



DEC 10 2009

L-PI-09-123
10 CFR 50.59

U S Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Prairie Island Nuclear Generating Plant Units 1 and 2
Dockets 50-282 and 50-306
License Nos. DPR-42 and DPR-60

50.59 EVALUATION SUMMARY REPORT

With this letter, Northern States Power Company, a Minnesota corporation, (NSPM) submits two enclosures. Enclosure 1 contains descriptions and summaries of safety evaluations for changes, tests, and experiments made under the provisions of 10 CFR 50.59 during the period since the last update.

Enclosure 2 contains discussion of changes to regulatory commitments made within our Regulatory Commitment Change Process during the period since the last update.

Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments.

 For M. Schimmel

Mark A. Schimmel
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosures (2)

cc: Administrator, Region III, USNRC
Project Manager, Prairie Island, USNRC
Resident Inspector, Prairie Island, USNRC
State of Minnesota

ENCLOSURE 1

PRAIRIE ISLAND NUCLEAR GENERATING PLANT REPORT OF CHANGES, TESTS, AND EXPERIMENTS – DECEMBER 2009

Below are a brief description and a summary of the safety evaluation for each of those changes, tests, and experiments which were carried out at the Prairie Island Nuclear Generating Plant by Northern States Power Company, a Minnesota corporation, (NSPM) without prior Nuclear Regulatory Commission (NRC) approval, pursuant to the requirements of 10 CFR 50.59.

50.59 Evaluation No. 1054 – Unit 1 Cycle 24 Core Reload, Revisions 4 & 5

Description of Change

This design change is required to allow for continued power operation of Prairie Island Unit 1 for approximately 18 months. The fuel in the current core will be burned to a state that no longer allows for significant full power operation. This reload will replace burned fuel from Unit 1 Cycle 23 with 48 fresh fuel assemblies. This will allow the Unit 1 reactor to produce power at its rated capacity.

Summary of 50.59 Evaluation

The USAR Chapter 14 evaluations performed by the Nuclear Analysis Department (NAD) and Westinghouse demonstrate that the Prairie Island Unit 1 Cycle 24 reload design and associated Core Operating Limits Report (COLR) do not result in the accepted safety limits for any accident being exceeded. The Cycle 24 design is consistent with the description of the core in the Updated Safety Analysis Report (USAR). The core contains 121 fuel assemblies using a 14 x 14 fuel rod array, with 29 control rods in the same locations as described in the USAR. The only change from Cycle 23 is the distribution of new and used assemblies. This results in a redistribution of the isotopic distribution of the core that changes the core physics parameters of the reactor. The effect of these changes in the cycle physics parameters on cycle operation and accident analyses have been evaluated using NRC approved methods.

The accident analyses show that no design limits are exceeded during any analyzed transient for the cycle as designed. The cycle does not exceed any fuel burnup limits. Therefore the reload modification for Unit 1 Cycle 24 is safe and consistent with Prairie Island's current Licensing Basis.

50.59 Evaluation No. 1055 – Unit 2 Cycle 24 Core Reload, Revision 2Description of Change

This design change is required to allow for continued power operation of Prairie Island Unit 2 for approximately 21 months. The fuel in the current core will be burned to a state that no longer allows for significant full power operation. This reload will replace burned fuel from Unit 2 Cycle 23 with 56 fresh fuel assemblies. This will allow the Unit 2 reactor to produce power at its rated capacity. Revision 2 is valid for modes 1 through 6.

Summary of 50.59 Evaluation

The USAR Chapter 14 evaluations performed by NAD and Westinghouse demonstrate that the Prairie Island Unit 2 Cycle 24 reload design and associated COLR do not result in the accepted safety limits for any accident being exceeded. The Cycle 24 design is consistent with the description of the core in the USAR. The core contains 121 fuel assemblies using a 14 x 14 fuel rod array, with 29 control rods in the same locations as described in the USAR. The only change from Cycle 23 is the distribution of new and used assemblies. This results in a redistribution of the isotopic distribution of the core that changes the core physics parameters of the reactor. The effect of these changes in the cycle physics parameters on cycle operation and accident analyses have been evaluated using NRC approved methods. No analysis needed to be re-run for this core design.

The accident analyses show that no design limits are exceeded during any analyzed transient for the cycle as designed. The cycle does not exceed any fuel burnup limits. Therefore the reload modification for Unit 2 Cycle 24 is safe and consistent with Prairie Island's current Licensing Basis.

**50.59 Evaluation No. 1058 – Turbine EH Control System Upgrade Project, Unit 1
50.59 Evaluation No. 1060 – Turbine EH Control System Upgrade Project, Unit 2**Description of Change

The existing Unit 1 & 2 electro-hydraulic (EH) control systems and many related devices are being replaced. The EH control system initiates Turbine Trip signals to trip the Turbine and to input to the Reactor Protection System. The existing Analog EH Controller is being replaced with a fault tolerant Digital Control System.

Summary of 50.59 Evaluations

The EH control system can cause turbine and reactor trips. However, several features of the EH control system replacement ensure that the frequency of occurrence of these events will not be increased. The devices affected by system replacement provide no role in mitigating the consequences of an accident. Project software was developed with a rigorous verification and validation program. Replacement control system installation is consistent with interface requirements for separation between safety and

non-safety related circuits. The new system and field devices do not create an adverse environment which could adversely affect other structures, systems, or components (SSC). Thus, the replacement does not result in more than a minimal increase in the likelihood of a malfunction nor in consequences of an accident or malfunction.

Any failure within controller hardware or software at worst case could only result in one or more previously analyzed transient. Thus, the project does not create a possibility for an accident of a different type nor a malfunction of an SSC important to safety with a different result. Replacement of the turbine controls does not impact the design basis limits for fission product barriers. The changes do not involve a method of analysis described in the USAR.

50.59 Evaluation No. 1059 – Unit 1 Cycle 25 Core Reload, Revisions 0 & 1

Description of Change

This design change will replace depleted fuel from the Unit 1 Cycle 24 reactor core with 48 fresh fuel assemblies. This will allow the Unit 1 reactor to produce power at its rated capacity in Unit 1 Cycle 25 for approximately 18 months. This activity is required because the fuel in the current core will be depleted to a state that no longer allows for full power operation.

Summary of 50.59 Evaluation

The USAR Chapter 14 evaluations performed by NAD and Westinghouse demonstrate that the Prairie Island Unit 1 Cycle 25 reload design and associated COLR do not result in the licensed safety limits for any accident being exceeded. The Cycle 25 design is consistent with the description of the core in the USAR. The core contains 121 fuel assemblies using a 14 x 14 fuel rod array, with 29 control rods in the same locations as described in the USAR. The only change from Cycle 24 is the distribution of new and used assemblies. This results in a redistribution of the isotopic distribution of the core that changes the core physics parameters of the reactor. The effect of these changes in the cycle physics parameters on cycle operation and accident analyses have been evaluated using NRC approved methods.

The accident analyses show that no design limits are exceeded during any analyzed transient for the cycle as designed. The cycle does not exceed any fuel burnup limits. Therefore the reload modification for Unit 1 Cycle 25 is safe and consistent with Prairie Island's current Licensing Basis.

50.59 Evaluation No. 1061 – Unit 2 Cycle 25 Core Reload

Description of Change

This design change will replace depleted fuel from the Unit 2 Cycle 24 reactor core with 49 fresh fuel assemblies. This will allow the Unit 2 reactor to produce power at its rated capacity in Unit 2 Cycle 25 for approximately 18 months. This activity is required

because the fuel in the current core will be depleted to a state that no longer allows for full power operation.

Summary of 50.59 Evaluation

The USAR Chapter 14 evaluations performed by NAD and Westinghouse demonstrate that the Prairie Island Unit 2 Cycle 25 reload design and associated COLR do not result in the licensed safety limits for any accident being exceeded. The Cycle 25 design is consistent with the description of the core in the USAR. The core contains 121 fuel assemblies using a 14 x 14 fuel rod array, with 29 control rods in the same locations as described in the USAR. The only change from Cycle 24 is the distribution of new and used assemblies. This results in a redistribution of the isotopic distribution of the core that changes the core physics parameters of the reactor. The effect of these changes in the cycle physics parameters on cycle operation and accident analyses have been evaluated using NRC approved methods.

All of the accident analyses comprising the licensing basis, that could potentially be affected by the fuel reload, have been reviewed for the Unit 2 Cycle 25 design. This includes the steamline break mass and energy release outside containment, which is not currently part of the Prairie Island licensing basis, but is anticipated to be by the end of Unit 2 Cycle 25. Therefore, this analysis is included in the Unit 2 Cycle 25 reload evaluation.

The accident analyses show that no design limits are exceeded during any analyzed transient for the cycle as designed. The cycle does not exceed any fuel burnup limits. Therefore the reload modification for Unit 2 Cycle 25 is safe and consistent with Prairie Island's current Licensing Basis.

50.59 Evaluations:

- No. 1062 – Revise Excessive Heat Removal Due to Feedwater System Malfunction Analysis in USAR Section 14.4.6**
- No. 1063 – Revise Loss of External Electrical Load Analysis in USAR Section 14.4.9**
- No. 1064 – Revise Loss of Reactor Coolant Flow – Flow Coast Down Analysis in USAR Section 14.4.8.1**
- No. 1065 – Revise Uncontrolled RCCA Withdrawal at Power Analysis in USAR Section 14.4.2**
- No. 1066 – Revise Excessive Load Increase Incident in USAR Section 14.4.7**
- No. 1067 – Revise Anticipated Transient Without Scram Analysis in USAR Section 14.8**
- No. 1068 – Revise Rupture of a Steam Pipe – Full Power Core Response Analysis in USAR Section 14.5.5.3.2**
- No. 1069 – Revise Loss of Reactor Coolant Flow – Locked Pump Rotor Analysis in USAR Section 14.4.8.2**
- No. 1070 – Revise RCCA Misalignment Analysis in USAR Section 14.4.3**

Description of Change

In anticipation of submitting a License Amendment Request (LAR) for a Measurement Uncertainty Recapture (MUR) power uprate, safety analyses that bound MUR conditions, e.g. increased nominal reactor power and reduced power uncertainty, are to be incorporated into the USAR. The revised analyses were performed and evaluated such that they also bound current operations. Each revised analysis is listed as the title for its respective 50.59 Evaluation.

There are no changes to the approved methodology used to analyze this event; the change only involves changes to inputs used to analyze the event.

Summary of 50.59 Evaluations

Changes to the analyses do not affect equipment operation, reliability, or performance and the results meet the design criteria. Thus, there is no impact on the frequency of an accident, likelihood of a malfunction, possibility of a new accident, or possibility of a malfunction with a different result.

The analyses show that the Departure From Nucleate Boiling Ratio remains above the limit and thus a design basis limit for a fission product barrier is not exceeded. The analyses used methods that were not deviations from those described in the USAR.

50.59 Evaluation No. 1071 – Hydrogen Storage Replacement Modification

Description of Change

The existing bulk hydrogen gas storage facility at Prairie Island Nuclear Generating Plant consists of multiple portable carts with each cart consisting of several cylinders of hydrogen gas. This configuration requires substantial handling of a large volume of small hydrogen cylinders, and is considered a personnel safety issue.

The proposed bulk hydrogen storage facility will consist of multiple banks of tubes situated in relatively the same location as the old system. System capacity will be increased. The delivery of hydrogen to the new facility will involve moving a larger quantity of hydrogen via a truck-mounted tube bank, but eliminates the safety concerns associated with the existing facility.

The evaluation focuses on the effects of a postulated hydrogen explosion. A 50.59 screening was performed to evaluate the non-adverse activities associated with this modification.

Summary of 50.59 Evaluation

The increase in bulk hydrogen storage vessel size and transportation vessel size results in a greater postulated hydrogen explosion, thereby has a greater effect on nearby SSCs. Blast analysis was conducted using NRC approved methodology. While the damage from the proposed hydrogen explosion will be more severe, the adverse effects

of the larger explosion have been evaluated and are enveloped by existing USAR safety analyses.

The increase in on-site vessel size does not result in a more than minimal increase in frequency or consequences of USAR previously evaluated accidents or malfunctions, does not have the potential to create a new type of event, and does not impact fission product barriers or methods of analysis described in the USAR.

50.59 Evaluation No. 1072 – Unit 1 Cycle 26 Core Reload

Description of Change

This activity will replace depleted fuel from the Unit 1 Cycle 25 reactor core with 48 fresh fuel assemblies. This will allow the Unit 1 reactor to produce power at its rated capacity in Unit 1 Cycle 26 for approximately 18 months. This activity is required because the fuel in the current core will be depleted to a state that no longer allows for full power operation.

Summary of 50.59 Evaluation

The USAR Chapter 14 evaluations performed by Westinghouse demonstrate that the Prairie Island Unit 1 Cycle 26 reload design and associated COLR do not result in the licensed safety limits for any accident being exceeded. The Cycle 26 design is consistent with the description of the core in the USAR, including pending changes pursuant License Amendment 192/181 which approved use of the 422 Vantage Plus (422V+) fuel assembly. The core contains 121 fuel assemblies using a 14 x 14 fuel rod array, with 29 control rods in the same locations as described in the USAR. The only change from Cycle 25 is the distribution of new 422V+ fuel assemblies with used assemblies of the Optimized Fuel Assembly (OFA) design. This change results in a redistribution of the isotopic distribution of the core that changes the core physics parameters of the reactor. The effect of these changes in the cycle physics parameters on cycle operation and accident analyses have been evaluated using NRC approved methods.

The accident analyses show that no design limits are exceeded during any analyzed transient for the cycle as designed. The cycle does not exceed any fuel burnup limits. Therefore the reload modification for Unit 1 Cycle 26 is safe and consistent with Prairie Island's current Licensing Basis.

ENCLOSURE 2

CHANGES TO REGULATORY COMMITMENTS

Regulatory Commitment Change 09-01 – Revise Commitment to Implement a Periodic Vendor Contact Program

Original commitment (reconstituted from a September 25, 1990 letter to the NRC) was to have procedures in place by November 1990 to document the program and the list of vendors of key safety-related components. The revised commitment is, "Northern States Power Company, a Minnesota corporation, (NSPM) will implement a periodic vendor contact program."

Regulatory Commitment Changes 09-05 through 09-10 – Cancel Commitments to the B.5.b Program

Initial implementation of the B.5.b program was achieved under the Commitment process. Six commitments were made via letter to the NRC, "Response Providing Information Regarding Implementation Details for the Phase 2 and 3 Mitigation Strategies", dated February 26, 2007.

The B.5.b strategies have now been codified through 10 CFR 50.54(hh). As such, the B.5.b strategies have become an obligation and the above referenced commitments can be canceled.