

**EXHIBIT B**

**PRAIRIE ISLAND NUCLEAR GENERATING STATION**

**License Amendment Request dated October 23, 1998**

Appendix A, Technical Specification Pages

Marked Up Pages

(shaded material to be added, strikethrough material to be removed)

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TS-x

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3.10.E. Rod Misalignment Limitations

1. If a rod cluster control assembly (RCCA) is misaligned from its bank by more than 24 steps, the rod will be realigned or the core power peaking factors shall be determined within 2 hours, and Specification 3.10.B applied. If peaking factors are not determined within 2 hours, the high neutron flux trip setpoint shall be reduced to 85 percent of rating.
- ~~2. a. If the bank demand position is greater than or equal to 215 steps, or less than or equal to 30 steps and the rod position indicator channel differs by more than 24 steps, that rod control cluster assembly (RCCA) shall be considered misaligned.~~
- ~~b. If the bank demand position is between 30 and 215 steps and the rod position indicator channel differs by more than 12 steps, that RCCA shall be considered misaligned.~~
23. If the misaligned RCCA is not realigned within a total of 8 hours, the RCCA shall be declared inoperable.

F. Inoperable Rod Position Indicator Channels

- ~~1. If a rod position indicator (RPI) channel is out of service then~~
  - ~~a. For operation between 50% and 100% of RATED THERMAL POWER, the position of the RCCA shall be checked directly by core instrumentation (excore detector and/or thermocouples and/or movable incore detectors) every shift or subsequent to rod motion exceeding a total of 24 steps, whichever occurs first.~~
  - ~~b. During operation below 50% of RATED THERMAL POWER, no special monitoring is required.~~
- ~~2. The plant shall be brought to the HOT SHUTDOWN Condition should more than one RPI channel per group or more than two RPI channels per bank be found to be inoperable during POWER OPERATION.~~
- ~~3. If a full length rod having a rod position indicator channel inoperable is found to be misaligned from 1.a. above, then apply Specification 3.10.E.~~

## 3.10.F. Rod Position Indication System

1. In MODE 1 each channel of the Rod Position Indication System shall be OPERABLE, capable of determining the control rod positions within the following (except as specified in 3.10.F.2 or 3.10.F.3 below):
  - a. With bank demand position greater than or equal to 215 steps, or less than or equal to 30 steps, the difference between the individual rod position indication and the demand position for the corresponding group step counter shall be no greater than  $\pm 24$  steps, or
  - b. With bank demand position between 30 and 215 steps, the difference between the individual rod position indication and the demand position for the corresponding group step counter shall be no greater than  $\pm 12$  steps.
2. In MODE 1 with one rod position indicator per group inoperable for one or more groups either:
  - a. Verify the position of rod(s) with inoperable position indicator(s) indirectly using the moveable incore detectors at least once per 8 hours, or
  - b. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.
3. In MODE 1 with more than one rod position indicator per group inoperable for one or more groups:
  - a. Verify the position of rods with inoperable position indicators indirectly using the moveable incore detectors at least once per 8 hours, and
  - b. Verify the position of rods with inoperable position indicators indirectly using the moveable incore detectors within 4 hours after rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of their position, and
  - c. Monitor and record the demand position for the corresponding group step counters for rods with inoperable position indicators at least once per hour, and
  - d. Monitor and record reactor coolant system average temperature at least once per hour, and
  - e. Restore inoperable position indicators to OPERABLE status within 24 hours such that a maximum of one rod position indicator per group is inoperable.
4. If the requirements of Specification 3.10.F.3 cannot be met, then place the affected unit in at least HOT SHUTDOWN within the following 6 hours.
5. If a control rod with an inoperable rod position indicator is found to be misaligned during the verification of rod position required by Specifications 3.10.F.2.a, 3.10.F.3.a or 3.10.F.3.b above, then apply the requirements of Specification 3.10.E.

### 3.10 CONTROL ROD AND POWER DISTRIBUTION LIMITS

Pases continued

#### D. Rod Insertion Limits (continued)

as stated above. Therefore, this specification has been written to further minimize the likelihood of any hypothesized event during the performance of these tests later in life. This is accomplished by limiting to two hours per year the time the reactor can be in this type of configuration, and requiring that a rod drop test is performed on the rod to be measured prior to performance of test.

Operation with abnormal rod configuration during low power and zero power testing is permitted because of the brief period of the test and because special precautions are taken during the test.

#### E. Rod Misalignment Limitations

Rod misalignment requirements are specified to ensure that power distributions more severe than those assumed in the safety analyses do not occur.

The rod misalignment limitations are linked closely with the Rod Position Indication System operability requirements of 3.10.F. The relaxed rod position indicator channel operability requirements at less than or equal to 30 steps or greater than or equal to 215 steps of up to  $\pm 24$  steps indicated position is allowed since the reactivity worths of control rods in these ranges are sufficiently small that this misalignment will have no appreciable effect on core power distributions.

#### F. ~~Inoperable~~ Rod Position Indicator Channels System

The rod position indicator channel is sufficiently accurate to detect a rod  $\pm 7.5$  inches away from its demand position in the center region of the core. A misalignment less than 15 inches in the center region of the core does not lead to over-limit power peaking factors. In the peripheral core regions (less than or equal to 30 steps or greater than or equal to 215 steps) a misalignment less than 22.5 inches will not lead to over-limit power peaking factors due to small control rod reactivity worth in this region of the core. If the rod position indicator channel is not operable, the operator will be fully aware of the inoperability of the channel, and special surveillance of core power tilt indications, using established procedures and relying on excore nuclear detectors, and/or core thermocouples, and/or movable incore detectors, will be used to verify power distribution symmetry. These indirect measurements do not have the same resolution if the bank is near either end of the core, because a 15-inch misalignment would have no effect on power distributions. Therefore, it is necessary to apply the indirect checks following significant rod motion.

Specifications 3.10.F.2 and 3.10.F.3 provide actions to be taken when rod position indicators are determined to be inoperable. The actions to be taken are dependent on how many rod position indicators are inoperable per group. When dealing with rod position indicators associated with a control rod bank that does not contain multiple groups, the bank should be considered a single group for the purposes of entry into Specifications 3.10.F.2 or 3.10.F.3.

Specification 3.10.F.3.c requires that the demand position for the corresponding group step counters for rods with inoperable position indicators be monitored and recorded on an hourly basis. This requirement is intended to provide a periodic assessment of rod position such that it can be determined if rod movement in excess of 24 steps has occurred since the last determination of rod position. If rod movement in excess of 24 steps has occurred since the last determination of rod position, the requirements of Specification 3.10.F.3.b are to be implemented.

Specification 3.10.F.3.d requires that reactor coolant system average temperature be monitored and recorded on an hourly basis. Monitoring and recording of the reactor coolant system average temperature may provide early detection of mispositioned or dropped rods.

Specifications 3.10.F.2.a and 3.10.F.3.a require that the position of rods with inoperable position indicators be verified indirectly using the moveable incore detectors every 8 hours. The verification of rod position every 8 hours is adequate for continued plant operation since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small.

The reduction of THERMAL POWER to less than 50% of RATED THERMAL POWER required by Specification 3.10.F.2.b puts the core into a condition where rod position is not significantly affecting core peaking factors. The allowed completion time of 8 hours is reasonable, based on operating experience, for reducing power to less than 50% RATED THERMAL POWER from full power conditions without challenging plant systems.

Specification 3.10.F.3.h ensures that verification of rod position is initiated promptly following the movement of rods with inoperable position indication in excess of 24 steps in one direction, since the rod position was last determined or was last available from an OPERABLE rod position indication channel. The four hour allowance for completion of this action allows adequate time for personnel to be called in and for them to complete the rod position verification using the moveable incore detectors.

When more than one rod position indication channel per group is inoperable, the position of the rod(s) can still be determined by use of the moveable incore detectors. Based on experience, normal power operation does not require excessive movement of control rods. If one or more banks has been significantly moved, the action specified by Specification 3.10.F.3.b is required. Therefore, verification of rod position within every 8 hours per Specification 3.10.F.3.a is adequate for allowing continued full power operation for up to 24 hours, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small. The 24 hour allowed out of service time also provides sufficient time to troubleshoot and restore the IRPI system to operation following a component failure in the system, while avoiding the challenge associated with a plant shutdown.

#### G. Control Rod Operability Limitations

One inoperable control rod is acceptable provided that the power distribution limits are met, trip shutdown capability is available, and provided the potential hypothetical ejection of the inoperable rod is not worse than the cases analyzed in the safety analysis report. The rod ejection accident for an isolated fully-inserted rod will be worse if the residence time of the rod is long enough to cause significant non-uniform fuel depletion. The four-week period is short compared with the time interval required to achieve a significant non-uniform fuel depletion.



**EXHIBIT C**

**PRAIRIE ISLAND NUCLEAR GENERATING STATION**

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Appendix A, Technical Specification Pages

Revised Pages

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3.13	Control Room Air Treatment System	B.3.13-1
3.14	Deleted	
3.15	Event Monitoring Instrumentation	B.3.15-1

3.10.E. Rod Misalignment Limitations

1. If a rod cluster control assembly (RCCA) is misaligned from its bank by more than 24 steps, the rod will be realigned or the core power peaking factors shall be determined within 2 hours, and Specification 3.10.B applied. If peaking factors are not determined within 2 hours, the high neutron flux trip setpoint shall be reduced to 85 percent of rating.
  
2. If the misaligned RCCA is not realigned within a total of 8 hours, the RCCA shall be declared inoperable.

### 3.10.F. Rod Position Indication System

1. In MODE 1 each channel of the Rod Position Indication System shall be OPERABLE, capable of determining the control rod positions within the following (except as specified in 3.10.F.2 or 3.10.F.3 below):
  - a. With bank demand position greater than or equal to 215 steps, or less than or equal to 30 steps, the difference between the individual rod position indication and the demand position for the corresponding group step counter shall be no greater than  $\pm 24$  steps, or
  - b. With bank demand position between 30 and 215 steps, the difference between the individual rod position indication and the demand position for the corresponding group step counter shall be no greater than  $\pm 12$  steps.
2. In MODE 1 with one rod position indicator per group inoperable for one or more groups either:
  - a. Verify the position of rod(s) with inoperable position indicator(s) indirectly using the moveable incore detectors at least once per 8 hours, or
  - b. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.
3. In MODE 1 with more than one rod position indicator per group inoperable for one or more groups:
  - a. Verify the position of rods with inoperable position indicators indirectly using the moveable incore detectors at least once per 8 hours, and
  - b. Verify the position of rods with inoperable position indicators indirectly using the moveable incore detectors within 4 hours after rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of their position, and
  - c. Monitor and record the demand position for the corresponding group step counters for rods with inoperable position indicators at least once per hour, and
  - d. Monitor and record reactor coolant system average temperature at least once per hour, and
  - e. Restore inoperable position indicators to OPERABLE status within 24 hours such that a maximum of one rod position indicator per group is inoperable.
4. If the requirements of Specification 3.10.F.3 cannot be met, then place the affected unit in at least HOT SHUTDOWN within the following 6 hours.
5. If a control rod with an inoperable rod position indicator is found to be misaligned during the verification of rod position required by Specifications 3.10.F.2.a, 3.10.F.3.a or 3.10.F.3.b above, then apply the requirements of Specification 3.10.E.

### 3.10 CONTROL ROD AND POWER DISTRIBUTION LIMITS

Bases continued

#### D. Rod Insertion Limits (continued)

as stated above. Therefore, this specification has been written to further minimize the likelihood of any hypothesized event during the performance of these tests later in life. This is accomplished by limiting to two hours per year the time the reactor can be in this type of configuration, and requiring that a rod drop test is performed on the rod to be measured prior to performance of test.

Operation with abnormal rod configuration during low power and zero power testing is permitted because of the brief period of the test and because special precautions are taken during the test.

#### E. Rod Misalignment Limitations

Rod misalignment requirements are specified to ensure that power distributions more severe than those assumed in the safety analyses do not occur.

The rod misalignment limitations are linked closely with the Rod Position Indication System operability requirements of 3.10.F. The relaxed rod position indicator channel operability requirements at less than or equal to 30 steps or greater than or equal to 215 steps of up to  $\pm 24$  steps indicated position is allowed since the reactivity worths of control rods in these ranges are sufficiently small that this misalignment will have no appreciable effect on core power distributions.

#### F. Rod Position Indication System

The rod position indicator channel is sufficiently accurate to detect a rod  $\pm 7.5$  inches away from its demand position in the center region of the core. A misalignment less than 15 inches in the center region of the core does not lead to over-limit power peaking factors. In the peripheral core regions (less than or equal to 30 steps or greater than or equal to 215 steps) a misalignment less than 22.5 inches will not lead to over-limit power peaking factors due to small control rod reactivity worth in this region of the core. If the rod position indicator channel is not operable, the operator will be fully aware of the inoperability of the channel, and special surveillance of core power tilt indications, using established procedures and relying on excore nuclear detectors, and/or core thermocouples, and/or movable incore detectors, will be used to verify power distribution symmetry. These indirect measurements do not have the same resolution if the bank is near either end of the core, because a 15-inch misalignment would have no effect on power distributions. Therefore, it is necessary to apply the indirect checks following significant rod motion.

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Specification 3.10.F.3.c requires that the demand position for the corresponding group step counters for rods with inoperable position indicators be monitored and recorded on an hourly basis. This requirement is intended to provide a periodic assessment of rod position such that it can be determined if rod movement in excess of 24 steps has occurred since the last determination of rod position. If rod movement in excess of 24 steps has occurred since the last determination of rod position, the requirements of Specification 3.10.F.3.b are to be implemented.

Specification 3.10.F.3.d requires that reactor coolant system average temperature be monitored and recorded on an hourly basis. Monitoring and recording of the reactor coolant system average temperature may provide early detection of mispositioned or dropped rods.

Specifications 3.10.F.2.a and 3.10.F.3.a require that the position of rods with inoperable position indicators be verified indirectly using the moveable incore detectors every 8 hours. The verification of rod position every 8 hours is adequate for continued plant operation since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small.

The reduction of THERMAL POWER to less than 50% of RATED THERMAL POWER required by Specification 3.10.F.2.b puts the core into a condition where rod position is not significantly affecting core peaking factors. The allowed completion time of 8 hours is reasonable, based on operating experience, for reducing power to less than 50% RATED THERMAL POWER from full power conditions without challenging plant systems.

Specification 3.10.F.3.b ensures that verification of rod position is initiated promptly following the movement of rods with inoperable position indication in excess of 24 steps in one direction, since the rod position was last determined or was last available from an OPERABLE rod position indication channel. The four hour allowance for completion of this action allows adequate time for personnel to be called in and for them to complete the rod position verification using the moveable incore detectors.

When more than one rod position indication channel per group is inoperable, the position of the rod(s) can still be determined by use of the moveable incore detectors. Based on experience, normal power operation does not require excessive movement of control rods. If one or more banks has been significantly moved, the action specified by Specification 3.10.F.3.b is required. Therefore, verification of rod position within every 8 hours per Specification 3.10.F.3.a is adequate for allowing continued full power operation for up to 24 hours, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small. The 24 hour allowed out of service time also provides sufficient time to troubleshoot and restore the IRPI system to operation following a component failure in the system, while avoiding the challenges associated with a plant shutdown.

#### G. Control Rod Operability Limitations

One inoperable control rod is acceptable provided that the power distribution limits are met, trip shutdown capability is available, and provided the potential hypothetical ejection of the inoperable rod is not worse than the cases analyzed in the safety analysis report. The rod ejection accident for an isolated fully-inserted rod will be worse if the residence time of the rod is long enough to cause significant non-uniform fuel depletion. The four-week period is short compared with the time interval required to achieve a significant non-uniform fuel depletion.