ATTACHMENT A

NIAGARA MOHAWK POWER CORPORATION

LICENSE NO. NPF-69

DOCKET NO. 50-410

Proposed Changes to Technical Specifications

Replace existing pages xiv, xx, 3/4 3-60, 3/4 3-61, 3/4 3-63, 3/4 3-89, 3/4 9-3, 3/4 9-4, 3/4 9-14, and 3/4 9-15 with the attached revised pages xiv, xx, 3/4 3-60, 3/4 3-61, 3/4 3-63, 3/4 3-89, 3/4 9-3, 3/4 9-4, 3/4 9-14, and 3/4 9-15. These pages have been retyped in their entirety with marginal markings to indicate the changes. Also, replace existing BASES pages B3/4 9-1, B3/4 9-2 and B3/4 10-1 with the attached revised pages B3/4 9-1, B3/4 9-2, B3/4 9-3 and B3/4 10-1. Pages 3/4 10-7 and 3/4 10-8 have been deleted in their entirety.

Page 3/4 9-3 contains revisions submitted in NMP2L 1142 as editorial corrections (TAC #68463). An additional copy of 3/4 9-3, without the revisions submitted in NMP2L 1142, is provided at the back of Attachment A.

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LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

BASES FOR SECTIONS 3.0/4.0

TABLE 3.3.6-1

CONTROL ROD BLOCK INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION	APPLICABLE OPERATIONAL CONDITIONS	ACTION
1. Rod Block Monitor(a)			
a. Upscale	2	1*	60
b. Inoperative	2	1*	60
c. Downscale	2	1*	60
2. APRM			
a. Flow-Biased Neutron Flux-Upscale	4	1	61
b. Inoperative	4	1, 2, 5	61
c. Downscale	4	1	61
d. Neutron Flux-Upscale, Startup	4	2, 5	61
3. Source Range Monitor			
a. Detector Not Full In (b)	3	2	61
	2	5	61
b. Upscale(c)	3	2	61
	2	5	61
c. Inoperative(c)	3	2	61
	2	5	61
d. Downscale(d)	3	2	61
	2(f)	5	61
4. Intermediate Range Monitor			
a. Detector Not Full In	6	2, 5	61
b. Upscale	6	2, 5	61
c. Inoperative	6	2, 5	61
d. Downscale(e)	6	2, 5	61
5. Scram Discharge Volume Water Level - High, Float Switch	2	1, 2, 5**	62
6. Reactor Coolant System Recirculation Flow			
a. Upscale	2	1	62
b. Inoperative	2	1	62
c. Comparator	2	1	62
7. Reactor Mode Switch			
a. Shutdown Mode	2	3, 4	62
b. Refuel Mode	2	5	62

TABLE NOTATIONS

* With THERMAL POWER greater than or equal to 30% of RATED THERMAL POWER.

** With more than one control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

(a) The RBM shall be automatically bypassed when a peripheral control rod is selected.

(b) This function shall be automatically bypassed if detector count rate is greater than 100 cps or the IRM channels are on range 3 or higher.

(c) This function shall be automatically bypassed when the associated IRM channels are on range 8 or higher.

(d) This function shall be automatically bypassed when the IRM channels are on range 3 or higher.

(e) This function shall be automatically bypassed when the IRM channels are on range 1.

(f) During complete core spiral offloading and reloading, an SRM downscale rod block instrumentation channel is not required to be OPERABLE when the associated SRM channel is downscale.

ACTION

ACTION 60 - Declare the RBM inoperable and take the ACTION required by Specification 3.1.4.3.

ACTION 61 - With the number of OPERABLE Channels:

a. One less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 7 days or place the inoperable channel in the tripped condition within the next hour.

b. Two or more less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within 1 hour.

ACTION 62 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within 1 hour.

Table 3.3.6-2 (Continued)

CONTROL ROD BLOCK INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
6. Reactor Coolant System Recirculation Flow		
a. Upscale	$\leq$108% rated flow	$\leq$111% rated flow
b. Inoperative	NA	NA
c. Comparator	$\leq$10% flow deviation	$\leq$11% flow deviation
7. Reactor Mode Switch		
a. Shutdown Mode	NA	NA
b. Refuel Mode	NA	NA

* The rod block function is varied as a function of recirculation loop flow (W), and must be maintained in accordance with note (a) of Table 2.2.1-1. The trip setting of this average power range monitor function must also be maintained in accordance with Specification 3.2.2 and note (a) of Table 2.2.1-1.

** For fuel loading and startup from refueling the count rate may be less than 3 cps if the following conditions are met: the signal to noise ratio is greater than or equal to 5, and the signal is greater than 1.3 cps.

SURVEILLANCE REQUIREMENTS

4.3.7.6 (Continued)

c. Verifying, before withdrawal of control rods, that the SRM count rate is at least 3 cps* with the detector fully inserted.

*For fuel loading and startup from refueling the count rate may be less than 3 cps if the following conditions are met: (1) the signal-to-noise ratio is greater than or equal to 5 and (2) the signal is greater than 1.3 cps.

3/4.9.2 INSTRUMENTATION

LIMITING CONDITIONS FOR OPERATION

3.9.2 At least 2 source range monitor* (SRM) channels shall be OPERABLE and inserted to the normal operating level with:

a. Continuous visual indication of the required count rate in the control room,**

b. Audible annunciation in the control room,

c. One of the required SRM detectors located in the quadrant where CORE ALTERATIONS are being performed and the other required SRM detector located in an adjacent quadrant, and

d. Unless adequate shutdown margin has been demonstrated per Specification 3.1.1 and the "one rod out" interlock is OPERABLE per Specification 3.9.1, the shorting links shall be removed from the RPS circuitry prior to and any time one control rod is withdrawn.***

APPLICABILITY: OPERATIONAL CONDITION 5.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS and insert all insertable control rods.

SURVEILLANCE REQUIREMENTS

4.9.2 Each of the above required SRM channels shall be demonstrated OPERABLE by:

a. At least once per 12 hours:

1. Performing a CHANNEL CHECK,

2. Verifying the detectors are inserted to the normal operating level, and

3. During CORE ALTERATIONS, verifying that the detector of an OPERABLE SRM channel is located in the core quadrant where CORE ALTERATIONS are being performed and another is located in an adjacent quadrant.

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* The use of special movable detectors during CORE ALTERATIONS in place of the normal SRM nuclear detectors is permissible as long as these special detectors are connected to the normal SRM circuits.

** During complete core spiral offload and reload, only one of the required SRM channels must have continuous visual indication in the control room. No visual indication is required until after the first four fuel bundles have been placed in the core, and no visual indication is required when all but four bundles have been removed from the core.

*** Not required for control rods removed per Specification 3.9.10.1 and 3.9.10.2.

SURVEILLANCE REQUIREMENTS

4.9.2 (Continued)

b. Performing a CHANNEL FUNCTIONAL TEST:

1. Within 24 hours before the start of CORE ALTERATIONS, and
2. At least once per 7 days.

c. Verifying that the channel count rate is at least 3 cps*

1. Before control rod withdrawal,

2. Before and at least once per 12 hours during CORE ALTERATIONS, and

3. At least once per 24 hours,

Except that:

1. During complete core spiral offloading, the SRM count rate need not be maintained when the fuel assemblies around the SRM are removed.

2. Prior to and during complete core spiral reloading, the required count rate may be achieved by:

   a) Use of a portable external source, or

   b) Loading up to 4 fuel assemblies in cells containing inserted control rods around an SRM.

d. Verifying, within 8 hours before and at least once per 12 hours during the time any control rod is withdrawn that the shorting links have been removed from the RPS circuitry, unless adequate shutdown margin has been demonstrated per Specification 3.1.1 and the "one rod out" interlock is OPERABLE per Specification 3.9.1.

* The count rate may be less than 3 cps if the following conditions are met: (1) the signal-to-noise ratio is greater than or equal to 5, and (2) the signal is greater than 1.3 cps.

CONTROL ROD REMOVAL

MULTIPLE CONTROL ROD REMOVAL

LIMITING CONDITIONS FOR OPERATION

3.9.10.2 Any number of control rods and/or control rod drive mechanisms may be removed from the core and/or reactor pressure vessel provided that at least the following requirements are satisfied until all control rods and control rod drive mechanisms are reinstalled and all control rods are inserted in the core.

a. The reactor mode switch is OPERABLE and locked in the Shutdown position or in the Refuel position per Specification 3.9.1, except that the Refuel position "one-rod-out" interlock may be bypassed, as required, for those control rods and/or control rod drive mechanisms to be removed, after the fuel assemblies have been removed as specified below.

b. The source range monitors (SRMs) are OPERABLE per Specification 3.9.2.

c. The SHUTDOWN MARGIN requirements of Specification 3.1.1 are satisfied.

d. All other control rods are either inserted or have the surrounding four fuel assemblies removed from the core cell.

e. The four fuel assemblies surrounding each control rod or control rod drive mechanism to be removed from the core and/or reactor vessel are removed from the core cell.

f. All fuel loading operations have been suspended.*

APPLICABILITY: OPERATIONAL CONDITION 5.

ACTION:

With the requirements of the above specification not satisfied, suspend removal of control rods and/or control rod drive mechanisms from the core and/or reactor pressure vessel and initiate action to satisfy the above requirements.

* Except during complete core spiral reload where the shorting links shall be removed and dedicated procedures shall be strictly followed.

REFUELING OPERATIONS

CONTROL ROD REMOVAL

MULTIPLE CONTROL ROD REMOVAL

SURVEILLANCE REQUIREMENTS

4.9.10.2.1 Within 4 hours before the start of removal of control rods and/or control rod drive mechanisms from the core and/or reactor pressure vessel and at least once per 24 hours thereafter until all control rods and control rod drive mechanisms are reinstalled and all control rods are inserted in the core, verify that:

a. The reactor mode switch is OPERABLE per Surveillance Requirement 4.3.1.1 or 4.9.1.2, as applicable, and locked in the Shutdown position or in the Refuel position per Specification 3.9.1

b. The SRM channels are OPERABLE per Specification 3.9.2

c. The SHUTDOWN MARGIN requirements of Specification 3.1.1 are satisfied.

d. All other control rods are either inserted or have the surrounding four fuel assemblies removed from the core cell.

e. The four fuel assemblies surrounding each control rod and/or control rod drive mechanism to be removed from the core and/or reactor vessel are removed from the core cell.

f. All fuel loading operations have been suspended.*

4.9.10.2.2 Following replacement of all control rods and/or control rod drive mechanisms removed in accordance with this specification, perform a functional test of the "one-rod-out" Refuel position interlock, if this function had been bypassed.

* Except during complete core spiral reload where the shorting links shall be removed and dedicated procedures shall be strictly followed.

BASES

3/4.9.1 REACTOR MODE SWITCH

Locking the OPERABLE reactor mode switch in the Shutdown or Refuel position, as specified, ensures that the restrictions on control rod withdrawal and refueling platform movement during the refueling operations are properly activated. These conditions reinforce the refueling procedures and reduce the probability of inadvertent criticality, damage to reactor internals or fuel assemblies, and exposure of personnel to excessive radioactivity.

3/4.9.2 INSTRUMENTATION

The OPERABILITY of at least two source range monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core. The SRM's are provided to monitor the core during periods of station shutdown and to guide the operator during refueling operations and station startup. Requiring two operable SRM's, one in and one adjacent to any core quadrant where fuel or control rods are being moved, assures adequate monitoring of that quadrant during such alterations. The requirement of 3 counts per second provides assurance that neutron flux is being monitored.

A spiral unloading pattern is one by which the fuel in the outermost cells (four fuel bundles surrounding a control blade) is removed first. Unloading continues by removing the remaining outermost fuel by cell. The last cell removed will be adjacent to an SRM. Spiral reloading is the reverse of unloading. Spiral unloading and reloading will preclude the creation of flux traps (moderator filled or partially filled cells surrounded on all sides by fuel).

During spiral unloading, the SRM's shall have an initial count rate of at least 3 cps with all rods fully inserted. It is expected that the count rate of the SRM's will drop below 3 cps before all of the fuel is unloaded. Since there will be no reactivity additions, a lower number of counts will not present a hazard. When all of the fuel has been removed to the spent fuel storage pool, the SRM's will no longer be required. Requiring an SRM to be operational prior to fuel removal from around that SRM assures that the SRM's are OPERABLE and can be relied upon when the count rate goes below the required minimum.

During spiral reload, SRM operability will be verified by using a portable external source once every 12 hours until the required amount of fuel is loaded to maintain 3 cps. As an alternative to the above, four fuel assemblies will be loaded in cells containing control blades around one SRM to obtain the required count rate. The loading of up to four bundles around the SRMs before attaining the required count rate is permissible because analysis has shown that an array of four fuel bundles in any configuration will remain subcritical. Until these four assemblies have been loaded, the 3 cps (or 1.3 cps) requirement is not necessary.

3/4.9.3 CONTROL ROD POSITION

The requirement that all control rods be inserted during other CORE ALTERATIONS ensures that fuel will not be loaded into a cell without a control rod.

3/4.9.4 DECAY TIME

The minimum requirement for reactor subcriticality before fuel movement ensures that sufficient time has elapsed to allow the radioactive decay of the short-lived fission products. This decay time is consistent with the assumptions used in the accident analyses.

3/4.9.5 COMMUNICATIONS

The requirement for communications capability ensures that refueling station personnel can be promptly informed of significant changes in the facility status or core reactivity condition during movement of fuel within the reactor pressure vessel.

3/4.9.6 REFUELING PLATFORM

The OPERABILITY requirements ensure that (1) the refueling platform will be used for handling control rods and fuel assemblies within the reactor pressure vessel, (2) each crane and hoist has sufficient load capacity for handling fuel assemblies and control rods, and (3) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL STORAGE POOL

The restriction on movement of loads in excess of the nominal weight of a fuel assembly over other fuel assemblies in the storage pool ensures that in the event this load is dropped (1) the activity release will be limited to that contained in a single fuel assembly and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the safety analyses.

3/4.9.8 & 3/4.9.9 WATER LEVEL - REACTOR VESSEL AND WATER LEVEL - SPENT FUEL STORAGE POOL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. This minimum water depth is consistent with the assumptions of the accident analysis.

3/4.9.10 CONTROL ROD REMOVAL

These specifications ensure that maintenance or repair of control rods or control rod drives will be performed under conditions that limit the probability of inadvertent criticality. The requirements for simultaneous removal of more than one control rod are more stringent since the SHUTDOWN MARGIN specification provides for the core to remain subcritical with only one control rod fully withdrawn.

3/4.9.10 CONTROL ROD REMOVAL (Continued)

This specification also permits the unloading of a significant portion of the reactor core for such purposes as removal of temporary control curtains, control rod drive maintenance, in-service inspection requirements, examination of the core support plate, etc. When the refueling interlock input signal from a withdrawn control rod is bypassed, administrative controls will be in effect to prohibit fuel from being loaded into that control cell.

These operations are performed with the mode switch in the "Refuel" position to provide the refueling interlocks normally available during refueling. In order to withdraw more than one control rod, it is necessary to bypass the refueling interlock on each withdrawn control rod. The requirement that the fuel assemblies in the cell controlled by a control rod be removed from the reactor core before the interlock can be bypassed insures that withdrawal of another control rod does not result in inadvertent criticality. Following the withdrawal of a rod from an empty cell, a second licensed operator will independently verify that the interlock bypassed is on the correct control rod. Once the control rod is withdrawn, it will be valved out of service. Each control rod essentially provides reactivity control for the fuel assemblies in the cell associated with the control rod. Thus, offloading the core results in a continuous reduction of core reactivity.

3/4.9.11 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

The requirement that at least one residual heat removal loop be OPERABLE or that an alternate method capable of decay heat removal be demonstrated and that an alternate method of coolant mixing be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during REFUELING and (2) sufficient coolant circulation would be available through the reactor core to assure accurate temperature indication and to distribute and prevent stratification of the poison in the event it becomes necessary to actuate the standby liquid control system.

The requirement to have two shutdown cooling mode loops OPERABLE when there is less than 22 feet 3 inches of water above the reactor vessel flange ensures that a single failure of the operating loop will not result in a complete loss of residual heat removal capability. With the reactor vessel head removed and 22 feet 3 inches of water above the reactor vessel flange, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating RHR loop, adequate time is provided to initiate alternate methods capable of decay heat removal or emergency procedures to cool the core.

3/4.10 SPECIAL TEST EXCEPTIONS

BASES

3/4.10.1 PRIMARY CONTAINMENT INTEGRITY

The requirement for PRIMARY CONTAINMENT INTEGRITY is not applicable during the period when open vessel tests are being performed during the low-power PHYSICS TESTS.

3/4.10.2 ROD SEQUENCE CONTROL SYSTEM

In order to perform the tests required in the Technical Specifications it is necessary to bypass the sequence restraints on control rod movement. The additional surveillance requirements ensure that the specifications on heat generation rates and shutdown margin requirements are not exceeded during the period when these tests are being performed and that individual rod worths do not exceed the values assumed in the safety analysis.

3/4.10.3 SHUTDOWN MARGIN DEMONSTRATIONS

Performance of shutdown margin demonstrations with the vessel head removed requires additional restrictions in order to ensure that criticality does not occur. These additional restrictions are specified in this Limiting Condition for Operation.

3/4.10.4 RECIRCULATION LOOPS

This special test exception permits reactor criticality under no-flow conditions and is required to perform certain startup and PHYSICS TESTS while at low THERMAL POWER levels.

3/4.10.5 OXYGEN CONCENTRATION

Relief from the oxygen concentration specifications is necessary in order to provide access to the primary containment during the initial startup and testing phase of operation. Without this access, the startup and test program could be restricted and delayed.

3/4.10.6 TRAINING STARTUPS

This special test exception permits training startups to be performed with the reactor vessel depressurized at low THERMAL POWER and temperature while controlling RCS temperature with one RHR subsystem aligned in the shutdown cooling mode in order to minimize the discharge of contaminated water to the radioactive waste disposal system.

3/4.9.2 INSTRUMENTATION

LIMITING CONDITIONS FOR OPERATION

3.9.2 At least 2 source range monitor* (SRM) channels shall be OPERABLE and inserted to the normal operating level with:

a. Continuous visual indication of the required count rate in the control room,**

b. Audible indication in the control room,

c. One of the required SRM detectors located in the quadrant where CORE ALTERATIONS are being performed and the other required SRM detector located in an adjacent quadrant, and

d. Unless adequate shutdown margin has been demonstrated per Specification 3.1.1 and the "one rod out" interlock is OPERABLE per Specification 3.9.1, the shorting links shall be removed from the RPS circuitry prior to and any time one control rod is withdrawn.***

APPLICABILITY: OPERATIONAL CONDITION 5.

ACTION:

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATIONS and insert all insertable control rods.

SURVEILLANCE REQUIREMENTS

4.9.2 Each of the above required SRM channels shall be demonstrated OPERABLE by:

a. At least once per 12 hours:

1. Performing a CHANNEL CHECK,

2. Verifying the detectors are inserted to the normal operating level, and

3. During CORE ALTERATIONS, verifying that the detector of an OPERABLE SRM channel is located in the core quadrant where CORE ALTERATIONS are being performed and another is located in an adjacent quadrant.

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* The use of special movable detectors during CORE ALTERATIONS in place of the normal SRM nuclear detectors is permissible as long as these special detectors are connected to the normal SRM circuits.

** During complete core spiral offload and reload, only one of the required SRM channels must have continuous visual indication in the control room. No visual indication is required until after the first four fuel bundles have been placed in the core, and no visual indication is required when all but four bundles have been removed from the core.

*** Not required for control rods removed per Specification 3.9.10.1 and 3.9.10.2.

ATTACHMENT B

NIAGARA MOHAWK POWER CORPORATION

LICENSE NO. NPF-69

DOCKET NO. 50-410

INTRODUCTION

For extended plant outages, the complete offloading (and subsequent reloading) of the reactor fuel eliminates many of the constraints imposed by plant technical specifications on equipment operability and minimizes radiation exposure accumulations. Consequently, the degree of equipment maintenance and plant modifications that can be performed concurrently is increased with the core completely offloaded. In most cases, this improved flexibility during an outage more than offsets the additional time required for complete core offload/reload, resulting in a plant availability improvement.

Refueling interlocks are specified to reinforce operational procedures which prohibit fuel loading with any control rod withdrawn to prevent the potential of criticality excursions during the refueling operations. During fuel removal from a control cell (defined as the four assemblies surrounding a control rod) or before a control rod is inserted in an unloaded cell, blade guides are inserted to support the control rod. Performing a complete core offload/reload, within the constraints of the existing system design, would therefore require a complete set of double blade guides. Storage of a complete set of blade guides (one double blade guide for each control rod; 185 for Nine Mile Point Nuclear Station - Unit 2) is impractical and therefore an alternative method for completely offloading and reloading the core has been developed.

DISCUSSION

A safe method for core offloading and reloading with only a few double blade guides can be achieved by the use of spiral offloading/reloading patterns and the controlled use of bypasses to the refueling interlock system. Spiral offloading/reloading will always remove or load fuel at the periphery of the fueled region. While offloading the core, this will result in a continuous reduction of the core reactivity. During core loading using a spiral pattern, the fuel added will always be on the periphery with at least two water faces to each fuel cell and therefore, the reactivity addition from the loaded fuel will be minimized. This method of spiral loading/offloading has been approved by the Nuclear Regulatory Commission (NRC) and is widely used in the nuclear industry.

Utilization of the spiral loading technique involves multiple control blade removal with fuel still in the core. Multiple control blade removal in turn creates three safety concerns. First, the intermediate fuel and control blade arrays must be subcritical at all times, even if the highest worth blade is withdrawn. Second, there must be adequate monitoring of neutron flux levels during the core alterations. Finally, the probability of an open-vessel criticality must be below that of a credible event.

• SHUTDOWN MARGIN

The proposed Technical Specification will allow spiral unloading and reloading of the core. In the unloading sequence fuel cells on the perimeter of the core are unloaded first. Cells are removed sequentially in a spiral sequence with the cells closest to an SRM removed last. After unloading of a fuel cell, the control rod is removed or withdrawn. Therefore, during the unloading sequence more than one control rod may be absent at any point in time since control rods are not required in defueled cells. The loading sequence is the reverse of the unloading sequence with control rods inserted and fuel loaded adjacent to an SRM first, and core peripheral control rods inserted and cells loaded sequentially in a spiral pattern.

In the spiral loading/unloading sequence neither imbedded cavities nor major peripheral concavities are permitted. Imbedded cavities are precluded since the spiral sequence does not result in the removal of imbedded fuel cells. Major peripheral concavities are precluded since the fuel added will always be on the periphery to cells with at least two water faces.

Since a single unloaded cell results in local flux which is less than or equal to flux prior to cell unload, the multiplication factor of intermediate fuel arrays is less than or equal to that of a fully loaded core. Since peripheral concavities are not allowed, approximate fuel array symmetry is maintained with a like number of cells removed from each array quadrant at any point in the sequence. Flux peaking due to an imbalance of unloaded cells in any one quadrant is thereby precluded. Therefore, the multiplication factor for the entire core is less than or equal to that of a fully loaded core.

Multiplication factors are analyzed for the fully loaded core and the shutdown margin of the fully loaded core is well assured by existing Technical Specifications. Spiral loading/unloading of the core does not result in an increase in multiplication factors, nor a decrease of shutdown margin relative to that of the fully loaded core. Therefore, the proposed fueling sequence is acceptable from the point of view of shutdown margin.

NEUTRON FLUX MONITORING

During any core alteration, and especially during core loading, it is necessary to monitor flux levels. In this manner, even in the highly unlikely event of multiple operator errors, there is reasonable assurance that any approach to criticality would be detected in time to halt operations.

The proposed Technical Specification would allow the use of the source range monitor (SRM) channels for this purpose. The spiral loading will begin adjacent to an SRM to provide early indication of neutron flux levels in the reactor core. Spiral loading out from an SRM will provide source-to-detector coupling after the first four assemblies are loaded. Thereafter, the SRM will provide continuous visual indication of the count rate and audible annunciation in the Control Room. Use of this "off-center" spiral loading by an SRM will also allow the elimination of Fuel Loading Chambers (FLC's).

- The spiral offloading scheme is established such that there will be at least one SRM which is constantly and continuously monitoring the fueled region. Since reactivity is continuously removed from the core during fuel offload, and no fuel assembly is allowed to be moved into the core under any circumstance, under normal conditions the neutron flux will continuously decrease. Consequently, it is permitted to allow SRM readings to go below the minimum required count rate as fuel is unloaded from the region around the SRM.

OPEN VESSEL CRITICALITY

A previous review of normal refueling interlock bypass practices identified a specific refueling event which could lead to an open-vessel criticality and significant fuel damage. The event is the result of loading two adjacent uncontrolled cells (eight assemblies) resulting in a criticality excursion. During the loading of the last assembly, assumed to be loaded at the maximum grapple insertion speed, a significant reactivity excursion occurs. Although the event was determined to be unlikely, its probability of occurrence was calculated to be somewhat greater than 10^{-6} per reactor year, the threshold for defining a credible event.

To minimize the probability of a critical excursion during spiral loading and unloading, detailed procedural guidelines have been developed by General Electric. These guidelines, along with additional supporting information, are contained in Appendix 15E to the Nine Mile Point Unit 2 Final Safety Analysis Report. The guidelines require bypassing individual refueling interlocks during the complete core offload/reload process.

An analysis was performed to determine the probability of creating two adjacent loaded uncontrolled fuel cells (LUFC) when following the guidelines in Appendix 15E. A simulation of the refueling process was performed using fault trees to determine the probability of creating two adjacent LUFC's for varying numbers of cells loaded per batch.

Based on the fault tree analysis, the probability of occurrence of creating two adjacent LUFC during complete core reloading, following the recommendations and guidelines contained in Appendix 15E, was found to be 10^{-8} to 10^{-9} per refueling for batch sizes of two to fifteen cells for cores with General Electric fuel. Since this probability was calculated using conservative assumptions and the probability of two adjacent LUFC's loaded on the periphery resulting in a significant criticality excursion is small, it is concluded that the goal of 10^{-6} per reactor year is easily met with the proposed guidelines.

TECHNICAL SPECIFICATION CHANGES

Plant technical specifications were reviewed to determine the impact of implementing complete core offload/reload procedures. Section 3/4.9 of the technical specifications relates to the refueling process. For complete core offload/reload, Sections 3/4.9.2, Instrumentation, and 3/4.9.10.2, Control Rod Removal, must be modified. In addition, Section 3.3.6, Control Rod Block Instrumentation and Section 3.3.7.6, Source Range Monitors, requires revision to remain consistent with Section 3/4.9.2.

In general, current technical specifications require a minimum of two SRM channels to be OPERABLE with continuous visual and audible indication in the control room, with one required SRM in the quadrant of fuel loading and the second required operable SRM in an adjacent quadrant. In addition, a minimum count rate on each OPERABLE SRM channel is required to be demonstrated at least once per 12 hours. The SRM has a lower monitoring limit, or minimum required count rate, of 3 counts per second. This is also the setpoint for the source range monitor downscale rod block. For initial fuel load, a minimum count rate of .7 cps was permitted provided a signal-to-noise ratio of 20-to-1 was main-ained. This provided a neutron detection confidence of more than 95%. However, for subsequent reloads, both the 3 counts per second and the signal-to-noise ratio of 20-to-1 may be unobtainable.

Consequently, an alternative approach was developed by General Electric. The same level of confidence can be maintained by implementing a minimum count rate of 1.3 cps with a signal-to-noise ratio of 5-to-1. The Technical Specifications have been modified in three places to reflect this revised requirement. Table 3.3.6-2 and Section 4.3.7.6 reflect the 1.3 cps count rate for fuel loading and startup from refueling, with the 5-to-1 signal-to-noise ratio as a prerequisite. Section 4.9.2 has also been modified to reflect the 1.3 cps and 5-to-1 ratio.

The SRM operability requirements of section 3/4.9.2 are also modified to require one channel of continuous visual indication in the control room. The SRM system is not safety-related and no credit is taken for the SRM's under these conditions (fuel loading with control rods inserted, i.e. core subcritical) in the safety analysis of accidental positive reactivity insertions. The SRM's provide indication of neutron flux changes as a matter of good practice during fuel loading and, thus, no safety requirements exist for an SRM detector. Therefore, continuous visual indication of only one SRM does not adversely affect any safety systems or the safe operation of the plant since the core will be subcritical during fuel loading and at least two SRM's will be demonstrated OPERABLE prior to and during fuel loading.

As an alternative to utilizing a portable source for operability checks, 4 irradiated fuel assemblies may be loaded adjacent to an SRM (with a control rod inserted) to provide the minimum count rate (exposed fuel assemblies act as neutron sources). Continuous visual indication and minimum count rate requirements for the SRM's are exempted for the first 4 fuel assemblies loaded since the core will be subcritical even with all control rods withdrawn. Thereafter, 2 SRM's, one in the quadrant where fuel is being loaded and one in an adjacent quadrant, will be required to be OPERABLE. This operability check will be periodically performed for required SRM's located in areas with no fuel loaded. During complete core offload, since the core reactivity will continually decrease, the SRM count rates are allowed to drop below the minimum required count rate.

During spiral offloading, as fuel is removed from around an SRM the count rate will drop below the required minimum. An SRM downscale rod block will result, preventing withdrawal of the control rod(s) associated with the offloaded fuel. Section 3/4.3.6 has been revised to provide an exception for a rod block instrumentation channel when fuel assemblies around the corresponding SRM are removed.

Multiple control rod removal (or withdrawal) is currently allowed by the technical specifications if the 4 adjacent fuel assemblies are removed prior to removing the control rod and all fuel loading operations have been suspended. This requires bypassing of the refueling interlocks. Section 3/4.9.10.2 modifications will allow fuel loading with all control rods not fully inserted only during complete core reloading which follows a dedicated procedure. Attachment A contains proposed modifications to Sections 3/4.3.6, 3/4.3.7.6, 3/4.9.2 & 3/4.9.10.2.

CONCLUSION

The reactor core can be safely offloaded and reloaded with only a few double blade guides by the use of spiral offloading/reloading patterns and the controlled use of bypasses to the refueling interlock system. The use of spiral patterns ensures that the multiplication factor of a partially loaded core is less than or equal to that of a fully loaded core.

The proposed Technical Specifications provide reasonable assurance that any approach to criticality would be detected in time to halt operations. The probability of an inadvertent criticality due to two adjacent LUFC's is below that of a credible event.

An editorial change was made to BASES Sections 3/4.9.8 and 3/4.9.9 on page B3/4 9-2. The section title was revised to agree with the actual Technical Specifications. Section 3/4.9.8 is entitled, "Water Level - Reactor Vessel," and Section 3/4.9.9 is entitled, "Water Level - Spent Fuel Storage Pool." This change is also reflected in the Index on Pages xiv and xx.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

10 CFR 50.91 requires that at the time a licensee requests an amendment, it must provide to the Commission its analysis using the standards in 10 CFR 50.92 concerning the issue of no significant hazards consideration. Therefore, in accordance with 10 CFR 50.91, the following analysis has been performed:

The operation of Nine Mile Point Unit 2, in accordance with the proposed amendment, will not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed amendment establishes an alternative method for defueling the vessel. By utilizing a limited number of blade guides, controlled bypassing of refueling interlocks, and strict procedural controls, the core can be safely offloaded and reloaded in a spiral pattern without all rods inserted. Analysis has shown that the probability of an inadvertent open-vessel criticality accident is less than the probability specified for a credible event. The administrative controls utilized for bypassing of refueling interlocks assure safe operation throughout the complete core offload/reload process. Therefore, this amendment will not involve a significant increase in the probability of an accident previously evaluated.

The operation of Nine Mile Point Unit 2, in accordance with the proposed amendment, will not create the possibility of a new or different kind of accident from any accident previously evaluated.

In the spiral loading/unloading sequence, neither imbedded cavities nor major peripheral concavities are permitted. Imbedded cavities are precluded since the

spiral sequence does not result in the removal of imbedded fuel cells. Major peripheral concavities are precluded since the fuel added will always be on the periphery with at least two water faces. The spiral loading/unloading, therefore, precludes the formation of flux traps. Normal fuel shuffling still requires that all control rods be fully inserted, thus precluding loading fuel into an uncontrolled cell. Therefore, operation in accordance with the proposed amendment will not create the possibility of a new or different kind of accident from any previously evaluated.

The operation of Nine Mile Point Unit 2, in accordance with the proposed amendment, will not involve a significant reduction in a margin of safety.

The proposed amendment allows SRM readings to go below the minimum required count rate during the offload process, and also allows loading of four fuel assemblies before reaching the minimum required count rate. Since reactivity is continuously removed from the core during fuel offload, the neutron flux will continuously decrease. Since there will be no reactivity additions, a lower number of counts will not present a hazard. For core reload, analysis has shown that the core will remain subcritical with four assemblies loaded, even with all control rods withdrawn. Thus, the margin of safety provided by the SRM's has not been reduced.

The Technical Specifications provide assurance that maintenance or repair of control rods or control rod drives will be performed under conditions that limit the probability of inadvertent criticality. Analysis has shown that the proposed amendment assures the probability of an inadvertent criticality will be below that of a credible event. Therefore, operation of Nine Mile Point Unit 2, in accordance with the proposed amendment, will not involve a significant reduction in a margin of safety.