SURVEILLANCE REQUIREMENTS

4.5.1 ECCS divisions 1, 2 and 3 shall be demonstrated OPERABLE by:

a. At least once per 31 days for the LPCS, LPCI and HPCS systems:

1. Verifying by venting at the high point vents that the system piping from the pump discharge valve to the system isolation valve is filled with water.

2. Performance of a CHANNEL FUNCTIONAL TEST of the:

a) Discharge line "keep filled" pressure alarm instrumentation, and

b) Header delta P instrumentation.

3. Verifying that each valve, manual, power operated or automatic, in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

4. Verifying that each ECCS corner room watertight door is closed, except during normal entry and exit from the room.

b. Verifying that, when tested pursuant to Specification 4.0.5, each:

1. LPCS pump develops a flow of at least 6350 gpm against a test line pressure greater than or equal to 290 psig.

2. LPCI pump develops a flow of at least 7200 gpm against a test line pressure greater than or equal to 130 psig.

3. HPCS pump develops a flow of at least 6250 gpm against a test line pressure greater than or equal to 370 psig.

c. For the LPCS, LPCI and HPCS systems, at least once per 18 months:

1. Performing a system functional test which includes simulated automatic actuation of the system throughout its emergency operating sequence and verifying that each automatic valve in the flow path actuates to its correct position. Actual injection of coolant into the reactor vessel may be excluded from this test.

2. Performing a CHANNEL CALIBRATION of the:

a) Discharge line "keep filled" pressure alarm instrumentation and verifying the: allowable value

1) High pressure setpoint and the low pressure setpoint of the:

*The specified 18 month interval may be waived for Cycle 1 provided the surveillance is performed during Refuel 1.

SURVEILLANCE REQUIREMENTS (Continued)

Replace with "INSERTA"

(a) LPCS system to be ≤ 500 psig and ≥ 55 psig, respectively.

(b) LPCI subsystems to be ≤ 400 psig and ≥ 55 psig, respectively.

2) Low pressure setpoint of the HPCS system to be ≥ 63 psig.

b) Header delta P instrumentation and verifying the setpoint of the:

allowable value

1) LPCS system and LPCI subsystems to be ± 1 psid.

2) HPCS system to be 5 ± 2.0 psid greater than the normal indicated ΔP.

3. Deleted.

4. Visually inspecting the ECCS corner room watertight door seals and room penetration seals and verifying no abnormal degradation, damage, or obstructions.

d. For the ADS by:

1. At least once per 31 days, performing a CHANNEL FUNCTIONAL TEST of the accumulator backup compressed gas system low pressure alarm system.

2. At least once per 18 months:

a) Performing a system functional test which includes simulated automatic actuation of the system throughout its emergency operating sequence, but excluding actual valve actuation.

b) Manually opening each ADS valve and observing the expected change in the indicated valve position.

c) Performing a CHANNEL CALIBRATION of the accumulator backup compressed gas system low pressure alarm system and verifying an alarm setpoint of 500 + 40, - 0 psig on decreasing pressure.

ATTACHMENT B
PROPOSED AMENDMENTS TO THE
LICENSE/TECHNICAL SPECIFICATIONS

INSERT A

(a) LPCS system to be ≤ 500 psig and ≥ 45.5 psig, respectively.

(b) LPCI subsystem "A" to be ≤ 400 psig and ≥ 41.0 psig, respectively.

(c) LPCI subsystem "B" to be ≤ 400 psig and ≥ 38.5 psig, respectively.

(d) LPCI subsystem "C" to be ≤ 400 psig and ≥ 45.0 psig, respectively.

2) Low pressure setpoint allowable value of the HPCS system to be ≥ 42.5 psig.

PLANT SYSTEMS

3/4.7.3 REACTOR CORE ISOLATION COOLING SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.3 The reactor core isolation cooling (RCIC) system shall be OPERABLE with an OPERABLE flow path capable of taking suction from the suppression pool and transferring the water to the reactor pressure vessel.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3 with reactor steam dome pressure greater than 150 psig.#

ACTION:

a. With a RCIC discharge line "keep filled" pressure alarm instrumentation channnel inoperable, perform Surveillance Requirement 4.7.3.a.1 at least once per 24 hours.

b. With the RCIC system inoperable, operation may continue provided the HPCS system is OPERABLE; restore the RCIC system to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to less than or equal to 150 psig within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.7.3 The RCIC system shall be demonstrated OPERABLE:

a. At least once per 31 days by:

1. Verifying by venting at the high point vents that the system piping from the pump discharge valve to the system isolation valve is filled with water,
2. Performance of a CHANNEL FUNCTIONAL TEST of the discharge line "keep filled" pressure alarm instrumentation, and
3. Verifying that each valve, manual, power operated or automatic in the flow path that is not locked, sealed or otherwise secured in position, is in its correct position.
4. Verifying that the pump flow controller is in the correct position.

b. At least once per 92 days by verifying that the RCIC pump develops a flow of greater than or equal to 600 gpm in the test flow path with a system head corresponding to reactor vessel operating pressure when steam is being supplied to the turbine at 1000 + 20, - 80 psig.*

*The provisions of Specification 4.0.4 are not applicable provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the tests.

#See Special Test Exception 3.10.7.

SURVEILLANCE REQUIREMENTS

c. At least once per 18 months by:

1. Performing a system functional test which includes simulated automatic actuation and verifying that each automatic valve in the flow path actuates to its correct position, but may exclude actual injection of coolant into the reactor vessel.

2. Verifying that the system is capable of providing a flow of greater than or equal to 600 gpm to the reactor vessel when steam is supplied to the turbine at a pressure of 150 ± 15 psig using the test flow path.* | 5

3. Performing a CHANNEL CALIBRATION of the discharge line "keep filled" pressure alarm instrumentation and verifying the low pressure setpoint to be ≥ 62 psig. (29) allowable value

d. By demonstrating MCC-121y and the 250-volt battery and charger OPERABLE: | 18

1. At least once per 7 days by verifying that:

a) MCC-121y is energized, and has correct breaker alignment, indicated power availability from the charger and battery, and voltage on the panel with an overall voltage of greater than or equal to 250 volts.
b) The electrolyte level of each pilot cell is above the plates,
c) The pilot cell specific gravity, corrected to 77°F, is greater than or equal to 1.200, and
d) The overall battery voltage is greater than or equal to 250 volts.

2. At least once per 92 days by verifying that:

a) The voltage of each connected battery is greater than or equal to 250 volts under float charge and has not decreased more than 12 volts from the value observed during the original test,
b) The specific gravity, corrected to 77°F, of each connected cell is greater than or equal to 1.195 and has not decreased more than 0.05 from the value observed during the previous test, and
c) The electrolyte level of each connected cell is above the plates.

3. At least once per 18 months by verifying that:

a) The battery shows no visual indication of physical damage or abnormal deterioration, and
b) Battery terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material.

*The provisions of Specification 4.0.4 are not applicably provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the tests.

| 18

Add "INSERT B"

BASES

3/4.5.1 and 3/4.5.2 ECCS - OPERATING and SHUTDOWN

ECCS Division 1 consists of the low pressure core spray system, low pressure coolant injection subsystem "A" of the RHR system, and the automatic depressurization system (ADS) as actuated by ADS trip system "A". ECCS Division 2 consists of low pressure coolant injection subsystems "B"and "C" of the RHR system and the automatic depressurization system as actuated by ADS trip system "B".

The low pressure core spray (LPCS) system is provided to assure that the core is adequately cooled following a loss-of-coolant accident and provides adequate core cooling capacity for all break sizes up to and including the double-ended reactor recirculation line break, and for transients or smaller breaks following depressurization by the ADS.

The LPCS is a primary source of emergency core cooling after the reactor vessel is depressurized and a source for flooding of the core in case of accidental draining.

The surveillance requirements provide adequate assurance that the LPCS system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage to piping and to start cooling at the earliest moment.

The low pressure coolant injection (LPCI) mode of the RHR system is provided to assure that the core is adequately cooled following a loss-of-coolant accident. Three subsystems, each with one pump, provide adequate core flooding for all break sizes up to and including the double-ended reactor recirculation line break, and for transients or small breaks following depressurization by the ADS.

The surveillance requirements provide adequate assurance that the LPCI system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage to piping and to start cooling at the earliest moment.

Add "INSERT C"

ECCS Division 3 consists of the high pressure core spray system. The high pressure core spray (HPCS) system is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the reactor coolant system and loss of coolant which does not result in rapid depressurization of the reactor vessel. The HPCS system permits the reactor to be shut down while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCS system operates over a range of 1160 psid, differential pressure between reactor vessel and HPCS suction source, to 0 psid.

The capacity of the HPCS system is selected to provide the required core cooling. The HPCS pump is designed to deliver greater than or equal to 516/1550/6200 gpm at differential pressures of 1160/1130/200 psid. Water is taken from the suppression pool and injected into the reactor.

ATTACHMENT B
PROPOSED AMENDMENTS TO THE
LICENSE/TECHNICAL SPECIFICATIONS

INSERT B

The low pressure setpoint allowable value for the discharge line "keep-filled" alarm is based on the head of water between the centerline of the pump discharge and the system high point vent.

INSERT C

The low pressure setpoint allowable value for the discharge line "keep-filled" alarm is based on the head of water between the centerline of the associated pump discharge and the system high point vent.

Add "INSERT D"

ECCS-OPERATING and SHUTDOWN (Continued)

With the HPCS system inoperable, adequate core cooling is assured by the OPERABILITY of the redundant and diversified automatic depressurization system and both the LPCS and LPCI systems. In addition, the reactor core isolation cooling (RCIC) system, a system for which no credit is taken in the hazards analysis, will automatically provide makeup at reactor operating pressures on a reactor low water level condition. The HPCS out-of-service period of 14 days is based on the demonstrated OPERABILITY of redundant and diversified low pressure core cooling systems.

The surveillance requirements provide adequate assurance that the HPCS system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete functional test with reactor vessel injection requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage and to provide cooling at the earliest moment.

Upon failure of the HPCS system to function properly, if required, the automatic depressurization system (ADS) automatically causes selected safety-relief valves to open, depressurizing the reactor so that flow from the low pressure core cooling systems can enter the core in time to limit fuel cladding temperature to less than 2200°F. ADS is conservatively required to be OPERABLE whenever reactor vessel pressure exceeds 122 psig even though low pressure core cooling systems provide adequate core cooling up to 350 psig.

ADS automatically controls seven selected safety-relief valves. Six valves are required to be OPERABLE since the LOCA analysis assumes 6 ADS valves in addition to a single failure. It is therefore appropriate to permit one of the required valves to be out-of-service for up to 14 days without materially reducing system reliability.

3/4.5.3 SUPPRESSION CHAMBER

The suppression chamber is also required to be OPERABLE as part of the ECCS to ensure that a sufficient supply of water is available to the HPCS, LPCS and LPCI systems in the event of a LOCA. This limit on suppression chamber minimum water volume ensures that sufficient water is available to permit recirculation cooling flow to the core (See Figure B 3/4.6.2-1). The OPERABILITY of the suppression chamber in OPERATIONAL CONDITIONS 1, 2 or 3 is required by Specification 3.6.2.1.

Repair work might require making the suppression chamber inoperable. This specification will permit those repairs to be made and at the same time give assurance that the irradiated fuel has an adequate cooling water supply when the suppression chamber must be made inoperable in OPERATIONAL CONDITION 4 or 5.

In OPERATIONAL CONDITION 4 and 5 the suppression chamber minimum required water volume is reduced because the reactor coolant is maintained at or below 200°F. Since pressure suppression is not required below 212°F, the minimum water volume is based on NPSH, recirculation volume, vortex prevention plus a 2'-4" safety margin for conservatism.

ATTACHMENT B
PROPOSED AMENDMENTS TO THE
LICENSE/TECHNICAL SPECIFICATIONS

INSERT D

The low pressure setpoint allowable value for the discharge line "keep-filled" alarm is based on the head of water between the centerline of the pump discharge and the system high point vent.

3/4.7 PLANT SYSTEMS

BASES

3/4.7.1 CORE STANDBY COOLING SYSTEM - EQUIPMENT COOLING WATER SYSTEMS

The OPERABILITY of the core standby cooling system - equipment cooling water systems and the ultimate heat sink ensure that sufficient cooling capacity is available for continued operation of safety-related equipment during normal and accident conditions. The redundant cooling capacity of these systems, assuming a single failure, is consistent with the assumptions used in the accident conditions within acceptable limits.

3/4.7.2 CONTROL ROOM AND AUXILIARY ELECTRIC EQUIPMENT ROOM EMERGENCY FILTRATION SYSTEM

The OPERABILITY of the control room and auxiliary electric equipment room emergency filtration system ensures that the rooms will remain habitable for operations personnel during and following all design basis accident conditions. The OPERABILITY of this system in conjunction with room design provisions is based on limiting the radiation exposure to personnel occupying the rooms to 5 rem or less whole body, or its equivalent. This limitation is consistent with the requirements of General Design Criteria 19 of Appendix "A", 10 CFR Part 50. Cumulative operation of the system with the heaters OPERABLE for 10 hours over a 31 day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters.

3/4.7.3 REACTOR CORE ISOLATION COOLING SYSTEM

The reactor core isolation cooling (RCIC) system is provided to assure adequate core cooling in the event of reactor isolation from its primary heat sink and the loss of feedwater flow to the reactor vessel without requiring actuation of any of the Emergency Core Cooling System equipment. The RCIC system is conservatively required to be OPERABLE whenever reactor pressure exceeds 150 psig even though the LPCI mode of the the residual heat removal (RHR) system provides adequate core cooling up to 350 psig.

The RCIC system specifications are applicable during OPERATIONAL CONDITIONS 1, 2 and 3 when reactor vessel pressure exceeds 150 psig because RCIC is the primary non-ECCS source of core cooling when the reactor is pressurized.

With the RCIC system inoperable, adequate core cooling is assured by the OPERABILITY of the HPCS system and justifies the specified 14 day out-of-service period.

The surveillance requirements provide adequate assurance that RCICS will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation during reactor operation, a complete functional test requires reactor shutdown. Initial startup test program data may be used to determine equivalent turbine/pump capabilities between test flow path and the vessel injection flow path. The pump discharge piping is maintained full to prevent water hammer damage and to start cooling at the earliest possible moment. ← Add "INSERT E"

ATTACHMENT B
PROPOSED AMENDMENTS TO THE
LICENSE/TECHNICAL SPECIFICATIONS

INSERT E

The low pressure setpoint allowable value for the discharge line "keep-filled" alarm is based on the head of water between the centerline of the pump discharge and the system high point vent.

For Information Only, NO CHANGES

SURVEILLANCE REQUIREMENTS

4.5.1 ECCS divisions 1, 2, and 3 shall be demonstrated OPERABLE by:

a. At least once per 31 days for the LPCS, LPCI, and HPCS systems:

1. Verifying by venting at the high point vents that the system piping from the pump discharge valve to the system isolation valve is filled with water.

2. Performance of a CHANNEL FUNCTIONAL TEST of the:

a) Discharge line "keep filled" pressure alarm instrumentation, and

b) Header delta P instrumentation.

3. Verifying that each valve (manual, power-operated, or automatic,) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

4. Verifying that each ECCS corner room watertight door is closed, except during entry to and exit from the room.

b. Verifying that, when tested pursuant to Specification 4.0.5, each:

1. LPCS pump develops a flow of at least 6350 gpm against a test line pressure greater than or equal to 290 psig.

2. LPCI pump develops a flow of at least 7200 gpm against a test line pressure greater than or equal to 130 psig.

3. HPCS pump develops a flow of at least 6200 gpm against a test line pressure greater than or equal to 330 psig.

c. For the LPCS, LPCI and HPCS systems, at least once per 18 months:

1. Performing a system functional test which includes simulated automatic actuation of the system throughout its emergency operating sequence and verifying that each automatic valve in the flow path actuates to its correct position. Actual injection of coolant into the reactor vessel may be excluded from this test.

SURVEILLANCE REQUIREMENTS (Continued)

allowable value

2. Performing a CHANNEL CALIBRATION of the:

   a) Discharge line "keep filled" pressure alarm instrumentation and verifying the:

      1) High pressure setpoint and the low pressure setpoint of the:

         (a) LPCS system to be $\leq$ 500 psig and $\geq$ 55 psig, respectively.

         (b) LPCI subsystems to be $\leq$ 400 psig and $\geq$ 55 psig, respectively.

      2) Low pressure setpoint of the HPCS system to be $\geq$ 63 psig.

   Replace with "INSERT A"

   b) Header delta P instrumentation and verifying the setpoint of the:

      1) LPCS system and LPCI subsystems to be ± 1 psid.

      2) HPCS system to be 5 ± 2.0 psid greater than the normal indicated ΔP.

3. Deleted

4. Visually inspecting the ECCS corner room watertight door seals and room penetration seals and verifying no abnormal degradation, damage, or obstructions.

d. For the ADS by:

1. At least once per 31 days, performing a CHANNEL FUNCTIONAL TEST of the accumulator backup compressed gas system low pressure alarm system.

2. At least once per 18 months:

   a) Performing a system functional test which includes simulated automatic actuation of the system throughout its emergency operating sequence, but excluding actual valve actuation.

   b) Manually opening each ADS valve and observing the expected change in the indicated valve position.

   c) Performing a CHANNEL CALIBRATION of the accumulator backup compressed gas system low pressure alarm system and verifying an alarm setpoint of 500 + 40, - 0 psig on decreasing pressure.

ATTACHMENT B
PROPOSED AMENDMENTS TO THE
LICENSE/TECHNICAL SPECIFICATIONS

INSERT A

(a) LPCS system to be ≤ 500 psig and ≥ 45.5 psig, respectively.

(b) LPCI subsystem "A" to be ≤ 400 psig and ≥ 41.0 psig, respectively.

(c) LPCI subsystem "B" to be ≤ 400 psig and ≥ 38.5 psig, respectively.

(d) LPCI subsystem "C" to be ≤ 400 psig and ≥ 45.0 psig, respectively.

2) Low pressure setpoint allowable value of the HPCS system to be ≥ 42.5 psig.

PLANT SYSTEMS

3/4.7.3 REACTOR CORE ISOLATION COOLING SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.3 The reactor core isolation cooling (RCIC) system shall be OPERABLE with an OPERABLE flow path capable of taking suction from the suppression pool and transferring the water to the reactor pressure vessel.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3 with reactor steam dome pressure greater than 150 psig.#e

ACTION:

a. With a RCIC discharge line "keep filled" pressure alarm instrumentation channnel inoperable, perform Surveillance Requirement 4.7.3.a.1 at least once per 24 hours.

b. With the RCIC system inoperable, operation may continue provided the HPCS system is OPERABLE; restore the RCIC system to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to less than or equal to 150 psig within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.7.3 The RCIC system shall be demonstrated OPERABLE:

a. At least once per 31 days by:

1. Verifying by venting at the high point vents that the system piping from the pump discharge valve to the system isolation valve is filled with water,

2. Performance of a CHANNEL FUNCTIONAL TEST of the discharge line "keep filled" pressure alarm instrumentation, and

3. Verifying that each valve, manual, power operated or automatic in the flow path that is not locked, sealed or otherwise secured in position, is in its correct position.

4. Verifying that the pump flow controller is in the correct position.

b. At least once per 92 days by verifying that the RCIC pump develops a flow of greater than or equal to 600 gpm in the test flow path with a system head corresponding to reactor vessel operating pressure when steam is being supplied to the turbine at 1000 + 20, - 80 psig.*

*The provisions of Specification 4.0.4 are not applicable provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the tests.

#See Special Test Exception 3.10.7.#e

SURVEILLANCE REQUIREMENTS

c. At least once per 18 months by:

1. Performing a system functional test which includes simulated automatic actuation and verifying that each automatic valve in the flow path actuates to its correct position, but may exclude actual injection of coolant into the reactor vessel.
2. Verifying that the system is capable of providing a flow of greater than or equal to 600 gpm to the reactor vessel when steam is supplied to the turbine at a pressure of 150 ± 15 psig using the test flow path.*
3. Performing a CHANNEL CALIBRATION of the discharge line "keep filled" pressure alarm instrumentation and verifying the low pressure setpoint to be ≥ 82 psig. (29.0) (allowable value)

d. By demonstrating MCC-221y and the 250-volt Battery and charger OPERABLE:

1. At least once per 7 days by verifying that:
   a) MCC-221y is energized, and has correct breaker alignment, indicated power availability from the charger and battery, and voltage on the panel with an overall voltage of greater than or equal to 250 volts.
   b) The electrolyte level of each pilot cell is above the plates,
   c) The pilot cell specific gravity, corrected to 77°F, is greater than or equal to 1.200, and
   d) The overall battery voltage is greater than or equal to 250 volts.
2. At least once per 92 days by verifying that:
   a) The voltage of each connected battery is greater than or equal to 250 volts under float charge and has not decreased more than 12 volts from the value observed during the original test,
   b) The specific gravity, corrected to 77°F, of each connected cell is greater than or equal to 1.195 and has not decreased more than 0.05 from the value observed during the previous test, and
   c) The electrolyte level of each connected cell is above the plates.
3. At least once per 18 months by verifying that:
   a) The battery shows no visual indication of physical damage or abnormal deterioration, and
   b) Battery terminal connections are clean, tight, free of corrosion and coated with anticorrosion material.

*The provisions of Specification 4.0.4 are not applicably provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the tests.

BASES

Add "INSERT B"

3/4.5.1 and 3/4.5.2 ECCS - OPERATING and SHUTDOWN

ECCS Division 1 consists of the low pressure core spray system, low pressure coolant injection subsystem "A" of the RHR system, and the automatic depressurization system (ADS) as actuated by ADS trip system "A". ECCS Division 2 consists of low pressure coolant injection subsystems "B"and "C" of the RHR system and the automatic depressurization system as actuated by ADS trip system "B".

The low pressure core spray (LPCS) system is provided to assure that the core is adequately cooled following a loss-of-coolant accident and provides adequate core cooling capacity for all break sizes up to and including the double-ended reactor recirculation line break, and for transients or smaller breaks following depressurization by the ADS.

The LPCS is a primary source of emergency core cooling after the reactor vessel is depressurized and a source for flooding of the core in case of accidental draining.

The surveillance requirements provide adequate assurance that the LPCS system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage to piping and to start cooling at the earliest moment. ←

The low pressure coolant injection (LPCI) mode of the RHR system is provided to assure that the core is adequately cooled following a loss-of-coolant accident. Three subsystems, each with one pump, provide adequate core flooding for all break sizes up to and including the double-ended reactor recirculation line break, and for transients or small breaks following depressurization by the ADS.

The surveillance requirements provide adequate assurance that the LPCI system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete functional test requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage to piping and to start cooling at the earliest moment. ←

Add "INSERT C"

ECCS Division 3 consists of the high pressure core spray system. The high pressure core spray (HPCS) system is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the reactor coolant system and loss of coolant which does not result in rapid depressurization of the reactor vessel. The HPCS system permits the reactor to be shut down while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCS system operates over a range of 1160 psid, differential pressure between reactor vessel and HPCS suction source, to 0 psid.

The capacity of the HPCS system is selected to provide the required core cooling. The HPCS pump is designed to deliver greater than or equal to 516/1550/6200 gpm at differential pressures of 1160/1130/200 psid. Water is taken from the suppression pool and injected into the reactor.

ATTACHMENT B
PROPOSED AMENDMENTS TO THE
LICENSE/TECHNICAL SPECIFICATIONS

INSERT B

The low pressure setpoint allowable value for the discharge line "keep-filled" alarm is based on the head of water between the centerline of the pump discharge and the system high point vent.

INSERT C

The low pressure setpoint allowable value for the discharge line "keep-filled" alarm is based on the head of water between the centerline of the associated pump discharge and the system high point vent.

Add "INSERT D"

ECCS-OPERATING and SHUTDOWN (Continued)

With the HPCS system inoperable, adequate core cooling is assured by the OPERABILITY of the redundant and diversified automatic depressurization system and both the LPCS and LPCI systems. In addition, the reactor core isolation cooling (RCIC) system, a system for which no credit is taken in the hazards analysis, will automatically provide makeup at reactor operating pressures on a reactor low water level condition. The HPCS out-of-service period of 14 days is based on the demonstrated OPERABILITY of redundant and diversified low pressure core cooling systems.

The surveillance requirements provide adequate assurance that the HPCS system will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation through a test loop during reactor operation, a complete functional test with reactor vessel injection requires reactor shutdown. The pump discharge piping is maintained full to prevent water hammer damage and to provide cooling at the earliest moment.

Upon failure of the HPCS system to function properly, if required, the automatic depressurization system (ADS) automatically causes selected safety-relief valves to open, depressurizing the reactor so that flow from the low pressure core cooling systems can enter the core in time to limit fuel cladding temperature to less than 2200°F. ADS is conservatively required to be OPERABLE whenever reactor vessel pressure exceeds 122 psig even though low pressure core cooling systems provide adequate core cooling up to 350 psig.

ADS automatically controls seven selected safety-relief valves. Six valves are required to be OPERABLE since the LOCA analysis assumes 6 ADS valves in addition to a single failure. It is therefore appropriate to permit one of the required valves to be out-of-service for up to 14 days without materially reducing system reliability.

3/4.5.3 SUPPRESSION CHAMBER

The suppression chamber is also required to be OPERABLE as part of the ECCS to ensure that a sufficient supply of water is available to the HPCS, LPCS and LPCI systems in the event of a LOCA. This limit on suppression chamber minimum water volume ensures that sufficient water is available to permit recirculation cooling flow to the core (See Figure B 3/4.6.2-1). The OPERABILITY of the suppression chamber in OPERATIONAL CONDITIONS 1, 2 or 3 is required by Specification 3.6.2.1.

Repair work might require making the suppression chamber inoperable. This specification will permit those repairs to be made and at the same time give assurance that the irradiated fuel has an adequate cooling water supply when the suppression chamber must be made inoperable in OPERATIONAL CONDITION 4 or 5.

In OPERATIONAL CONDITION 4 and 5 the suppression chamber minimum required water volume is reduced because the reactor coolant is maintained at or below 200°F. Since pressure suppression is not required below 212°F, the minimum water volume is based on NPSH, recirculation volume, vortex prevention plus a 2'-4" safety margin for conservatism.

ATTACHMENT B
PROPOSED AMENDMENTS TO THE
LICENSE/TECHNICAL SPECIFICATIONS

INSERT D

The low pressure setpoint allowable value for the discharge line "keep-filled" alarm is based on the head of water between the centerline of the pump discharge and the system high point vent.

3/4.7 PLANT SYSTEMS

BASES

3/4.7.1 CORE STANDBY COOLING SYSTEM - EQUIPMENT COOLING WATER SYSTEMS

The OPERABILITY of the core standby cooling system - equipment cooling water systems and the ultimate heat sink ensure that sufficient cooling capacity is available for continued operation of safety-related equipment during normal and accident conditions. The redundant cooling capacity of these systems, assuming a single failure, is consistent with the assumptions used in the accident conditions within acceptable limits.

3/4.7.2 CONTROL ROOM AND AUXILIARY ELECTRIC EQUIPMENT ROOM EMERGENCY FILTRATION SYSTEM

The OPERABILITY of the control room and auxiliary electric equipment room emergency filtration system ensures that the rooms will remain habitable for operations personnel during and following all design basis accident conditions. The OPERABILITY of this system in conjunction with room design provisions is based on limiting the radiation exposure to personnel occupying the rooms to 5 rem or less whole body, or its equivalent. This limitation is consistent with the requirements of General Design Criteria 19 of Appendix "A", 10 CFR Part 50. Cumulative operation of the system with the heaters OPERABLE for 10 hours over a 31 day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters.

3/4.7.3 REACTOR CORE ISOLATION COOLING SYSTEM

The reactor core isolation cooling (RCIC) system is provided to assure adequate core cooling in the event of reactor isolation from its primary heat sink and the loss of feedwater flow to the reactor vessel without requiring actuation of any of the Emergency Core Cooling System equipment. The RCIC system is conservatively required to be OPERABLE whenever reactor pressure exceeds 150 psig even though the LPCI mode of the the residual heat removal (RHR) system provides adequate core cooling up to 350 psig.

The RCIC system specifications are applicable during OPERATIONAL CONDITIONS 1, 2 and 3 when reactor vessel pressure exceeds 150 psig because RCIC is the primary non-ECCS source of core cooling when the reactor is pressurized.

With the RCIC system inoperable, adequate core cooling is assured by the OPERABILITY of the HPCS system and justifies the specified 14 day out-of-service period.

The surveillance requirements provide adequate assurance that RCICS will be OPERABLE when required. Although all active components are testable and full flow can be demonstrated by recirculation during reactor operation, a complete functional test requires reactor shutdown. Initial startup test program data may be used to determine equivalent turbine/pump capabilities between test flow path and the vessel injection flow path. The pump discharge piping is maintained full to prevent water hammer damage and to start cooling at the earliest possible moment. ← Add "INSERT E"

ATTACHMENT B
PROPOSED AMENDMENTS TO THE
LICENSE/TECHNICAL SPECIFICATION

INSERT E

The low pressure setpoint allowable value for the discharge line "keep-filled" alarm is based on the head of water between the centerline of the pump discharge and the system high point vent.

ATTACHMENT C
SIGNIFICANT HAZARDS CONSIDERATION

Commonwealth Edison has evaluated the proposed Technical Specification Amendment and determined that it does not represent a significant hazards consideration. Based on the criteria for defining a significant hazards consideration established in 10 CFR 50.92, operation of LaSalle County Station Units 1 and 2 in accordance with the proposed amendment will not:

1) Involve a significant increase in the probability or consequences of an accident previously evaluated because:

   a. The proposed change in the technical specification allowable values for the ECCS and RCIC discharge line "keep filled" alarm instrument channels does not change the design bases or function of these systems as described in the technical specifications and UFSAR. An analysis performed by engineering demonstrates that the proposed allowable values are sufficient for verifying that the ECCS and RCIC pump discharge lines are full of water. In addition, setpoint calculations have been performed to verify that sufficient margin exists between the recommended calibration setpoints and the analytical limits for these instrument channels to account for all applicable instrument errors. This provides high assurance that the trip setpoints of these instrument channels will not drop below the minimum required value. The "keep filled" instrumentation is not a factor in the assumptions of any accidents, thus, the probability of analyzed accidents is not increased.

   b. The proposed technical specification amendment does not revise the configuration of the ECCS and RCIC discharge line "keep filled" instrument channels or sensing lines. The proposed setpoint allowable values and associated calibration setpoints are within the calibration ranges of the existing pressure switches. Thus, implementation of the proposed amendment does not involve any physical alterations to the plant except for the recalibration of the pressure switches to the new calibration setpoints.

   c. The ECCS and RCIC discharge line "keep filled" instrument channels only perform a monitoring function. Other than ensuring system readiness they do not perform a function important to safety. Thus, the probability of a ECCS or RCIC failure is not increased since the operation and function of the ECCS and RCIC discharge line fill systems is not affected by this change.

d. The failure of a ECCS or RCIC discharge line fill system will not go undetected by the proposed change, since water leg pump trips are annunciated in the control room. In addition, quarterly surveillances are performed on these pumps to check for degradation.

e. The ECCS and RCIC discharge line fill systems are not used to mitigate the consequences of an accident or transient. These systems are not required after the ECCS and RCIC pumps are activated.

Therefore, the proposed change does not cause an increase in the probability or consequences of an accident previously evaluated.

2) Create the possibility of a new or different kind of accident from any accident previously evaluated because:

This technical specification amendment only lowers the trip setpoint allowable values for the ECCS and RCIC discharge line "keep filled" alarm instrumentation channels. As described above, the proposed setpoint allowable values are sufficient for verifying that the ECCS and RCIC discharge lines are full of water. Thus, the probability of a water hammer occurring during system activation for a surveillance test is not increased. In addition, each instrument channel is independent from the other channels so that a failure in one channel will not propagate to another channel. Therefore, the operation of the facility in accordance with the proposed amendment does not create the possibility of a new or different kind of accident.

3) Involve a significant reduction in the margin of safety because:

The margin of safety is not affected by this amendment, because this change involves monitoring instrumentation only. The purpose of the ECCS and RCIC discharge line "keep filled" alarms is to alert the operators when a ECCS or RCIC system may not be operable due to empty or partially empty discharge lines. The proposed amendment does not alter or degrade this function, since the new setpoint allowable values are adequate for verifying that the discharge lines are full of water. Therefore the operation of the facility in accordance with the proposed amendment does not involve a significant reduction in a margin of safety.

ATTACHMENT C
SIGNIFICANT HAZARDS CONSIDERATION

Guidance has been provided in "Final Procedures and Standards on No Significant Hazards Considerations," Final Rule, 51 FR 7744, for the application of standards to license change requests for determination of the existence of significant hazards considerations. This document provides examples of amendments which are and are not considered likely to involve significant hazards considerations. These proposed amendments most closely fit the example of a change which may either result in some increase to the probability or consequences of a previously analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within all acceptance criteria with respect to the system or component specified in the standard review plan. (e.g., a change resulting from the application of a small refinement of a previously used calculational model or design method). This proposed amendment does not involve a significant relaxation of the criteria used to establish safety limits, a significant relaxation of the bases for the limiting safety system settings or a significant relaxation of the bases for the limiting conditions for operations. Therefore, based on the guidance provided in the Federal Register and the criteria established in 10 CFR 50.92(c), the proposed change does not constitute a significant hazards consideration.

ATTACHMENT D
ENVIRONMENTAL ASSESSMENT STATEMENT APPLICABILITY REVIEW

Commonwealth Edison has evaluated the proposed amendment against the criteria for identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR Part 51.21. It has been determined that the proposed changes meet the criteria for categorical exclusion as provided for under 10 CFR Part 51.22(c)(9). This conclusion has been determined because the changes requested do not pose significant hazards considerations or do not involve a significant increase in the amounts, and no significant changes in the types of any effluents that may be released off-site. Additionally, this request does not involve a significant increase in individual or cumulative occupational radiation exposure.

ATTACHMENT E

CECo NED Nuclear Design Information Transmittal (NDIT) No. EIC-93-011-2, dated 6/3/94, summary report of the calculations that determine the ECCS system "Keep Filled" Alarm Ideal Setpoint and Technical Specification Allowable Values.

CHRON# 209686

Exhibit A
ENC-QE-51.M
Revision 0
page 1 of 2

CECO NED NUCLEAR DESIGN INFORMATION TRANSMITTAL (NDIT)

■ SAFETY RELATED
□ NON-SAFETY RELATED

NDIT NO. EIC-93-011-2
PAGE 1 OF 1

SUBJECT LaSalle Station Units 1 & 2 - ECCS System "Keep Filled" Alarm Ideal Setpoint and Tech Specification Allowable Value

SENT TO (Name/Dept.) J. Abel- SEC Manager, LaSalle County Station

DISTRIBUTION

R. Shields	(1/0)	M. Cray	(1/1)	R. Ayer	(1/1)
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J. Lockwood	(1/0)	E. Seckinger	(1/1)	M. Tennyson	(1/1)
G. Wagner	(1/0)	J. Miller	(1/1)		

DESCRIPTION OF NUCLEAR DESIGN INFORMATION AND PURPOSE OF ISSUANCE

At the request of Gerald Swihart (Reg. Assurance, LaSalle Station), I&C has evaluated the errors associated with the ECCS "Keep Filled" Alarm System Instrumentation. The purpose of this evaluation was to determine a new Analytical Limit, new setpoint, and an associated Tech Spec Allowable Value for these loops. This analysis applies at normal operating conditions, for the following instruments;

LPCI - A:	1(2)-E12-N512-A	1(2)-E21-R500
LPCI - B:	1(2)-E12-N512-B	1(2)-E12-R510
LPCI - C:	1(2)-E12-N512-C	1(2)-E12-R510
LPCS:	1(2)-E21-N005-B	1(2)-E21-R500
HPCS:	1(2)-E22-N013	1(2)-E22-R500
RCIC:	1(2)-E51-N034	1(2)-E51-R501

This revision incorporates a set of recommended Published Tech. Spec. Allowable Values referenced to the pump discharge nozzle centerline.

This NDIT transmits the attached error analysis summary report which provides 1) the detailed summary of the loop accuracy calculation, 2) associated Measurement & Test Equipment, used for normal loop calibration, 3) the assumptions, references and design inputs that provide input to the calculation.

V. R. SHAH (S&S)	D. L. RAHN (S&S)	E. A. Kaczmarski
Preparer (PRINT)	Reviewer (PRINT)	Approver (PRINT)
05/31/94.	David L. Rahn 06/03/94	6-3-94
Signature/Date	Signature/Date	Signature/Date

STATUS OF INFORMATION: ■ APPROVED FOR USE □ PRELIMINARY

With respect to third party use, CECo does not assume any obligations to the third party as to the accuracy, completeness or non-infringing nature of such information.

NDIT SOURCE DOCUMENT(S)

NED-I-EIC-0153 Rev. 1	NED-I-EIC-0156 Rev. 1
NED-I-EIC-0154 Rev. 1	NED-I-EIC-0157 Rev. 1
NED-I-EIC-0155 Rev. 1	NED-I-EIC-0158 Rev. 1

LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

SYSTEM	CALCULATION NO.	INSTRUMENT NO.	
LPCI - A	NED-I-EIC-0153 (Rev. 1)	1(2)-E12-N512-A	1(2)-E21-R500
LPCI - B	NED-I-EIC-0154 (Rev. 1)	1(2)-E12-N512-B	1(2)-E12-R510
LPCI - C	NED-I-EIC-0155 (Rev. 1)	1(2)-E12-N512-C	1(2)-E12-R510
LPCS	NED-I-EIC-0156 (Rev. 1)	1(2)-E21-N005-B	1(2)-E21-R500
HPCS	NED-I-EIC-0157 (Rev. 1)	1(2)-E22-N013	1(2)-E22-R500
RCIC	NED-I-EIC-0158 (Rev. 1)	1(2)-E51-N034	1(2)-E51-R501

The results provided in the table "A" should be included in the LaSalle County Station Surveillance Procedures for the ECCS "Keep Filled Alarm" pressure switches. This results includes the head correction associated with the ECCS "Keep Filled Alarm" System.

TABLE "A"

ECCS "Keep Filled" Alarm System	Calculated Analytical Limit at the Switch (PSIG)	Recommended Tech Spec Allowable Value at the Switch (PSIG)	Corresponding Tech Spec Allowable Value at the Pump Discharge Centerline (PSIG)	Recommended Calibration Setpoint at the Switch (PSIG)	Calculated Discharge Pressure Indication Error (PSIG)	Recommended Acceptance Criteria for Pump Discharge Pressure Operating Surveillance (PSIG)
LPCI - A	41.7	42.1	41.0	48.3 ↓ ±1.5	±5.818	56.0
LPCI - B	38.4	38.8	38.5	45.0 ↓ ±1.5	±5.818	57.0
LPCI - C	45.4	45.8	45.0	52.0 ↓ ±1.5	±5.818	57.0
LPCS	44.7	45.1	45.5	51.3 ↓ ±1.5	±5.818	56.0
HPCS	42.2	42.8	42.5	51.7 ↓ ±1.5	±5.818	57.0
RCIC	28.9	29.5	29.0	38.1 ↓ ±1.0	+5.818	43.1

LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

NED CALCULATION NO:	NED-I-EIC-0153, Rev. 1		
PROCEDURE:	LIS-RH-1(2)16-A (Rev. 0)		LOS-LP-Q1 (Rev. 22)
TITLE:	RHR Pump 1(2)A Discharge High/Low Pressure Refuel Calibration		Low Pressure Core Spray System Inservice Test For Operating Conditions 1, 2, 3, 4, and 5.
INSTRUMENT NO:	1(2)-E12-N512-A	1(2)-E21-R500	
MANUFACTURER:	STATIC-O-RING	ASHCROFT	
MODEL NO:	4N6-B45-NX-C1A-JJTTX7	1279	

CALCULATED ANALYTICAL LIMIT: 41.7 PSIG (At the Switch)

PRESSURE INDICATOR SWITCH
(2)-E12-N512A

	EXISTING LIS VALUE	**RECOMMENDED LIS VALUE**
CALIBRATED RANGE:	4 to 75 PSIG	4 to 75 PSIG
CALIBRATED TOLERANCE:	± 1.5 PSIG	± 1.5 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25% of calibration frequency	25% of calibration frequency
CALIBRATION SETPOINT:	58.5 PSIG ↓ (Does not Include Head Correction)	48.3 PSIG ↓ (At the Switch) 47.0 PSIG ↓ (At the Pump)
TECH. SPEC. ALLOWABLE VALUE:	55 PSIG (Does not Include Head Correction)	42.1 PSIG (At the Switch) 41.0 PSIG (At the Pump)

DISCHARGE PRESSURE INDICATOR
1(2)-E21-R500

	EXISTING LOS VALUE
CALIBRATED RANGE:	0 to 100 PSIG
CALIBRATED TOLERANCE:	± 1.0 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months))
CALIB. FREQ. LATE FACTOR:	25% of calibration frequency

CALCULATED DISCHARGE PRESSURE INDICATION ERROR: ±5.818 PSIG

CALCULATED MINIMUM ACCEPTANCE CRITERIA FOR PUMP DISCHARGE PRESSURE: 56.0 PSIG

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LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

(CONTINUED FROM PREVIOUS PAGE)

NED CALCULATION NO:	NED-I-EIC-0153, Rev. 1	
PROCEDURE:	LIS-RH-1(2)16-A (Rev. 2)	LOS-LP-Q1 (Rev. 22)
TITLE:	RHR Pump 1(2)A Discharge High/Low Pressure Refuel Calibration	Low Pressure Core Spray System Inservice Test For Operating Conditions 1, 2, 3, 4, and 5.

MEASUREMENT & TEST EQUIPMENT (M&TE) REQUIREMENTS

ANALOG PRESSURE GAUGE

1(2)-E12-N-512-A

Manufacturer:	Heise	Mensor
Model	CMM	2455
Range:	0 to 100 PSIG	0 to 100 PSIG
Scale Graduation:	0.1 PSIG	0.1 PSIG
Calibration Accuracy:	± 0.2 PSIG	± 0.2 PSIG

1(2)-E21-R500

Manufacturer:	Heise	Mensor
Model	CMM	2455
Range:	0 to 200 PSIG	0 to 200 PSIG
Scale Graduation:	0.2 PSIG	0.2 PSIG
Calibration Accuracy:	± 0.4 PSIG	± 0.4 PSIG

LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

NED CALCULATION NO:	NED-I-EIC-0154, Rev. 1		
PROCEDURE:	LIS-RH-1(2)16-B (Rev. 0)		LOS-RH-Q1 (Rev. 23)
TITLE:	RHR Pumps 1(2)B and C Discharge High/Low Pressure Refuel Calibration		RHR B&C Service Water System Operability and Inservice Test .
INSTRUMENT NO:	1(2)-E12-N512-B	1(2)-E12-R510	
MANUFACTURER:	STATIC-O-RING	ASHCROFT	
MODEL NO:	4N6-B45-NX-C1A-JJTTX7	1279	

CALCULATED ANALYTICAL LIMIT: 38.4 PSIG (At the Swittch)

PRESSURE INDICATOR SWITCH 1(2)-E12-N512B

	EXISTING LIS VALUE	RECOMMENDED LIS VALUE
CALIBRATED RANGE:	4 to 75 PSIG	4 to 75 PSIG
CALIBRATED TOLERANCE:	± 1.5 PSIG	± 1.5 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25% of calibration frequency	25% of calibration frequency
CALIBRATION SETPOINT:	58.5 PSIG ↓ (Does not Include Head Correction)	45.0 PSIG ↓ (At the Switch) 44.6 PSIG ↓ (At the Pump)
TECH. SPEC. ALLOWABLE VALUE:	55 PSIG (Does not Include Head Correction)	38.8 PSIG (At the Switch) 38.5 PSIG (At the Pump)

DISCHARGE PRESSURE INDICATOR 1(2)-E12-R510

	EXISTING LOS VALUE
CALIBRATED RANGE:	0 to 100 PSIG
CALIBRATED TOLERANCE:	± 1.0 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25% of calibration frequency

CALCULATED DISCHARGE PRESSURE INDICATION ERROR: ±5.818 PSIG

CALCULATED MINIMUM ACCEPTANCE CRITERIA FOR PUMP DISCHARGE PRESSURE: 57.0 PSIG

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LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

(CONTINUED FROM PREVIOUS PAGE)

NED CALCULATION NO: NED-I-EIC-0154, Rev. 1

PROCEDURE:	LIS-RH-1(2)16-B (Rev. 0)	LOS-RH-Q1 (Rev. 23)
TITLE:	RHR Pumps 1(2)B and C Discharge High/Low Pressure Refuel Calibration	RHR B&C Service Water System Operability and Inservice Test .

MEASUREMENT & TEST EQUIPMENT (M&TE) REQUIREMENTS

ANALOG PRESSURE GAUGE

1(2)-E12-N512-B

Manufacturer:	Heise	Mensor
Model	CMM	2455
Range:	0 to 100 PSIG	0 to 100 PSIG
Scale Graduation:	0.1 PSIG	0.1 PSIG
Calibration Accuracy:	± 0.2 PSIG	± 0.2 PSIG

1(2)-E12-R510

Manufacturer:	Heise	Mensor
Model	CMM	2455
Range:	0 to 200 PSIG	0 to 200 PSIG
Scale Graduation:	0.2 PSIG	0.2 PSIG
Calibration Accuracy:	± 0.4 PSIG	± 0.4 PSIG

LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

NED CALCULATION NO:	NED-I-EIC-0155, Rev. 1		
PROCEDURE:	LIS-RH-1(2)16-B (Rev. 0)		LOS-RH-Q1 (Rev. 23)
TITLE:	RHR Pumps 1(2)B and C Discharge High/Low Pressure Refuel Calibration		RHR B&C Service Water System Operability and Inservice Test .
INSTRUMENT NO:	1(2)-E12-N512-C	1(2)-E12-R510	
MANUFACTURER:	STATIC-O-RING	ASHCROFT	
MODEL NO:	4N6-B45-NX-C1A-JJTTX7	1279	

CALCULATED ANALYTICAL LIMIT: 45.4 PSIG (At the Switch)

PRESSURE INDICATOR SWITCH
1(2)-E12-N512C

	EXISTING LIS VALUE	RECOMMENDED LIS VALUE
CALIBRATED RANGE:	4 to 75 PSIG	4 to 75 PSIG
CALIBRATED TOLERANCE:	± 1.5 PSIG	± 1.5 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25 % of calibration frequency	25 % of calibration frequency
CALIBRATION SETPOINT:	58.5 PSIG ↓ (Does not Include Head Correction)	52.0 PSIG ↓ (At the Switch) 50.8 PSIG ↓ (At the Pump)
TECH. SPEC. ALLOWABLE VALUE:	55 PSIG (Does not Include Head Correction)	45.8 PSIG (At the Switch) 45.0 PSIG (At the Pump)

DISCHARGE PRESSURE INDICATOR
1(2)-E12-R510

	EXISTING LOS VALUE
CALIBRATED RANGE:	0 to 100 PSIG
CALIBRATED TOLERANCE:	± 1.0 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25 % of calibration frequency

CALCULATED DISCHARGE PRESSURE INDICATION ERROR: ±5.818 PSIG

CALCULATED MINIMUM ACCEPTANCE CRITERIA FOR PUMP DISCHARGE PRESSURE: 57.0 PSIG

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LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

(CONTINUED FROM PREVIOUS PAGE)

NED CALCULATION NO: NED-I-EIC-0155, Rev. 1

PROCEDURE:	LIS-RH-1(2)16-B (Rev. 0)	LOS-RH-Q1 (Rev. 23)
TITLE:	RHR Pumps 1(2)B and C Discharge High/Low Pressure Refuel Calibration	RHR B&C Service Water System Operability and Inservice Test .

MEASUREMENT & TEST EQUIPMENT (M&TE) REQUIREMENTS

ANALOG PRESSURE GAUGE

1(2)-E12-N512-C

Manufacturer:	Heise	Mensor
Model	CMM	2455
Range:	0 to 100 PSIG	0 to 100 PSIG
Scale Graduation:	0.1 PSIG	0.1 PSIG
Calibration Accuracy:	± 0.2 PSIG	± 0.2 PSIG

1(2)-E12-R510

Manufacturer:	Heise	Mensor
Model	CMM	2455
Range:	0 to 200 PSIG	0 to 200 PSIG
Scale Graduation:	0.2 PSIG	0.2 PSIG
Calibration Accuracy:	± 0 4 PSIG	± 0.4 PSIG

LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

NED CALCULATION NO:	NED-I-EIC-0156, Rev. 1		
PROCEDURE:	LIS-LP-1(2)08 (Rev. 2)		LOS-LP-Q1 (Rev. 22)
TITLE:	LPCS Pumps High/Low Discharge Pressure Alarm Refuel Calibration		Low Pressure Core Spray System Inservice Test For Operating Conditions 1, 2, 3, 4, and 5.
INSTRUMENT NO:	1(2)-E21-N005-B	1(2)-E21-R500	
MANUFACTURER:	STATIC-O-RING	ASHCROFT	
MODEL NO:	4N6-B45-NX-C1A-JJTTX7	1279	

CALCULATED ANALYTICAL LIMIT: 44.7 PSIG (At the Switch)

PRESSURE INDICATOR SWITCH
1(2)-E21-N005-B

	EXISTING LIS VALUE	RECOMMENDED LIS VALUE
CALIBRATED RANGE:	4 to 75 PSIG	4 to 75 PSIG
CALIBRATED TOLERANCE:	± 1.5 PSIG	± 1.5 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25% of calibration frequency	25% of calibration frequency
CALIBRATION SETPOINT:	58.5 PSIG ↓ (Does not Include Head Correction)	51.3 PSIG ↓ (At the Switch) 51.6 PSIG ↓ (At the Pump)
TECH. SPEC. ALLOWABLE VALUE:	55 PSIG (Does not Include Head Correction)	45.1 PSIG (At the Switch) 45.5 PSIG (At the Pump)

DISCHARGE PRESSURE INDICATOR
1(2)-E21-R500

	EXISTING LOS VALUE
CALIBRATED RANGE:	0 to 100 PSIG
CALIBRATED TOLERANCE:	± 1.0 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25% of calibration frequency

CALCULATED DISCHARGE PRESSURE INDICATION ERROR: ±5.818 PSIG

CALCULATED MINIMUM ACCEPTANCE CRITERIA FOR PUMP DISCHARGE PRESSURE: 56.0 PSIG

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LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

(CONTINUED FROM PREVIOUS PAGE)

NED CALCULATION NO: NED-I-EIC-0156, Rev. 1

PROCEDURE:	LIS-LP-1(2)08 (Rev. 2)	LOS-LP-Q1 (Rev. 22)
TITLE:	LPCS Pumps High/Low Discharge Pressure Alarm Refuel Calibration	Low Pressure Core Spray System Inservice Test For Operating Conditions 1, 2, 3, 4, and 5.

MEASUREMENT & TEST EQUIPMENT (M&TE) REQUIREMENTS

ANALOG PRESSURE GAUGE

1(2)-E21-N005-B

Manufacturer:	Heise	Mensor
Model	CMM	2455
Range:	0 to 100 PSIG	0 to 100 PSIG
Scale Graduation:	0.1 PSIG	0.1 PSIG
Calibration Accuracy:	± 0.2 PSIG	± 0.2 PSIG

1(2)-E21-R500

Manufacturer:	Heise	Mensor
Model	CMM	2455
Range:	0 to 200 PSIG	0 to 200 PSIG
Scale Graduation:	0.2 PSIG	0.2 PSIG
Calibration Accuracy:	± 0.4 PSIG	± 0.4 PSIG

LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

NED CALCULATION NO:	NED-I-EIC-0157, Rev. 1		
PROCEDURE:	LIS-HP-1(2)09 (Rev. 2)		LOS-HP-Q1 (Rev. 26)
TITLE:	HPCS Low Water Leg Line Pressure Calibration		HPCS System Operability and Inservice Test.
INSTRUMENT NO:	1(2)-E22-N013	1(2)-E22-R500	
MANUFACTURER:	BARTON	ASHCROFT	
MODEL NO:	288A	1279	

CALCULATED ANALYTICAL LIMIT: 42.2 PSIG (At the Switch)

PRESSURE INDICATOR SWITCH
1(2)-E22-N013

	EXISTING LIS VALUE	RECOMMENDED LIS VALUE
CALIBRATED RANGE:	0 to 100 PSIG	0 to 100 PSIG
CALIBRATED TOLERANCE:	± 1.5 PSIG	± 1.5 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25% of calibration frequency	25% of calibration frequency
CALIBRATION SETPOINT:	68.25 PSIG ↓ (Includes 3.75 PSIG of Head Correction)	51.7 PSIG ↓ (At the Switch) 51.1 PSIG ↓ (At the Pump)
TECH. SPEC. ALLOWABLE VALUE:	66.75 PSIG (Includes 3.75 PSIG of Head Correction)	42.8 PSIG (At the Switch) 42.5 PSIG (At the Pump)

DISCHARGE PRESSURE INDICATOR
1(2)-E22-R500

	EXISTING LOS VALUE
CALIBRATED RANGE:	0 to 100 PSIG
CALIBRATED TOLERANCE:	± 1.0 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25% of calibration frequency

CALCULATED DISCHARGE PRESSURE INDICATION ERROR: ±5.818 PSIG

CALCULATED MINIMUM ACCEPTANCE CRITERIA FOR PUMP DISCHARGE PRESSURE: 57.0 PSIG

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LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

(CONTINUED FROM PREVIOUS PAGE)

NED CALCULATION NO: NED-I-EIC-0157, Rev. 1

PROCEDURE:	LIS-HP-1(2)09 (Rev. 2)	LOS-HP-Q1 (Rev. 26)
TITLE:	HPCS Low Water Leg Line Pressure Calibration	HPCS System Operability and Inservice Test.

MEASUREMENT & TEST EQUIPMENT (M&TE) REQUIREMENTS

ANALOG PRESSURE GAUGE

1(2)-E22-N013 & 1(2)-E22-R500

Manufacturer:	Heise	Mensor
Model	CMM	2455
Range:	0 to 200 PSIG	0 to 200 PSIG
Scale Graduation:	0.2 PSIG	0.2 PSIG
Calibration Accuracy:	± 0.4 PSIG	±0.4 PSIG

LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

NED CALCULATION NO:	NED-I-EIC-0158, Rev. 1		
PROCEDURE:	LIS-RI-1(2)13 (Rev. 0)		LOS-RI-Q1 (Rev. 21)
TITLE:	RCIC Pump Water Leg Line Low Pressure Calibration		RCIC System Pump Operability and Valve Inservice Tests in Conditions 1, 2, and 3.
INSTRUMENT NO:	1(2)-E51-N034	1(2)-E51-R501	
MANUFACTURER:	ROBERTSHAW	ASHCROFT	
MODEL NO:	SP-222-C09	1279	

CALCULATED ANALYTICAL LIMIT: 28.9 PSIG (At the Switch)

PRESSURE INDICATOR SWITCH
1(2)-E51-N034

	EXISTING LIS VALUE	RECOMMENDED LIS VALUE
CALIBRATED RANGE:	0 to 100 PSIG	0 to 100 PSIG
CALIBRATED TOLERANCE:	± 1.0 PSIG	± 1.0 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25% of calibration frequency	25% of calibration frequency
CALIBRATION SETPOINT:	63 PSIG ↓ (Does not Include Head Correction.)	38.1 PSIG ↓ (At the Switch) 37.5 PSIG ↓ (At the Pump)
TECH. SPEC. ALLOWABLE VALUE:	62 PSIG (Does not Include Head Correction.)	29.5 PSIG (At the Switch) **29.0 PSIG (At the Pump)**

DISCHARGE PRESSURE INDICATOR
1(2)-E51-R501

	EXISTING LOS VALUE
CALIBRATED RANGE:	0 to 100 PSIG
CALIBRATED TOLERANCE:	± 1.0 PSIG
CALIBRATION FREQUENCY:	Every Refueling Outage (18 Months)
CALIB. FREQ. LATE FACTOR:	25% of calibration frequency
CALCULATED DISCHARGE PRESSURE INDICATION ERROR:	±5.818 PSIG
CALCULATED MINIMUM ACCEPTANCE CRITERIA FOR PUMP DISCHARGE PRESSURE:	43.1 PSIG

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LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

(CONTINUED FROM PREVIOUS PAGE)

NED CALCULATION NO:	NED-I-EIC-0158, Rev. 1	
PROCEDURE:	LIS-RI-1(2)13 (Rev. 0)	LOS-RI-Q1 (Rev. 21)
TITLE:	RCIC Pump Water Leg Line Low Pressure Calibration	RCIC System Pump Operability and Valve Inservice Tests in Conditions 1, 2, and 3.

MEASUREMENT & TEST EQUIPMENT (M&TE) REQUIREMENTS

ANALOG PRESSURE GAUGE

1(2)-E51-N034 & 1(2)-E51-R501

Manufacturer:	Heise	Mensor
Model	CMM	2455
Range:	0 to 200 PSIG	0 to 200 PSIG
Scale Graduation:	0.2 PSIG	0.2 PSIG
Calibration Accuracy:	± 0.4 PSIG	±0.4 PSIG

LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

ERROR ANALYSIS REFERENCES

1. ANSI/ISA-S67.04-1988, "Setpoints for Nuclear Safety Related Instrumentation."

2. TID-E/I&C-20, "Basis for Analysis of Instrument Channel Setpoint Error & Loop Accuracy", Rev. 0, dated 4/6/92.

3. TID-E/I&C-10, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy", Rev. 0, dated 4/6/92.

4. LaSalle Station Instrument Surveillance Procedures:

   LPCI-A

   LIS-RH-116A, 216A, Rev. 0, dated January 10, 1992, "Unit 1(2) RHR Pumps 1(2)A Discharge High/Low Pressure Refuel Calibration."

   LOS-LP-Q1, Rev. 22, dated August 18, 1992, "Unit 1(2) Low Pressure Core Spray System Inservice Test for Operating Conditions 1, 2, 3, 4 and 5."

   LPCI-B & LPCI-C

   LIS-RH-1(2)16B, Rev. 0, dated January 10, 1992, "Unit 1(2) RHR Pumps 1(2)B and C Discharge High/Low Pressure Refuel Calibration."

   LOS-RH-Q1, Rev. 23, dated December 11, 1991, "Unit 1(2) B RHR & C RHR Service Water System Operability and Inservice Test."

   LPCS

   LIS-LP-1(2)08, Rev. 2, dated November 1, 1990, "Unit 1(2) LPCS Pumps High/Low Discharge Pressure Alarm Refuel Calibration."

   LOS-LP-Q1, Rev. 22, dated August 18, 1992, "Unit 1(2) Low Pressure Core Spray System Inservice Test for Operating Conditions 1, 2, 3, 4 and 5."

   HPCS

   LIS-HP-1(2)09, (Rev.2), dated October 29, 1991, "Unit 1(2) HPCS Low Water Leg Line Pressure Calibration"

   LOS-HP-Q1, Rev. 26, dated January 30, 1992, "Unit 1(2) High Pressure Core Spray System Operability And Inservice Test."

   RCIC

   LIS-RI-1(2)13, Rev. 0, "Unit 1(2) RCIC Pump Water Leg Line Low Pressure Calibration."

   LOS-RI-Q3, Rev. 21, dated April 1, 1992, "Reactor Core Isolation Cooling (RCIC) System Pump Operability And Valve Inservice Tests In Conditions 1,2, and 3."

5. SOR Inc., Form 216, Revised 3/90.

6. ITT Barton Product Bulletin 288A/289A-4, 1987

7. Acragage Corp., SP-200 Series Pressure Switch Bulletin Q-3412A, dated 8/90.

LASALLE STATION - UNIT 1 & 2
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ERROR ANALYSIS REFERENCES (continued)

8. Ashcroft Pressure Gauges, Bulletin DU-1, Rev. 3/80.

9. LaSalle County Station Updated Final Safety Analysis Report, "Chapter 3.11, Environmental Design of Mechanical and Electrical Equipment", Rev.3, April 1987.

11. LaSalle County Station Technical Specification, Amendment No. 68, dated 07/19/89, Page 3/4 0-2, "Surveillance Requirements, Paragraph 4.0.2"

14. ASHCROFT Pressure Gauge, Bulletin DU-1, dated 12/91.

15. ASME Steam Tables dated 1967, provides the following conversion from Ft. of W.C. to PSIG.

Ft. Of W.C. X 0.43352 = PSIG

16. Commonwealth Edison Co., "Report of Investigation of Static-O-Ring Differential Pressure Switches, LaSalle County Station", Section 3, "SOR Differential Switch Evaluation", dated 08/01/86

17. Sargent & Lundy single line piping drawing depicting "as built" field arrangements

	Drwg #	Sht#	Revision	Dated	Drwg #	Sht#	Revision	Dated
•	M-839	10	AC	3/26/93	M-939	10	AD	5/15/92
•	M-839	12	AF	7/29/91	M-939	12	Y	7/13/89
•	M-839	11	AR	9/21/88	M-939	11	AD	7/13/88
•	M-837	3	AJ	5/27/93	M-937	3	P	4/14/89
•	M-838	2	AJ	2/14/93	M-938	2	AC	6/24/92
•	M-844	4	AM	5/27/93	M-944	4	W	7/22/92

LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
IDEAL SETPOINT AND TECH SPEC ALLOWABLE VALUE

ERROR ANALYSIS DESIGN INPUTS

1. Elevation Measurements for ECCS "Keep Filled Alarm" Pressure Switches and system High Points, dated January 27 & 28, 1987 by Mr. D. Lyon and Mr. R. Rohrer (Design Input 1 has been used for System High Point Elevation Only).

2. Trend Data as follows,

   LOS-LP-Q1, of Quarterly Inspection Results for pump differential pressure, taken 6/21/88 through 8/17/92 for 1E21-C002 and 7/12/88 through 10/13/92 for 2E21-C002.

   LOS-RH-Q1, of Quarterly Inspection Results for pump differential pressure, taken 5/26/88 through 8/10/92 for 1E12-C003 and 7/20/88 through 10/20/92 for 2E12-C003.

   LOS-HP-Q1, of Quarterly Inspection Results for pump differential pressure, taken 10/3/88 through 8/31/92 for 1E22-C003 and 8/19/88 through 9/29/92 for 2E22-C003.

   LOS-RI-Q3-1(2)A/Q5-1(2)A, of Quarterly Inspection Results for pump differential pressure, taken 7/16/88 through 8/7/92 for 1E51-C003 and 7/29/88 through 9/11/92 for 2E51-C003.

3. Record of Telephone Conversation between V. R. Shah of Signals & Safeguards, Inc. and D. Spencer & M. Tennyson of LaSalle Station Tech Staff Department regarding "Keeping track of ambient temperature of reactor building" dated 1/07/93.

4. A Facsimile from Mr. Bob Davidson of SOR, Inc. to V. Shah of Signals & Safeguards, Inc., transmitting the SOR Pressure Switches "Temperature Influence Test Results", dated 01/06/93.

5. The following printed data sheets from Stone & Webster engineering Corp. Instrument Database Program for LaSalle County Station.

1(2)-E12-N512-A	dated 12/4/92	1(2)-E21-R500	dated 12/4/92
1(2)-E12-N512-B	dated 12/4/92	1(2)-E12-R510	dated 12/4/92
1(2)-E12-N512-C	dated 12/4/92.	1(2)-E12-R510	dated 12/4/92
1(2)-E21-N005-B	dated 12/4/92.	1(2)-E21-R500	dated 12/4/92
1(2)-E22-N013	dated 12/4/92.	1(2)-E22-R500	dated 12/4/92
1(2)-E51-N034	dated 12/4/92.	1(2)-E51-R501	dated 12/4/92

6. Basic Statistics: A Modern Approach by Morris Hamburg, Published by Harcourt Bruce Jovanovich, Inc., 1974, Provides the formula 3.9 for sample standard deviation on page 64.

LASALLE STATION - UNIT 1 & 2
ECCS SYSTEM "KEEP FILLED" ALARM
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ERROR ANALYSIS ASSUMPTIONS

1. Published instrument and M&TE vendor specifications are considered to be 2 sigma values unless specific information is available to indicate otherwise.

2. Only normal environmental conditions have been considered unless specifically identified. Temperature, radiation and humidity errors, when available from the manufacturer, were evaluated with respect to the normal conditions specified in the LaSalle Station EQ zones. The EQ zone requirements for each instrument was obtained from Design Input 5 and the LaSalle Station EQ Zone maps (Reference 11). Seismic Errors have not been evaluated, as seismic events are not considered under normal operating conditions.

3. Temperature, humidity and pressure errors have been incorporated when provided by the manufacturer. Otherwise, these errors are assumed to be included within the manufacturer's reference accuracy specification.

4. Drift error has been assumed to be 1% of span per year, unless specified otherwise by the manufacturer. The calculated drift error will be adjusted for surveillance intervals of greater or lesser length based on calibration frequency.

5. Head corrections have been evaluated and incorporated in this study where applicable. Tap and mounting elevations were obtained from Design Input 5. Head corrections derived from walkdown data have been used in the calculation. Density corrections have been incorporated into the specific instrument head correction using the assumed minimum average ambient temperature of 85°F. (Design Input 3)

6. The only temperature induced M&TE errors that were evaluated were those specified by the manufacturer for a specific model number. This methodology used the most conservative error evaluation by considering the full range of ambient temperature change as specified for the applicable EQ zone.

   It is assumed that the M&TE listed is calibrated to the required manufacture's recommendations & within the manufacturer's required environmental conditions. Temperature related errors are based on the difference between the manufacture's special calibration temperature and the worst case temperature at which the device is used.

7. Instrument reference accuracy was obtained from the published manufacturers' accuracy specifications.

8. The use of particular M&TE as specified in the applicable LIS or by LaSalle IM Department was assumed even though the specified M&TE scale units did not always exactly match the LIS data sheet engineering units. It has been assumed that the IM using the M&TE would make correct and accurate conversions where necessary.

9. The following assumption is made with regard to M&TE accuracy:

   - Pressure gauges: A value equal to 2 times the manufacturer's specified reference accuracy was assumed to be a 2-sigma value under plant operating conditions.

10. Evaluation of M&TE errors is based on the assumption that the test equipment listed is used. Use of test equipment less accurate than that previously listed will require evaluation of the effect upon the calculation results.

11. Process measurement errors for normal operating conditions were assumed to include only head correction.

12. Instrument sensing lines are assumed to be cold and dead-ended. Therefore, process fluid temperature in contact with the instrument is assumed to be at ambient temperature.

LASALLE STATION - UNIT 1 & 2
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ERROR ANALYSIS ASSUMPTIONS (continued)

13. Radiation induced errors associated with normal environments have been incorporated when provided by the manufacturer. Otherwise, these errors are assumed to be small and capable of being adjusted out each time the instrument is re-calibrated. Therefore, unless specifically published by the equipment vendor, the normal radiation errors can be assumed to be included within the instrument drift related errors.

14. Calibration Tolerance was obtained from the associated LIS calibration data sheet.

15. Based on Assumption 6, it is assumed that the calibration standard accuracy error of M&TE is negligible with respect to the other error terms.

16. When determining new calibration setpoints, the margin (MAR) that accounts for unknown component or loop uncertainties is calculated as 0.5% of the process measurement span.

17. Since cold water has a higher density than hot water, for conservatism, the analytical limit is calculated at 39.2°F.

18. When the instrument location is not in a designated EQ Zone, the environmental normal operating conditions are assumed to be a temperature range of 40° to 150°F, pressure of 14.7 PSIA, radiation of ,1.0 x 10^4 (TID over 40 years) and a humidity of 20 to 90%.