UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

NORTHERN STATES POWER COMPANY

DOCKET NO. 50-282

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 99
License No. DPR-42

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Northern States Power Company (the licensee) dated October 4, 1991, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-42 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.99, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

L B Marsh

L. B. Marsh, Director
Project Directorate III-1
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical Specifications

Date of Issuance: July 9, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 99

FACILITY OPERATING LICENSE NO. DPR-42

DOCKET NO. 50-282

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change.

REMOVE	INSERT
TS-iii	TS-iii
TS-vi	TS-vi
TS-vii	TS-vii
TS-xi	TS-xi
TS.3.8-3	TS.3.8-3
Table TS.4.1-2B (page 1 of 2)	Table TS.4.1-2B (page 1 of 2)
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3.8.B. <u>Fuel Handling Operations</u>

1. During fuel handling operations the following conditions shall be satisfied:

   a. Radiation levels in the spent fuel storage pool area shall be monitored continuously during fuel handling operations.

   b. Prior to fuel handling operations, fuel-handling cranes shall be load-tested for OPERABILITY of limit switches, interlocks and alarms.

   c. A minimum boron concentration of 1800 ppm shall be maintained in the spent fuel pool whenever a spent fuel cask containing fuel is located in the spent fuel pool.

2. If any of the conditions in 3.8.B.1, above, cannot be met, suspend all fuel handling operations and initiate the actions necessary to re-establish compliance with the requirements of 3.8.B.1.

TABLE TS.4.1-2B

MINIMUM FREQUENCIES FOR SAMPLING TESTS

TEST	FREQUENCY	FSAR Section Reference
1. RCS Gross Activity Determination	5/week	
2. RCS Isotopic Analysis for DOSE EQUIVALENT I-131 Concentration	1/14 days (when at power)	
3. RCS Radiochemistry $\bar{E}$ determination	1/6 months(1) (when at power)	
4. RCS Isotopic Analysis for Iodine Including I-131, I-133, and I-135	a) Once per 4 hours, whenever the specific activity exceeds 1.0 uCi/gram DOSE EQUIVALENT I-131 or 100/$\bar{E}$ uCi/gram (at or above cold shutdown), and b) One sample between 2 and 6 hours following THERMAL POWER change exceeding 15 percent of the RATED THERMAL POWER within a one hour period (above hot shutdown)	
5. RCS Radiochemistry (2)	Monthly	
6. RCS Tritium Activity	Weekly	
7. RCS Chemistry (Cl*, F*, O_2)	5/Week	
8. RCS Boron Concentration*(3)	2/Week (4)	9.2
9. RWST Boron Concentration	Weekly	
10. Boric Acid Tanks Boron Concentration	2/Week	
11. Caustic Standpipe NaOH Concentration	Monthly	6.4
12. Accumulator Boron Concentration	Monthly	6
13. Spent Fuel Pit Boron Concentration	Monthly (7)	9.5.5

TABLE TS.4.1-2B

MINIMUM FREQUENCIES FOR SAMPLING TESTS

TEST	FREQUENCY	FSAR Section Reference
14. Secondary Coolant Gross Beta-Gamma activity	Weekly	
15. Secondary Coolant Isotopic Analysis for DOSE EQUIVALENT I-131 concentration	1/6 months (5)	
16. Secondary Coolant Chemistry		
pH	5/week (6)	
pH Control Additive	5/week (6)	
Sodium	5/week (6)	

Notes:

1. Sample to be taken after a minimum of 2 EFPD and 20 days of POWER OPERATION have elapsed since reactor was last subcritical for 48 hours or longer.
2. To determine activity of corrosion products having a half-life greater than 30 minutes.
3. D-ring REFUELING, the boron concentration shall be verified by chemical analysis daily.
4. The maximum interval between analyses shall not exceed 5 days.
5. If activity of the samples is greater than 10% of the limit in Specification 3.4.D, the frequency shall be once per month.
6. The maximum interval between analyses shall not exceed 3 days.
7. The minimum spent fuel pool boron concentration from Specification 3.8.B.1.b shall be verified by chemical analysis weekly while a spent fuel cask containing fuel is located in the spent fuel pool.

* See Specification 4.1.D

4.19 Auxiliary Building Crane Lifting Devices

Applicability

Applies to surveillance requirements for the auxiliary building crane special lifting devices and slings before handling heavy loads carried over safe shutdown equipment or spent fuel in the spent fuel pool.

Objective

To verify that special lifting devices and slings used in conjunction with the auxiliary building crane are operable prior to their use in supporting heavy loads over safe shutdown equipment or spent fuel in the spent fuel pool.

Specification

Slings and special lifting devices which will be used in supporting heavy loads from the auxiliary building crane shall be visually inspected and verified OPERABLE within 7 days prior to their use in handling heavy loads over safe shutdown equipment or spent fuel in the spent fuel pool.

5.6 FUEL HANDLING

A. Criticality Consideration

The new and spent fuel pit structures are designed to withstand the anticipated earthquake loadings as Class I (seismic) structures. The spent fuel pit has a stainless steel liner to ensure against loss of water (Reference 1).

The new and spent fuel storage racks are designed so that it is impossible to insert assemblies in other than the prescribed locations. The design of the new fuel storage pit and racks (Reference 1) ensures a new fuel pit K_{eff} of less than or equal to 0.95, including uncertainties, even if unborated water were used to fill the pit. The new fuel rack configuration also ensures K_{eff} less than or equal to 0.98, including uncertainties, even if the new fuel racks were accidentally filled with a low density moderator which resulted in optimum low density moderation conditions. Fuel stored in the new fuel storage racks will have a maximum enrichment of 4.25 weight percent U-235.

The spent fuel storage rack design (Reference 1) and the limitations on the storage of low burnup fuel contained in Technical Specification Section 3.8.E ensure a spent fuel pool K_{eff} of less than or equal to 0.95, including uncertainties. The maximum enrichment of fuel to be stored in the spent fuel pool will be 4.25 weight percent U-235.

Fuel will not be inserted into a spent fuel cask in the pool unless a minimum boron concentration of 1800 ppm is present. The 1800 ppm will ensure that k_{eff} for the spent fuel cask, including statistical uncertainties, will be less than or equal to 0.95 for all postulated arrangements of fuel within the cask. The criticality analysis for the TN-40 spent fuel storage cask was based on fresh fuel enriched to 3.85 weight percent U-235.

B. Spent Fuel Storage Structure

The spent fuel storage pool is enclosed with a reinforced concrete building having 12- to 18-inch thick walls and roof (Reference 1). The pool and pool enclosure are Class I (seismic) structures that afford protection against loss of integrity from postulated tornado missiles. The storage compartments and the fuel transfer canal are connected by fuel transfer slots that can be closed off with pneumatically sealed gates. The bottoms of the slots are above the tops of the active fuel in the fuel assemblies which will be stored vertically in specially constructed racks.

The spent fuel pool has a reinforced concrete bottom slab nearly 6 feet thick and has been designed to minimize loss of water due to a dropped cask accident. Piping to the pool is arranged so that failure of any pipe cannot drain the pool below the tops of the stored fuel assemblies.

C. Fuel Handling

The fuel handling system provides the means of transporting and handling fuel from the time it reaches the plant in an unirradiated condition until it leaves after post-irradiation cooling. The system consists of the refueling cavity, the fuel transfer system, the spent fuel storage pit, and the spent fuel cask transfer system.

Major components of the fuel handling system are the manipulation crane, the spent fuel pool bridge, the auxiliary building crane, the fuel transfer system, the spent fuel storage racks, the spent fuel cask, and the rod cluster control changing fixture. The reactor vessel stud tensioner, the reactor vessel head lifting device, and the reactor internals lifting device are used for preparing the reactor for refueling and for assembling the reactor after refueling.

Upon arrival in the storage pit, spent fuel will be removed from the transfer system and placed, one assembly at a time, in storage racks using a long-handled manual tool suspended from the spent fuel pit bridge crane. After sufficient decay, the fuel will be loaded into storage casks for storage in the Independent Spent Fuel Storage Installation or into shipping casks for removal from the site. The casks will be handled by the auxiliary building crane.

Spent fuel casks will be handled by a single failure proof handling system meeting the requirements of Section 5.1.6 of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants", July 1980. The auxiliary building crane has been upgraded to conform with the single failure proof requirements of Section 5.1.6 of NUREG-0612. The auxiliary building crane is designed to not allow a load drop as a result of any single failure. The improved reliability of the auxiliary building crane is achieved through increased factors of safety and through redundancy or duality in certain active components.

D. Spent Fuel Storage Capacity

The spent fuel storage facility is a two-compartment pool that, if completely filled with fuel storage racks, provides up to 1582 storage locations. The southeast corner of the small pool (pool no. 1) also serves as the cask lay down area. During times when the cask is being used, four racks are removed from the small pool. With the four storage racks in the southeast corner of pool 1 removed, a total of 1386 storage locations are provided. To allow insertion of a spent fuel cask, total storage is limited to 1385 assemblies, not including those assemblies which can be returned to the reactor.

Reference

1. USAR, Section 10.2

3.8 REFUELING AND FUEL HANDLING

Bases

The equipment and general procedures to be utilized during refueling are discussed in the FSAR. Detailed instructions, the precautions specified above, and the design of the fuel handling equipment incorporating built-in interlocks and safety features, provide assurance that no incident could occur during CORE ALTERATIONS that would result in a hazard to public health and safety (Reference 1). Whenever changes are not being made in core geometry, one flux monitor is sufficient. This permits maintenance of the instrumentation. Continuous monitoring of radiation levels and neutron flux provides immediate indication of an unsafe condition. The residual heat removal pump is used to maintain a uniform boron concentration.

Under rodded and unrodded conditions, the k_{eff} of the reactor must be less than or equal to 0.95 and the boron concentration must be greater than or equal to 2000 ppm. Periodic checks of refueling water boron concentration insure that proper shutdown margin is maintained. 3.8.A.1.h allows the control room operator to inform the manipulator operator of any impending unsafe condition detected from the main control board indicators during fuel movement.

No movement of fuel in the reactor is permitted until the reactor has been subcritical for at least 100 hours to permit decay of the fission products in the fuel. The delay time is consistent with the fuel handling accident analysis (Reference 2).

Fuel will not be inserted into a spent fuel cask unless a minimum boron concentration of 1800 ppm is present. The 1800 ppm will ensure that k_{eff} for the spent fuel cask, including statistical uncertainties, will be less than or equal to 0.95 for all postulated arrangements of fuel within the cask.

The number of recently discharged assemblies in Pool No. 1 has been limited to 45 to provide assurance that in the event of loss of pool cooling capability, at least eight hours are available under worst case conditions to make repairs until the onset of boiling.

The Spent Fuel Pool Special Ventilation System (Reference 3) is a safeguards system which maintains a negative pressure in the spent fuel enclosure upon detection of high area radiation. The Spent Fuel Pool Normal Ventilation System is automatically isolated and exhaust air is drawn through filter modules containing a roughing filter, particulate filter, and a charcoal filter before discharge to the environment via one of the Shield Building exhaust stacks. Two completely redundant trains are provided. The exhaust fan and filter of each train are shared with the corresponding train of the Containment In-service Purge System. High efficiency particulate absolute (HEPA) filters are installed before the charcoal adsorbers to prevent clogging of the iodine adsorbers in each SFPSVS filter train. The charcoal adsorbers are installed to reduce the potential release of radioiodine to the environment.

3.8 REFUELING AND FUEL HANDLING

Bases continued

During movement of irradiated fuel assemblies or control rods, a water level of 23 feet is maintained to provide sufficient shielding.

The water level may be lowered to the top of the RCCA drive shafts for latching and unlatching. The water level may also be lowered below 20 feet for upper internals removal/replacement. The basis for these allowance(s) are (1) the refueling cavity pool has sufficient level to allow time to initiate repairs or emergency procedures to cool the core, (2) during latching/unlatching and upper internals removal/replacement the level is closely monitored because the activity uses this level as a reference point, (3) the time spent at this level is minimal.

The requirements for the storage of low burnup fuel in the spent fuel pool ensure that the spent fuel pool will remain subcritical during fuel storage. Fuel stored in the spent fuel pool will be limited to a maximum enrichment of 4.25 weight percent U-235. It has been shown by criticality analysis that the use of the three out of four storage configuration will assure that the K_{eff} will remain less than 0.95, including uncertainties, when fuel with a maximum enrichment of 4.25 weight percent U-235 and average assembly burnup of less than 5,000 MWD/MTU is stored in the spent fuel pool.

The requirement for maintaining the spent fuel pool boron concentration greater than 500 ppm whenever fuel with average assembly burnup of less than 5,000 MWD/MTU is stored in the spent fuel pool ensures that K_{eff} for the spent fuel pool will remain less than 0.95, including uncertainties, even if a fuel assembly is inadvertently inserted in the empty cell of the three out of four storage configuration

References

1. USAR, Section 10.2.1.2
2. USAR, Section 14.5.1
3. USAR, Section 10.3.7

4.19 Auxiliary Building Crane Lifting Devices

Bases

The auxiliary building crane has been modified to conform with the single failure proof requirements of Section 5.1.6 of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants", July 1980. The auxiliary building crane is designed to not allow a load drop as a result of any single failure. As the slings and special lifting devices are, by their nature, an integral part of the load bearing path, their surveillance is necessary to ensure against a load drop as a result of deficient rigging. Any load that weighs more than the combined weight of a single fuel assembly and its associated handling tool is considered a heavy load.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

NORTHERN STATES POWER COMPANY

DOCKET NO. 50-306

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 92
License No. DPR-60

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Northern States Power Company (the licensee) dated , complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-60 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.92, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

L B Marsh

L. B. Marsh, Director
Project Directorate III-1
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 9, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 92

FACILITY OPERATING LICENSE NO. DPR-60

DOCKET NO. 50-306

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by amendment number and contain marginal lines indicating the area of change.

REMOVE	INSERT
TS-iii	TS-iii
TS-vi	TS-vi
TS-vii	TS-vii
TS-xi	TS-xi
TS.3.8-3	TS.3.8-3
Table TS.4.1-2B (page 1 of 2)	Table TS.4.1-2B (page 1 of 2)
Table TS.4.1-2B (page 2 of 2)	Table TS.4.1-2B (page 2 of 2)
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TS.5.6-1	TS.5.6-1
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3.8.B. <u>Fuel Handling Operations</u>

1. During fuel handling operations the following conditions shall be satisfied:

   a. Radiation levels in the spent fuel storage pool area shall be monitored continuously during fuel handling operations.

   b. Prior to fuel handling operations, fuel-handling cranes shall be load-tested for OPERABILITY of limit switches, interlocks and alarms.

   c. A minimum boron concentration of 1800 ppm shall be maintained in the spent fuel pool whenever a spent fuel cask containing fuel is located in the spent fuel pool.

2. If any of the conditions in 3.8.B.1, above, cannot be met, suspend all fuel handling operations and initiate the actions necessary to re-establish compliance with the requirements of 3.8.B.1.

TABLE TS.4.1-2B

MINIMUM FREQUENCIES FOR SAMPLING TESTS

TEST	FREQUENCY	FSAR Section Reference
1. RCS Gross Activity Determination	5/week	
2. RCS Isotopic Analysis for DOSE EQUIVALENT I-131 Concentration	1/14 days (when at power)	
3. RCS Radiochemistry $\bar{E}$ determination	1/6 months(1) (when at power)	
4. RCS Isotopic Analysis for Iodine Including I-131, I-133, and I-135	a) Once per 4 hours, whenever the specific activity exceeds 1.0 uCi/gram DOSE EQUIVALENT I-131 or 100/$\bar{E}$ uCi/gram (at or above cold shutdown), and b) One sample between 2 and 6 hours following THERMAL POWER change exceeding 15 percent of the RATED THERMAL POWER within a one hour period (above hot shutdown)	
5. RCS Radiochemistry (2)	Monthly	
6. RCS Tritium Activity	Weekly	
7. RCS Chemistry (Cl*, F*, O_2)	5/Week	
8. RCS Boron Concentration*(3)	2/Week (4)	9.2
9. RWST Boron Concentration	Weekly	
10. Boric Acid Tanks Boron Concentration	2/Week	
11. Caustic Standpipe NaOH Concentration	Monthly	6.4
12. Accumulator Boron Concentration	Monthly	6
13. Spent Fuel Pit Boron Concentration	Monthly (7)	9.5.5

TABLE TS.4.1-2B

MINIMUM FREQUENCIES FOR SAMPLING TESTS

TEST		FREQUENCY	FSAR Section Reference
14.	Secondary Coolant Gross Beta-Gamma activity	Weekly	
15.	Secondary Coolant Isotopic Analysis for DOSE EQUIVALENT I-131 concentration	1/6 months (5)	
16.	Secondary Coolant Chemistry		
	pH	5/week (6)	
	pH Control Additive	5/week (6)	
	Sodium	5/week (6)	

Notes:

1. Sample to be taken after a minimum of 2 EFPD and 20 days of POWER OPERATION have elapsed since reactor was last subcritical for 48 hours or longer.

2. To determine activity of corrosion products having a half-life greater than 30 minutes.

3. During REFUELING, the boron concentration shall be verified by chemical analysis daily.

4. The maximum interval between analyses shall not exceed 5 days.

5. If activity of the samples is greater than 10% of the limit in Specification 3.4.D, the frequency shall be once per month.

6. The maximum interval between analyses shall not exceed 3 days.

7. The minimum spent fuel pool boron concentration from Specification 3.8.B.1.b shall be verified by chemical analysis weekly while a spent fuel cask containing fuel is located in the spent fuel pool.

* See Specification 4.1.D

4.19 Auxiliary Building Crane Lifting Devices

Applicability

Applies to surveillance requirements for the auxiliary building crane special lifting devices and slings before handling heavy loads carried over safe shutdown equipment or spent fuel in the spent fuel pool.

Objective

To verify that special lifting devices and slings used in conjunction with the auxiliary building crane are operable prior to their use in supporting heavy loads over safe shutdown equipment or spent fuel in the spent fuel pool.

Specification

Slings and special lifting devices which will be used in supporting heavy loads from the auxiliary building crane shall be visually inspected and verified OPERABLE within 7 days prior to their use in handling heavy loads over safe shutdown equipment or spent fuel in the spent fuel pool.

5.6 FUEL HANDLING

A. Criticality Consideration

The new and spent fuel pit structures are designed to withstand the anticipated earthquake loadings as Class I (seismic) structures. The spent fuel pit has a stainless steel liner to ensure against loss of water (Reference 1).

The new and spent fuel storage racks are designed so that it is impossible to insert assemblies in other than the prescribed locations. The design of the new fuel storage pit and racks (Reference 1) ensures a new fuel pit K_{eff} of less than or equal to 0.95, including uncertainties, even if unborated water were used to fill the pit. The new fuel rack configuration also ensures K_{eff} less than or equal to 0.98, including uncertainties, even if the new fuel racks were accidentally filled with a low density moderator which resulted in optimum low density moderation conditions. Fuel stored in the new fuel storage racks will have a maximum enrichment of 4.25 weight percent U-235.

The spent fuel storage rack design (Reference 1) and the limitations on the storage of low burnup fuel contained in Technical Specification Section 3.8.E ensure a spent fuel pool K_{eff} of less than or equal to 0.95, including uncertainties. The maximum enrichment of fuel to be stored in the spent fuel pool will be 4.25 weight percent U-235.

Fuel will not be inserted into a spent fuel cask in the pool, unless a minimum boron concentration of 1800 ppm is present. The 1800 ppm will ensure that k_{eff} for the spent fuel cask, including statistical uncertainties, will be less than or equal to 0.95 for all postulated arrangements of fuel within the cask. The criticality analysis for the TN-40 spent fuel storage cask was based on fresh fuel enriched to 3.85 weight percent U-235.

B. Spent Fuel Storage Structure

The spent fuel storage pool is enclosed with a reinforced concrete building having 12- to 18-inch thick walls and roof (Reference 1). The pool and pool enclosure are Class I (seismic) structures that afford protection against loss of integrity from postulated tornado missiles. The storage compartments and the fuel transfer canal are connected by fuel transfer slots that can be closed off with pneumatically sealed gates. The bottoms of the slots are above the tops of the active fuel in the fuel assemblies which will be stored vertically in specially constructed racks.

The spent fuel pool has a reinforced concrete bottom slab nearly 6 feet thick and has been designed to minimize loss of water due to a dropped cask accident. Piping to the pool is arranged so that failure of any pipe cannot drain the pool below the tops of the stored fuel assemblies.

C. Fuel Handling

The fuel handling system provides the means of transporting and handling fuel from the time it reaches the plant in an unirradiated condition until it leaves after post-irradiation cooling. The system consists of the refueling cavity, the fuel transfer system, the spent fuel storage pit, and the spent fuel cask transfer system.

Major components of the fuel handling system are the manipulation crane, the spent fuel pool bridge, the auxiliary building crane, the fuel transfer system, the spent fuel storage racks, the spent fuel cask, and the rod cluster control changing fixture. The reactor vessel stud tensioner, the reactor vessel head lifting device, and the reactor internals lifting device are used for preparing the reactor for refueling and for assembling the reactor after refueling.

Upon arrival in the storage pit, spent fuel will be removed from the transfer system and placed, one assembly at a time, in storage racks using a long-handled manual tool suspended from the spent fuel pit bridge crane. After sufficient decay, the fuel will be loaded into storage casks for storage in the Independent Spent Fuel Storage Installation or into shipping casks for removal from the site. The casks will be handled by the auxiliary building crane.

Spent fuel casks will be handled by a single failure proof handling system meeting the requirements of Section 5.1.6 of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants", July 1980. The auxiliary building crane has been upgraded to conform with the single failure proof requirements of Section 5.1.6 of NUREG-0612. The auxiliary building crane is designed to not allow a load drop as a result of any single failure. The improved reliability of the auxiliary building crane is achieved through increased factors of safety and through redundancy or duality in certain active components.

D. Spent Fuel Storage Capacity

The spent fuel storage facility is a two-compartment pool that, if completely filled with fuel storage racks, provides up to 1582 storage locations. The southeast corner of the small pool (pool no. 1) also serves as the cask lay down area. During times when the cask is being used, four racks are removed from the small pool. With the four storage racks in the southeast corner of pool 1 removed, a total of 1386 storage locations are provided. To allow insertion of a spent fuel cask, total storage is limited to 1385 assemblies, not including those assemblies which can be returned to the reactor.

Reference

1. USAR, Section 10.2

3.8 REFUELING AND FUEL HANDLING

Bases

The equipment and general procedures to be utilized during refueling are discussed in the FSAR. Detailed instructions, the precautions specified above, and the design of the fuel handling equipment incorporating built-in interlocks and safety features, provide assurance that no incident could occur during CORE ALTERATIONS that would result in a hazard to public health and safety (Reference 1). Whenever changes are not being made in core geometry, one flux monitor is sufficient. This permits maintenance of the instrumentation. Continuous monitoring of radiation levels and neutron flux provides immediate indication of an unsafe condition. The residual heat removal pump is used to maintain a uniform boron concentration.

Under rodded and unrodded conditions, the K_{eff} of the reactor must be less than or equal to 0.95 and the boron concentration must be greater than or equal to 2000 ppm. Periodic checks of refueling water boron concentration insure that proper shutdown margin is maintained. 3.8.A.1.h allows the control room operator to inform the manipulator operator of any impending unsafe condition detected from the main control board indicators during fuel movement.

No movement of fuel in the reactor is permitted until the reactor has been subcritical for at least 100 hours to permit decay of the fission products in the fuel. The delay time is consistent with the fuel handling accident analysis (Reference 2).

Fuel will not be inserted into a spent fuel cask unless a minimum boron concentration of 1800 ppm is present. The 1800 ppm will ensure that k_{eff} for the spent fuel cask, including statistical uncertainties, will be less than or equal to 0.95 for all postulated arrangements of fuel within the cask.

The number of recently discharged assemblies in Pool No. 1 has been limited to 45 to provide assurance that in the event of loss of pool cooling capability, at least eight hours are available under worst case conditions to make repairs until the onset of boiling.

The Spent Fuel Pool Special Ventilation System (Reference 3) is a safeguards system which maintains a negative pressure in the spent fuel enclosure upon detection of high area radiation. The Spent Fuel Pool Normal Ventilation System is automatically isolated and exhaust air is drawn through filter modules containing a roughing filter, particulate filter, and a charcoal filter before discharge to the environment via one of the Shield Building exhaust stacks. Two completely redundant trains are provided. The exhaust fan and filter of each train are shared with the corresponding train of the Containment In-service Purge System. High efficiency particulate absolute (HEPA) filters are installed before the charcoal adsorbers to prevent clogging of the iodine adsorbers in each SFPSVS filter train. The charcoal adsorbers are installed to reduce the potential release of radioiodine to the environment.

3.8 REFUELING AND FUEL HANDLING

Bases continued

During movement of irradiated fuel assemblies or control rods, a water level of 23 feet is maintained to provide sufficient shielding.

The water level may be lowered to the top of the RCCA drive shafts for latching and unlatching. The water level may also be lowered below 20 feet for upper internals removal/replacement. The basis for these allowance(s) are (1) the refueling cavity pool has sufficient level to allow time to initiate repairs or emergency procedures to cool the core, (2) during latching/unlatching and upper internals removal/replacement the level is closely monitored because the activity uses this level as a reference point, (3) the time spent at this level is minimal.

The requirements for the storage of low burnup fuel in the spent fuel pool ensure that the spent fuel pool will remain subcritical during fuel storage. Fuel stored in the spent fuel pool will be limited to a maximum enrichment of 4.25 weight percent U-235. It has been shown by criticality analysis that the use of the three out of four storage configuration will assure that the K_{eff} will remain less than 0.95, including uncertainties, when fuel with a maximum enrichment of 4.25 weight percent U-235 and average assembly burnup of less than 5,000 MWD/MTU is stored in the spent fuel pool.

The requirement for maintaining the spent fuel pool boron concentration greater than 500 ppm whenever fuel with average assembly burnup of less than 5,000 MWD/MTU is stored in the spent fuel pool ensures that K_{eff} for the spent fuel pool will remain less than 0.95, including uncertainties, even if a fuel assembly is inadvertently inserted in the empty cell of the three out of four storage configuration.

References

1. USAR, Section 10.2.1.2
2. USAR, Section 14.5.1
3. USAR, Section 10.3.7

4.19 Auxiliary Building Crane Lifting Devices

Bases

The auxiliary building crane has been modified to conform with the single failure proof requirements of Section 5.1.6 of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants", July 1980. The auxiliary building crane is designed to not allow a load drop as a result of any single failure. As the slings and special lifting devices are, by their nature, an integral part of the load bearing path, their surveillance is necessary to ensure against a load drop as a result of deficient rigging. Any load that weighs more than the combined weight of a single fuel assembly and its associated handling tool is considered a heavy load.