV242F057	Nuclear Boiler	C	2
XV242F059A	Nuclear Boiler	C	1
XV242F059B	Nuclear Boiler	C	1
XV242F059C	Nuclear Boiler	C	1
XV242F059D	Nuclear Boiler	C	1
XV242F059E	Nuclear Boiler	C	1
XV242F059F	Nuclear Boiler	C	1
XV242F059G	Nuclear Boiler	C	1
XV242F059H	Nuclear Boiler	C	1
XV242F059L	Nuclear Boiler	C	1

Valve	System	Cat	Class
XV242F059M	Nuclear Boiler	C	1
XV242F059N	Nuclear Boiler	C	1
XV242F059P	Nuclear Boiler	C	1
XV242F059R	Nuclear Boiler	C	1
XV242F059S	Nuclear Boiler	C	1
XV242F059T	Nuclear Boiler	C	1
XV242F059U	Nuclear Boiler	C	1
XV242F061	Nuclear Boiler	C	1
XV243F003A	Reactor Recirculation	C	1
XV243F003B	Reactor Recirculation	C	1
XV243F004A	Reactor Recirculation	C	1
XV243F004B	Reactor Recirculation	C	1
XV243F009A	Reactor Recirculation	C	1
XV243F009B	Reactor Recirculation	C	1
XV243F009C	Reactor Recirculation	C	1
XV243F009D	Reactor Recirculation	C	1
XV243F010A	Reactor Recirculation	C	1
XV243F010B	Reactor Recirculation	C	1
XV243F010C	Reactor Recirculation	C	1
XV243F010D	Reactor Recirculation	C	1
XV243F011A	Reactor Recirculation	C	1
XV243F011B	Reactor Recirculation	C	1
XV243F011C	Reactor Recirculation	C	1
XV243F011D	Reactor Recirculation	C	1
XV243F012A	Reactor Recirculation	C	1
XV243F012B	Reactor Recirculation	C	1
XV243F012C	Reactor Recirculation	C	1

**RELIEF REQUEST RR03
(CONTINUED)**

Valve	System	Cat	Class
XV243F012D	Reactor Recirculation	C	1
XV243F040A	Reactor Recirculation	C	1
XV243F040B	Reactor Recirculation	C	1
XV243F040C	Reactor Recirculation	C	1
XV243F040D	Reactor Recirculation	C	1
XV243F057A	Reactor Recirculation	C	1
XV243F057B	Reactor Recirculation	C	1
XV24411A	Reactor Water Cleanup	C	1
XV24411B	Reactor Water Cleanup	C	1
XV24411C	Reactor Water Cleanup	C	1
XV24411D	Reactor Water Cleanup	C	1
XV244F046	Reactor Water Cleanup	C	1
XV249F044A	Reactor Core Isolation Cooling	C	1

Valve	System	Cat	Class
XV249F044B	Reactor Core Isolation Cooling	C	1
XV249F044C	Reactor Core Isolation Cooling	C	1
XV249F044D	Reactor Core Isolation Cooling	C	1
XV255F024A	High Pressure Coolant Injection	C	1
XV255F024B	High Pressure Coolant Injection	C	1
XV255F024C	High Pressure Coolant Injection	C	1
XV255F024D	High Pressure Coolant Injection	C	1
XV25109A	Residual Heat Removal	C	1
XV25109B	Residual Heat Removal	C	1
XV25109C	Residual Heat Removal	C	1
XV25109D	Residual Heat Removal	C	1
XV252F018A	Core Spray	C	1
XV252F018B	Core Spray	C	1

These valves are instrumentation line excess flow check valves (EFCVs) provided in each instrument line process line that penetrates primary containment in accordance with Regulatory Guide 1.11. The EFCVs are designed to close upon rupture of the instrument line downstream of the EFCV and otherwise remain open. The lines are sized and/or orificed such that off-site dose will be substantially below 10 CFR 100 limits in the event of a rupture.

2. <u>Applicable Code Requirement</u>

ASME OM Code 1998 Edition through OMb-2000 Addenda

ISTC-3522(c), "Category C Check Valves"

"If exercising is not practicable during operation at power and cold shutdown, it shall be performed during refueling outages."

ISTC- 3700, "Position Verification Testing"

"Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve operation is accurately indicated."

RELIEF REQUEST RR03
(CONTINUED)

3. **Basis for Relief**

Pursuant to 10CFR 50.55a, "Codes and Standards," paragraph (a)(3), relief is requested from the requirements of ASME OM Code ISTC-3522(c) and ISTC-3700. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

Testing the subject valves quarterly or during cold shutdown is not practicable, based on plant conditions. These valves have been successfully tested throughout the life of the Susquehanna Steam Electric Station Unit 2 and they have shown no degradation or other signs of aging.

The technology for testing these valves is simple and has been demonstrated effectively during the operating history of Susquehanna Steam Electric Station Unit 2. The basis for this alternative is that testing a sample of EFCVs each refueling outage provides a level of safety and quality equivalent to that of the Code-required testing.

Excess flow check valves are required to be tested in accordance with ISTC-3522, which requires exercising check valves nominally every three months to the positions required to perform their safety functions. ISTC-3522(c) permits deferral of this requirement to every reactor refueling outage. Excess flow check valves are also required to be tested in accordance with ISTC-3700, which requires remote position verification at least once every 2 years.

The EFCVs are classified as ASME Code Category C and are also containment isolation valves. However, these valves are excluded from 10 CFR 50 Appendix J Type C leak rate testing, due to the size of the instrument lines and upstream orificing. Therefore, they have no safety-related seat leakage criterion.

The excess flow check valve is a simple device. The major components are a poppet and spring. The spring holds the poppet open under static conditions. The valve will close upon sufficient differential pressure across the poppet. Functional testing of the valve is accomplished by venting the instrument side of the valve. The resultant increase in flow imposes a differential pressure across the poppet, which compresses the spring and decreases flow through the valve.

Functional testing is required by Technical Specification Surveillance Requirement 3.6.1.3.9. System design does not include test taps upstream of the EFCV. For this reason, the EFCVs cannot be isolated and tested using a pressure source other than reactor pressure.

**RELIEF REQUEST RR03
(CONTINUED)**

The testing described above requires removal of the associated instrument or instruments from service. Since these instruments are in use during plant operation, removal of any of these instruments from service may cause a spurious signal, which could result in a plant trip or an unnecessary challenge to safety systems. Additionally, process liquid will be contaminated to some degree, requiring special measures to collect flow from the vented instrument side and also will contribute to an increase in personnel radiation exposure.

Industry experience as documented in NEDO-32977-A, indicates the ECFVs have a very low failure rate. At Susquehanna, the failure rate has been approximately 1%. Only half of these failures have resulted in replacement of the EFCV. The Susquehanna test history shows no evidence of common mode failure. This Susquehanna test experience is consistent with the findings of NEDO. The NEDO indicates similarly that many reported test failures at other plants were related to test methodologies and not actual EFCV failures. Thus, the ECFVs at Susquehanna, consistent with the industry, have exhibited a high degree of reliability, availability, and provide an acceptable level of quality and safety.

Testing on a cold shutdown frequency is impractical considering the large number of valves to be tested and the condition that reactor pressure greater than 500 psig is needed for testing. In this instance, considering the number of valves to be tested and the conditions required for testing, it is also a hardship to test all these valves during refueling outages. Recent improvements in refueling outage schedules minimized the time that is planned for refueling and testing activities during the outages.

The appropriate time for performing excess flow check valve test is during refueling outages in conjunction with vessel hydrostatic testing. As a result of shortened outages, decay heat levels during hydrostatic tests are higher than in the past. If the hydrostatic test were extended to test all EFCVs, the vessel could require depressurization several times to avoid exceeding the maximum bulk coolant temperature limit. This is an evolution that challenges the reactor operators and thermally cycles the reactor vessel. This evolution should be avoided if possible. Also, based on past experience, excess flow check valve testing during hydrostatic testing becomes the outage critical path and could possibly extend the outage by two days if all EFCVs were to be tested during this time frame.

RELIEF REQUEST RR03
(CONTINUED)

4. **Proposed Alternate Testing**

As an alternative to testing all EFCVs during the refueling outage, a sampling plan will be implemented. This plan will test certain excess flow check valves immediately preceding the refueling outage while the reactor is at power, while also instituting the appropriate conditions for testing (reactor press > 500 psig). This alternative provides an acceptable level of quality and safety. Performance of this excess flow check valve testing prior to the outage will be scheduled such that, in the event of a failure, the resulting action statement and limiting condition of operation will encompass the planned shutdown for the refueling outage. Using this strategy, unplanned, unnecessary plant shutdowns as a result of excess flow cheek valve testing will be avoided.

Functional testing with verification that flow is checked will be performed per Technical Specification 3.6.1.3.9, either immediately preceding a planned refueling outage or during the refueling outage for certain EFCVs. For those valves tested prior to the refueling outage, appropriate administrative and scheduling controls will be established.

Surveillance Requirement 3.6.1.3.9 allows a "representative sample" of EFCVs to be tested every 24 months, such that each EFCV will be tested at least once every ten years (nominal).

The EFCVs have position indication in the control room. Check valve remote position indication is excluded from Regulatory Guide 1.97 as a required parameter for evaluating containment isolation. The remote position indication will be verified in the closed direction at the same frequency as the exercise test, which will be performed at the frequency prescribed in Technical Specification Surveillance Requirement 3.6.1.3.9. After the close position test, the valve will be reset, and the remote open position indication will be verified. Although inadvertent actuation of an EFCV during operation is highly unlikely due to the spring poppet design, Susquehanna verifies the EFCVs indicate open in the control room at a frequency greater than once every two years.

In summary, considering the extremely low failure rate along with personnel and plant safety concerns to perform testing, the alternative sampling plan proposed provides an acceptable level of quality and safety.

5. **Duration of Relief Request**

This proposed alternative is requested for the duration of the 3rd Ten-Year Interval Susquehanna Steam Electric Station Unit 2 IST program (June 1, 2004 through May 31, 2014). This is similar to the relief request approved for the 2nd Ten-Year Interval Susquehanna Steam Electric Station Unit 2 IST Program (reference TAC No. MA0127, dated April 7, 1998).

RELIEF REQUEST RR04

Relief in accordance with 10 CFR 50.55a (a)(3)(i)

Alternative Provides Acceptable Level of Quality and Safety

1. **<u>ASME Code Component(s) Affected</u>**

Component Number	System	Code Class
2P202A	Residual Heat Removal	2
2P202B	Residual Heat Removal	2
2P202C	Residual Heat Removal	2
2P202D	Residual Heat Removal	2
2P506A	RHR Service Water	3
2P506B	RHR Service Water	3

2. **<u>Applicable Code Requirement</u>**

ASME OM Code 1998 Edition through OMb-2000 Addenda

ISTB-5123 - Comprehensive Test Procedure

Comprehensive tests shall be conducted with the pump operating at a specified reference point.

3. **<u>Basis for Relief</u>**

Pursuant to 10CFR 50.55a(a)(3)(i), relief is requested from the requirement of ASME OM Code ISTB-5123. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.

The subject pumps are all categorized as Group A pumps. These pumps are operated routinely during normal plant operations. Each pump is tested in accordance with its associated Group A procedure. All of these pumps are operated at conditions within ± 20% of the design flow rate when tested each quarter. All of the required Code parameters are measured and compared to their respective reference values.

The intent of the Code required Comprehensive Test is to test the pump at substantial flow (biennially) such that pump degradation may be easily detected on the portion of the pump curve which is well sloped. SSES tests each of these pumps at substantial flow (± 20% of design) each quarter.

**RELIEF REQUEST RR04
(CONTINUED)**

4. **Proposed Alternate Testing**

As an alternative to performing Comprehensive Pump tests biennially, the subject pumps will be tested each quarter at ± 20% of the design flow rate. The required inservice test parameters of Table ISTB-3000-1 based on pump type will be measured and compared to their reference values. The Group A pump test acceptance criteria will be applied. Additionally, once very two years, full spectrum analysis will be performed above the Code required vibration measurements.

Based on the full spectrum analysis, and continued quarterly Group A testing at ± 20% of design pump flow, an accurate assessment of pump health and operational readiness is determined.

This alternative provides an acceptable level of quality and safety.

5. **Duration of Relief Request**

This proposed alternative is requested for the duration of the 3rd Ten-Year Interval Susquehanna Steam Electric Station Unit 2 IST program (June 1, 2004 through May 31, 2014).