ENCLOSURE 4

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
NRC DOCKET NOS. 50-325 AND 50-324
OPERATING LICENSE NOS. DPR-71 AND DPR-62
REQUEST FOR LICENSE AMENDMENTS
REACTOR COOLANT SYSTEM CONDUCTIVITY

PAGE CHANGE INSTRUCTIONS UNIT 1	
Removed page	Inserted page
3/4 4-7	3/4 4-7
3/4 4-9	3/4 4-9
B 3/4 4-3	B 3/4 4-3
B 3/4 4-4	B 3/4 4-4

PAGE CHANGE INSTRUCTIONS UNIT 2	
Removed page	Inserted page
3/4 4-7	3/4 4-7
3/4 4-9	3/4 4-9
B 3/4 4-3	B 3/4 4-3
B 3/4 4-4	B 3/4 4-4

ENCLOSURE 5

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
NRC DOCKET NOS. 50-325 AND 50-324
OPERATING LICENSE NOS. DPR-71 AND DPR-62
REQUEST FOR LICENSE AMENDMENTS
REACTOR COOLANT SYSTEM CONDUCTIVITY

MARKED-UP TECHNICAL SPECIFICATION PAGES - UNIT 1

3/4.4.4 CHEMISTRY

LIMITING CONDITION FOR OPERATION

3.4.4 The chemistry of the reactor coolant system shall be maintained within the limits specified in Table 3.4.4-1.

APPLICABILITY: ~~At all times.~~ OPERATIONAL CONDITIONS 1, 2, 3, 4, and 5.*

ACTION:

a. In OPERATIONAL CONDITION 1, 2, and 3:

1. With the conductivity or chloride concentration exceeding the limits specified in Table 3.4.4-1, but less than 10 µmho/cm at 25°C and less than 0.5 ppm, respectively, operation may continue for up to 24 hours and this condition need not be reported to the Commission provided that operation under these conditions shall not exceed 336 hours per year. The provisions of Specification 3.0.4 are not applicable.

2. With the conductivity or chloride concentration exceeding the limits specified in Table 3.4.4-1 for more than 24 hours during one continuous time interval or with the conductivity exceeding 10 µmho/cm at 25°C or chloride exceeding 0.5 ppm, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. ~~At all other times~~ In OPERATIONAL CONDITIONS 4 and 5* with the conductivity and/or chloride concentration of the reactor coolant in excess of the limit specified in Table 3.4.4-1, restore the conductivity and/or chloride concentration to within the limit within 48 hours.

*Except during planned chemical decontamination activities (with the reactor vessel defueled).

FOR INFORMATION ONLY

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS

4.4.4 The reactor coolant shall be determined to be within the specified chemistry limit by:

a. Analyzing a sample of the reactor coolant for conductivity and chlorides at least once per 72 hours, and

b. Continously recording the conductivity of the reactor coolant, or

c. Analyzing a sample of the reactor coolant for conductivity at least once per 24 hours when all of the continuous recording conductivity monitors are inoperable.

TABLE 3.4.4-1

REACTOR COOLANT SYSTEM CHEMISTRY LIMITS

OPERATIONAL CONDITION	CHLORIDES	CONDUCTIVITY (μmhos/cm @25°C)
1	< 0.5 ppm	< 2.0
2	< 0.2 ppm	< 2.0
~~At all other times~~ 3, 4, and 5*	< 0.2 ppm	<10.0

*Except during planned chemical decontamination activities (with the reactor vessel defueled).

FOR INFORMATION ONLY

These specifications are based on the guidance of General Electric SIL #380, Rev. 1, 2-10-84.

3/4.4.2 SAFETY/RELIEF VALVES

The reactor coolant system safety valve function of the safety-relief valves operate to prevent the system from being pressurized above the Safety Limit of 1325 psig. The system is designed to meet the requirements of the ASME Boiler and Pressure Vessel Code Section III for the pressure vessel and ANSI B31.1, 1975, Code for the reactor coolant system piping.

3/4.4.3 REACTOR COOLANT SYSTEM LEAKAGE
3/4.4.3.1 LEAKAGE DETECTION SYSTEMS

The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems."

3/4.4.3.2 OPERATIONAL LEAKAGE

The allowable leakage rates of coolant from the reactor coolant system have been based on the predicted and experimentally observed behavior of cracks in pipes. The normally expected background leakage due to equipment design and the detection capability of the instrumentation for determining system leakage was also considered. The evidence obtained from experiments suggests that for leakage somewhat greater than that specified for unidentified leakage, the probability is small that the imperfection or crack associated with such leakage would grow rapidly. However, in all cases, if the leakage rates exceed the values specified or the leakage is located and known to be PRESSURE BOUNDARY LEAKAGE, the reactor will be shut down to allow further investigation and corrective action. Monitoring leakage at eight hour intervals is in conformance with the 12/21/89 NRC SER for GL 88-01.

3/4.4.4 CHEMISTRY

The reactor water chemistry limits are established to prevent damage to the reactor materials in contact with the coolant. Chloride limits are specified to prevent stress corrosion cracking of the stainless steel. The effect of chloride is not as great when the oxygen concentration in the coolant is low; thus, the higher limit on chlorides is permitted during full power operation. During shutdown and refueling operations, the temperature necessary for stress corrosion to occur is not present.

Conductivity measurements are required on a continuous basis since changes in this parameter are an indication of abnormal conditions. When the conductivity is within limits, the pH, chlorides, and other impurities affecting conductivity must also be within their acceptable limits. With the conductivity outside the limits, additional samples must be examined to ensure that the chlorides are not exceeding the limits.

The surveillance requirements provide adequate assurance that concentrations in excess of the limits will be detected in sufficient time to take corrective action.

→ INSERT PARAGRAPH (ATTACHED)

3/4.4.5 SPECIFIC ACTIVITY

The limitations on the specific activity of the primary coolant ensure that the 2-hour thyroid and whole body doses resulting from a main steam line failure outside the containment during steady state operation will not exceed small fractions of the dose guidelines of 10 CFR 100. Permitting operation to continue for limited time periods with higher specific activity levels accommodates short-term iodine spikes which may be associated with power level changes, and is based on the fact that a steam line failure during these short time periods is considerably less likely. Operation at the higher activity levels, therefore, is restricted to a small fraction of the unit's total operating time. The upper limit of coolant iodine concentration during short-term iodine spikes ensures that the thyroid dose from a steam line failure will not exceed 10 CFR Part 100 dose guidelines.

Information obtained on iodine spiking will be used to assess the parameters associated with spiking phenomena. A reduction in frequency of isotopic analysis following power changes may be permissible if justified by the data obtained.

Closing the main steam line isolation valves prevents the release of activity to the environs should the steam line rupture occur. The surveillance requirements provide adequate assurance that excessive specific activity levels in the reactor coolant will be detected in sufficient time to take corrective action.

3/4.4.6 PRESSURE/TEMPERATURE LIMITS

All components in the Reactor Coolant System are designed to withstand the effects of cyclic loads due to system temperature and pressure changes. These cyclic loads are introduced by normal load transients, reactor trips, and start-up and shutdown operations. The various categories of load cycles used for design purposes are provided in Section 4.2 of the FSAR. During start-up and shutdown, the rates of temperature and pressure changes are limited so that the maximum specified heatup and cooldown rates are consistent with the design assumptions and satisfy the stress limits for cyclic operation.

During heatup, the thermal gradients in the reactor vessel wall produce thermal stresses which vary from compressive at the inner wall to tensile at the outer wall. Thermal-induced compressive stresses tend to alleviate the tensile stresses induced by the internal pressure. During cooldown, thermal gradients to be accounted for are tensile at the inner wall and compressive at the outer wall.

INSERT PARAGRAPH:

In order to reduce personnel radiation exposure, chemical decontamination of portions of the reactor coolant system may be performed during shutdown. During the chemical decontamination process, the injection of chemical solvents may cause the reactor coolant system conductivity and chloride measurements to increase above the limits. The solvents that are selected for use in performing the chemical decontamination process are selected and evaluated to ensure their chemical reactivity will not adversely impact components or the structural integrity of the reactor coolant system. Because decontamination activities are performed at temperatures significantly less than normal operating temperatures, the chemical reactivity of these solvents will not increase the likelihood of stress corrosion occurring nor affect those stress corrosion cracks that may already be present.

ENCLOSURE 6

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
NRC DOCKET NOS. 50-325 AND 50-324
OPERATING LICENSE NOS. DPR-71 AND DPR-62
REQUEST FOR LICENSE AMENDMENTS
REACTOR COOLANT SYSTEM CONDUCTIVITY

MARKED-UP TECHNICAL SPECIFICATION PAGES - UNIT 2

3/4.4.4 CHEMISTRY

LIMITING CONDITION FOR OPERATION

3.4.4 The chemistry of the reactor coolant system shall be maintained within the limits specified in Table 3.4.4-1.

APPLICABILITY: ~~At all times.~~ OPERATIONAL CONDITIONS 1, 2, 3, 4, and 5.*

ACTION:

a. In OPERATIONAL CONDITION 1, 2, and 3:

1. With the conductivity or chloride concentration exceeding the limits specified in Table 3.4.4-1, but less than 10 µmho/cm at 25°C and less than 0.5 ppm, respectively, operation may continue for up to 24 hours and this condition need not be reported to the Commission provided that operation under these conditions shall not exceed 336 hours per year. The provisions of Specification 3.0.4 are not applicable.

2. With the conductivity or chloride concentration exceeding the limits specified in Table 3.4.4-1 for more than 24 hours during one continuous time interval or with the conductivity exceeding 10 µmho/cm at 25°C or chloride exceeding 0.5 ppm, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. ~~At all other times,~~ In OPERATIONAL CONDITIONS 4 and 5* with the conductivity and/or chloride concentration of the reactor coolant in excess of the limit specified in Table 3.4.4-1, restore the conductivity and/or chloride concentration to within the limit within 48 hours.

*Except during planned chemical decontamination activities (with the reactor vessel defueled).

FOR INFORMATION ONLY

SURVEILLANCE REQUIREMENTS

4.4.4 The reactor coolant shall be determined to be within the specified chemistry limit by:

a. Analyzing a sample of the reactor coolant for conductivity and chloride at least once per 72 hours, and

b. Continuously recording the conductivity of the reactor coolant, or

c. Analyzing a sample of the reactor coolant for conductivity at least once per 24 hours when all of the continuous recording conductivity monitors are inoperable.

TABLE 3.4.4-1

REACTOR COOLANT SYSTEM CHEMISTRY LIMITS

OPERATIONAL CONDITIONS	CHLORIDES	CONDUCTIVITY (μmhos/cm @25^{0}C)
1	< 0.5 ppm	< 2.0
2	< 0.2 ppm	< 2.0
~~At all other times~~ 3, 4, and 5*	< 0.2 ppm	<10.0

---

* Except during planned chemical decontamination activities (with the reactor vessel defueled).

FOR INFORMATION ONLY

These specifications are based on the guidance of General Electric SIL #380, Rev. 1, 2-10-84.

3/4.4.2 SAFETY/RELIEF VALVES

The reactor coolant system safety valve function of the safety-relief valves operate to prevent the system from being pressurized above the Safety Limit of 1325 psig. The system is designed to meet the requirements of the ASME Boiler and Pressure Vessel Code Section III for the pressure vessel and ANSI B31.1, 1967, Code for the reactor coolant system piping.

3/4.4.3 REACTOR COOLANT SYSTEM LEAKAGE
3/4.4.3.1 LEAKAGE DETECTION SYSTEMS

The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems."

3/4.4.3.2 OPERATIONAL LEAKAGE

The allowable leakage rates of coolant from the reactor coolant system have been based on the predicted and experimentally observed behavior of cracks in pipes. The normally expected background leakage due to equipment design and the detection capability of the instrumentation for determining system leakage was also considered. The evidence obtained from experiments suggests that for leakage somewhat greater than that specified for unidentified leakage, the probability is small that the imperfection or crack associated with such leakage would grow rapidly. However, in all cases, if the leakage rates exceed the values specified or the leakage is located and known to be PRESSURE BOUNDARY LEAKAGE, the reactor will be shut down to allow further investigation and corrective action. Monitoring leakage at eight hour intervals is in conformance with the 12/21/89 NRC SER for GL 88-01.

3/4.4.4 CHEMISTRY

The reactor water chemistry limits are established to prevent damage to the reactor materials in contact with the coolant. Chloride limits are specified to prevent stress corrosion cracking of the stainless steel. The effect of chloride is not as great when the oxygen concentration in the coolant is low; thus, the higher limit on chlorides is permitted during full power operation. During shutdown and refueling operations, the temperature necessary for stress corrosion to occur is not present.

Conductivity measurements are required on a continuous basis since changes in this parameter are an indication of abnormal conditions. When the conductivity is within limits, the pH, chlorides, and other impurities affecting conductivity must also be within their acceptable limits. With the conductivity outside the limits, additional samples must be examined to ensure that the chlorides are not exceeding the limits.

The surveillance requirements provide adequate assurance that concentrations in excess of the limits will be detected in sufficient time to take corrective action.

→ INSERT PARAGRAPH (ATTACHED)

3/4.4.5 SPECIFIC ACTIVITY

The limitations on the specific activity of the primary coolant ensure that the 2-hour thyroid and whole body doses resulting from a main steam line failure outside the containment during steady state operation will not exceed small fractions of the dose guidelines in 10CFR 100. Permitting operation to continue for limited time periods with higher specific activity levels accommodates short-term iodine spikes which may be associated with power level changes, and is based on the fact that a steam line failure during these short time periods is considerably less likely. Operation at the higher activity levels, therefore, is restricted to a small fraction of the unit's total operating time. The upper limit of coolant iodine concentration during short-term iodine spikes ensures that the thyriod dose from a steam line failure will not exceed 10 CFR Part 100 dose guidelines.

Information obtained on iodine spiking will be used to assess the parameters associated with spiking phenomena. A reduction in frequency of isotopic analysis following power changes may be permissible, if justified by the data obtained.

Closing the main steam line isolation valves prevents the release of activity to the environs should the steam line rupture occur. The surveillance requirements provide adequate assurance that excessive specific activity levels in the reactor coolant will be detected in sufficient time to take corrective action.

3/4.4.6 PRESSURE/TEMPERATURE LIMITS

All components in the Reactor Coolant System are designed to withstand the effects of cyclic loads due to system temperature and pressure changes. These cyclic loads are introduced by normal load transients, reactor trips, and start-up and shutdown operations. The various categories of load cycles used for design purposes are provided in Section 4.2 of the FSAR. During start-up and shutdown, the rates of temperature and pressure changes are limited so that the maximum specified heatup and cooldown rates are consistent with the design assumptions and satisfy the stress limits for cyclic operation.

During heatup, the thermal gradients in the reactor vessel wall produce thermal stresses which vary from compressive at the inner wall to tensile at the outer wall. Thermally induced compressive stresses tend to alleviate the tensile stresses induced by the internal pressure. During cooldown, thermal gradients to be accounted for are tensile at the inner wall and compressive at the outer wall.

INSERT PARAGRAPH:

In order to reduce personnel radiation exposure, chemical decontamination of portions of the reactor coolant system may be performed during shutdown. During the chemical decontamination process, the injection of chemical solvents may cause the reactor coolant system conductivity and chloride measurements to increase above the limits. The solvents that are selected for use in performing the chemical decontamination process are selected and evaluated to ensure their chemical reactivity will not adversely impact components or the structural integrity of the reactor coolant system. Because decontamination activities are performed at temperatures significantly less than normal operating temperatures, the chemical reactivity of these solvents will not increase the likelihood of stress corrosion occurring nor affect those stress corrosion cracks that may already be present.

ENCLOSURE 7

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
NRC DOCKET NOS. 50-325 AND 50-324
OPERATING LICENSE NOS. DPR-71 AND DPR-62
REQUEST FOR LICENSE AMENDMENTS
REACTOR COOLANT SYSTEM CONDUCTIVITY

TYPED TECHNICAL SPECIFICATION PAGES - UNIT 1

3/4.4.4 CHEMISTRY

LIMITING CONDITION FOR OPERATION

3.4.4 The chemistry of the reactor coolant system shall be maintained within the limits specified in Table 3.4.4-1.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, and 5*.

ACTION:

a. In OPERATIONAL CONDITIONS 1, 2, and 3:

1. With the conductivity of chloride concentration exceeding the limits specified in Table 3.4.4-1, but less than 10 μmho/cm at 25°C and less than 0.5 ppm, respectively, operation may continue for up to 24 hours and this condition need not be reported to the Commission provided that operation under these conditions shall not exceed 336 hours per year. The provisions of Specification 3.0.4 are not applicable.

2. With the conductivity or chloride concentration exceeding the limits specified in Table 3.4.4-1 for more than 24 hours during one continuous time interval or with the conductivity exceeding 10 μmho/cm at 25°C or chloride exceeding 0.5 ppm, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. In OPERATION CONDITIONS 4 and 5* with the conductivity and/or chloride concentration of the reactor coolant in excess of the limit specified in Table 3.4.4-1, restore the conductivity and/or chloride concentration to within the limit within 48 hours.

*Except during planned chemical decontamination activities (with the reactor vessel defueled).

TABLE 3.4.4-1

REACTOR COOLANT SYSTEM CHEMISTRY LIMITS

OPERATIONAL CONDITION	CHLORIDES	CONDUCTIVITY (μmhos/cm @ 25°C)
1	< 0.5 ppm	< 2.0
2	< 0.2 ppm	< 2.0
3, 4, and 5*	< 0.2 ppm	<10.0

*Except during planned chemical decontamination activities (with the reactor vessel defueled).

The surveillance requirements provide adequate assurance that concentrations in excess of the limits will be detected in sufficient time to take corrective action.

In order to reduce personnel radiation exposure, chemical decontamination of portions of the reactor coolant system may be performed during shutdown. During the chemical decontamination process, the injection of chemical solvents may cause the reactor coolant system conductivity and chloride measurements to increase above the limits. The solvents that are selected for use in performing the chemical decontamination process are selected and evaluated to ensure their chemical reactivity will not adversely impact components or the structural integrity of the reactor coolant system. Because decontamination activities are performed at temperatures significantly less than normal operating temperatures, the chemical reactivity of these solvents will not increase the likelihood of stress corrosion occurring nor affect those stress corrosion cracks that may already be present.

3/4.4.5 SPECIFIC ACTIVITY

The limitations on the specific activity of the primary coolant ensure that the 2-hour thyroid and whole body doses resulting from a main steam line failure outside the containment during steady state operation will not exceed small fractions of the dose guidelines in 10CFR 100. Permitting operation to continue for limited time periods with higher specific activity levels accommodates short-term iodine spikes which may be associated with power level changes, and is based on the fact that a steam line failure during these short time periods is considerably less likely. Operation at the higher activity levels, therefore, is restricted to a small fraction of the unit's total operating time. The upper limit of coolant iodine concentration during short-term iodine spikes ensures that the thyroid dose from a steam line failure will not exceed 10 CFR Part 100 dose guidelines.

Information obtained on iodine spiking will be used to assess the parameters associated with spiking phenomena. A reduction in frequency of isotopic analysis following power changes may be permissible, if justified by the data obtained.

Closing the main steam line isolation valves prevents the release of activity to the environs should the steam line rupture occur. The surveillance requirements provide adequate assurance that excessive specific activity levels in the reactor coolant will be detected in sufficient time to take corrective action.

3/4.4.6 PRESSURE/TEMPERATURE LIMITS

All components in the Reactor Coolant System are designed to withstand the effects of cyclic loads due to system temperature and pressure changes. These cyclic loads are introduced by normal load transients, reactor trips, and start-up and shutdown operations. The various categories of load cycles used for design purposes are provided in Section 4.2 of the FSAR. During

PRESSURE/TEMPERATURE LIMITS (Continued)

start-up and shutdown, the rates of temperature and pressure changes are limited so that the maximum specified heatup and cooldown rates are consistent with the design assumptions and satisfy the stress limits for cyclic operation.

During heatup, the thermal gradients in the reactor vessel wall produce thermal stresses which vary from compressive at the inner wall to tensile at the outer wall. Thermal-induced compressive stresses tend to alleviate the tensile stresses induced by the internal pressure. During cooldown, thermal gradients to be accounted for are tensile at the inner wall and compressive at the outer wall.

The reactor vessel materials have been tested to determine their initial RT_{NDT}. The results of these tests are shown in GE NEDO 24161. Reactor operation and resultant fast neutron, E>1 Mev, fluence will cause an increase in the RT_{NDT}. Therefore, an adjusted reference temperature, based upon the fluence, can be predicted using the proper, revision of Regulatory Guide 1.99. The pressure-temperature limit curve Figures 3.4.6.1-1, 3.4.6.1-2, and 3.4.6.1-3a through 3.4.6.1-3c include predicted adjustments for this shift in RT_{NDT} at the end of indicated EFPY, as well as adjustments to account for the location of the pressure-sensing instruments.

The actual shift in RT_{NDT} of the vessel material will be checked periodically during operation by removing and evaluating, in accordance with ASTM E185-82, reactor vessel material irradiation surveillance specimens installed near the inside wall of the reactor vessel in the core area. Since the neutron spectra at the irradiation samples and vessel inside radius vary little, the measured transition shift for a sample can be adjusted with confidence to the adjacent section of the reactor vessel.

The pressure-temperature limit lines shown in Figures 3.4.6.1-1, 3.4.6.1-2 and 3.4.6.1-3a through 3.4.6.1-3c have been provided to assure compliance with the minimum temperature requirements of the 1983 revision to Appendix G of 10CFR50. The conservative method of the Standard Review Plan has been used for heatup and cooldown.

The number of reactor vessel irradiation surveillance specimens and the frequencies for removing and testing these specimens are provided in Table 4.4.6.1.3-1 to assure compliance with the requirements of ASTM E185-82.

ENCLOSURE 8

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
NRC DOCKET NOS. 50-325 AND 50-324
OPERATING LICENSE NOS. DPR-71 AND DPR-62
REQUEST FOR LICENSE AMENDMENTS
REACTOR COOLANT SYSTEM CONDUCTIVITY

TYPED TECHNICAL SPECIFICATION PAGES - UNIT 2

3/4.4.4 CHEMISTRY

LIMITING CONDITION FOR OPERATION

3.4.4 The chemistry of the reactor coolant system shall be maintained within the limits specified in Table 3.4.4-1.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, 4, and 5*.

ACTION:

a. In OPERATIONAL CONDITIONS 1, 2, and 3:

1. With the conductivity of chloride concentration exceeding the limits specified in Table 3.4.4-1, but less than 10 μmho/cm at 25°C and less than 0.5 ppm, respectively, operation may continue for up to 24 hours and this condition need not be reported to the Commission provided that operation under these conditions shall not exceed 336 hours per year. The provisions of Specification 3.0.4 are not applicable.

2. With the conductivity or chloride concentration exceeding the limits specified in Table 3.4.4-1 for more than 24 hours during one continuous time interval or with the conductivity exceeding 10 μmho/cm at 25°C or chloride exceeding 0.5 ppm, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. In OPERATIONAL CONDITIONS 4 and 5* with the conductivity and/or chloride concentration of the reactor coolant in excess of the limit specified in Table 3.4.4-1, restore the conductivity and/or chloride concentration to within the limit within 48 hours.

*Except during planned chemical decontamination activities (with the reactor vessel defueled).

TABLE 3.4.4-1

REACTOR COOLANT SYSTEM CHEMISTRY LIMITS

OPERATIONAL CONDITION	CHLORIDES	CONDUCTIVITY (μmhos/cm @ 25°C)
1	< 0.5 ppm	< 2.0
2	< 0.2 ppm	< 2.0
3, 4, and 5*	< 0.2 ppm	<10.0

*Except during planned chemical decontamination activities (with the reactor vessel defueled).

The surveillance requirements provide adequate assurance that concentrations in excess of the limits will be detected in sufficient time to take corrective action.

In order to reduce personnel radiation exposure, chemical decontamination of portions of the reactor coolant system may be performed during shutdown. During the chemical decontamination process, the injection of chemical solvents may cause the reactor coolant system conductivity and chloride measurements to increase above the limits. The solvents that are selected for use in performing the chemical decontamination process are selected and evaluated to ensure their chemical reactivity will not adversely impact components or the structural integrity of the reactor coolant system. Because decontamination activities are performed at temperatures significantly less than normal operating temperatures, the chemical reactivity of these solvents will not increase the likelihood of stress corrosion occurring nor affect those stress corrosion cracks that may already be present.

3/4.4.5 SPECIFIC ACTIVITY

The limitations on the specific activity of the primary coolant ensure that the 2-hour thyroid and whole body doses resulting from a main steam line failure outside the containment during steady state operation will not exceed small fractions of the dose guidelines in 10CFR 100. Permitting operation to continue for limited time periods with higher specific activity levels accommodates short-term iodine spikes which may be associated with power level changes, and is based on the fact that a steam line failure during these short time periods is considerably less likely. Operation at the higher activity levels, therefore, is restricted to a small fraction of the unit's total operating time. The upper limit of coolant iodine concentration during short-term iodine spikes ensures that the thyriod dose from a steam line failure will not exceed 10 CFR Part 100 dose guidelines.

Information obtained on iodine spiking will be used to assess the parameters associated with spiking phenomena. A reduction in frequency of isotopic analysis following power changes may be permissible, if justified by the data obtained.

Closing the main steam line isolation valves prevents the release of activity to the environs should the steam line rupture occur. The surveillance requirements provide adequate assurance that excessive specific activity levels in the reactor coolant will be detected in sufficient time to take corrective action.

3/4.4.6 PRESSURE/TEMPERATURE LIMITS

All components in the Reactor Coolant System are designed to withstand the effects of cyclic loads due to system temperature and pressure changes. These cyclic loads are introduced by normal load transients, reactor trips, and start-up and shutdown operations. The various categories of load cycles used for design purposes are provided in Section 4.2 of the FSAR. During

PRESSURE/TEMPERATURE LIMITS (Continued)

start-up and shutdown, the rates of temperature and pressure changes are limited so that the maximum specified heatup and cooldown rates are consistent with the design assumptions and satisfy the stress limits for cyclic operation.

During heatup, the thermal gradients in the reactor vessel wall produce thermal stresses which vary from compressive at the inner wall to tensile at the outer wall. Thermally induced compressive stresses tend to alleviate the tensile stresses induced by the internal pressure. During cooldown, thermal gradients to be accounted for are tensile at the inner wall and compressive at the outer wall.

The reactor vessel materials have been tested to determine their initial RT_{NDT}. The results of these tests are shown in GE NEDO 24161. Reactor operation and resultant fast neutron, E>1 Mev, fluence will cause an increase in the RT_{NDT}. Therefore, an adjusted reference temperature, based upon the fluence, can be predicted using the proper revision of Regulatory Guide 1.99. The pressure/temperature limit curves Figures 3.4.6.1-1, 3.4.6.1-2, and 3.4.6.1-3a through 3.4.6.1-3c include predicted adjustments for this shift in RT_{NDT} at the end of indicated EFPY, as well as adjustments to account for the location of the pressure-sensing instruments.

The actual shift in RT_{NDT} of the vessel material will be checked periodically during operation by removing and evaluating, in accordance with ASTM E185-82, reactor vessel material irradiation surveillance specimens installed near the inside wall of the reactor vessel in the core area. Since the neutron spectra at the irradiation samples and vessel inside radius vary little, the measured transition shift for a sample can be adjusted with confidence to the adjacent section of the reactor vessel.

The pressure/temperature limit lines shown in Figures 3.4.6.1-1, 3.4.6.1-2, and 3.4.6.1-3a through 3.4.6.1-3c have been provided to assure compliance with the minimum temperature requirements of the 1983 revision to Appendix G of 10CFR50. The conservative method of the Standard Review Plan has been used for heatup and cooldown.

The number of reactor vessel irradiation surveillance specimens and the frequencies for removing and testing these specimens are provided in Table 4.4.6.1.3-1 to assure compliance with the requirements of ASTM E185-82.