Xcel Energy®

November 18, 2013

L-PI-13-100
10 CFR 50.73

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

Prairie Island Nuclear Generating Plant Units 1 and 2
Docket 50-282 and 50-306
Renewed License No. DPR-42 and DPR-60

LER 50-282/2013-002-00, Unanalyzed Condition – Fuel Oil Inadequate Replenishment

Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), encloses Licensee Event Report (LER) 50-282/2013-002-00, Unanalyzed Condition – Fuel Oil Inadequate Replenishment.

Summary of Commitments

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

Scott Sharp acting Site VP for Kevin Davison

Kevin Davison
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosure

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

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ENCLOSURE

LICENSEE EVENT REPORT 50-282/2013-002-00

6 Pages Follow

NRC FORM 366
(10-2010)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0066), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Prairie Island Nuclear Generating Plant Unit 1	05000 282	1 OF 6

4. TITLE

Unanalyzed Condition - Fuel Oil Inadequate Replenishment

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									PINGP Unit 2	05000-306
9	19	2013	2013	– 002 –	00	11	18	2013	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

Mode 1

10. POWER LEVEL

100%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☑ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Frank Sienczak	651-267-1740

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FA CTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

O YES (If yes, complete 15. EXPECTED SUBMISSION DATE). ⊙ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On September 19, 2013, a potential unanalyzed condition was identified associated with replenishing fuel oil during a flood after 14 days.

The fuel oil storage requirements specified in the site's Abnormal Procedure AB-4, "Flood," defines "Keep Full" status as sufficient level in the emergency tanks to exceed the required Technical Specification (Tech Spec) levels at all times during the flood crest. Maintaining fuel oil inventory just above the Tech Spec level may not be adequate to allow replenishment of the fuel oil during a flood, which was considered an unanalyzed condition as required by 10 CFR 50.73(a)(2)(ii)(B).

EVENT DESCRIPTION

On September 19, 2013, a potential unanalyzed condition was identified. The current licensing basis requires a 14 day supply of fuel oil. Preliminary calculations show that there is sufficient tank volume for the duration of design basis maximum probable flood condition. However, during maximum flood condition there is currently no documented plan in place to receive additional fuel oil to maintain Unit 1 and Unit 2 Emergency Diesel Generators[1] operable and running to supply emergency power to essential loads for the duration of the effects of a design basis maximum probable flood condition. These effects, such as flooded roads, may exceed 14 days. Maintaining fuel oil inventory just above the Technical Specification (Tech Spec) level may not be adequate to allow replenishment of the fuel oil during a flood, which was considered an unanalyzed condition as required by 10 CFR 50.73(a)(2)(ii)(B). This is not an immediate safety concern because additional fuel oil can be added to the fuel oil storage tanks for imminent flood conditions.

The following description and timeline provides the history associated with the current wording in AB-4, "Flood," that defines "Keep Full" status as sufficient level in the emergency tanks to exceed the required Tech Spec levels at all times during the flood crest.

FSAR

1971 FSAR – Section 2 indicated the following:
The design minimum supply of emergency diesel fuel oil is 70,000 gallons, 11 days nominal full load supply for one emergency diesel set (with two tanks unavailable). If flood stage above 691.5 feet is forecasted, this supply would be brought up to maximum (105,000 gallons with all six tanks available).

The emergency diesel storage tanks[2] can be refilled from either of the two 35,000 gallon heating boiler tanks (non-Class I) by truck delivery to a flood stage of about 693 feet, or by rail delivery to a stage of about 695 feet.

USAR

1981 USAR (Revision 0) – Section 2 indicated the following:
The design minimum supply of emergency diesel fuel oil (Figure 8.4-1, two Class I tanks unavailable) is 70,000 gallons for one emergency diesel set running at full load (3000 KW) for 11 days. It should also be noted 70,000 gallons will supply one diesel cooling water pump and one diesel generator (loaded per Table 8.4-1) for greater than 14 days. If flood stage above 691.5 feet is forecast, this Class I supply would be brought to maximum capacity of 105,000 gallons (all six tanks available).

The emergency diesel storage tanks can be refilled from either of the two 35,000 gallons heating boiler tanks (non-Class I), as indicated by Figure 8.4-1.

[1] EIIS System Code - DG
[2] EIIS System Code - DE

1993 USAR (Revision 11) – Section 2 indicated the following:
The Unit 1 design minimum supply of emergency diesel fuel oil (Figure 8.4-1, two Class I tanks available) is 70,000 gallons for one emergency diesel set running at full load (3000 KW) for 11 days. It should also be noted 70,000 gallons will supply one diesel cooling water pump and one diesel generator (loaded per Table 8.4-1) for greater than 14 days. If flood stage above 691.5 feet is forecast, this Class I supply would be brought to maximum capacity of 105,000 gallons (all six tanks available).

The Unit 2 design minimum supply of emergency diesel fuel oil is 61,600 gallons (two 30,800 gallon storage tanks available) for each diesel generator set. This volume is sufficient for the emergency diesel to operate for seven days at rated full load. The tanks are sized so that if one is not in service, the capacity of the remaining three is sufficient to supply D5 and D6 continuously for seven days at actual load. The Unit 2 storage system can supply sufficient fuel to operate one diesel generator set for fourteen days at actual load in the event of a design basis flood.

The emergency diesel storage tanks can be refilled from either of the two 35,000 gallon heating boiler tanks (non-Class I), as indicated by Figure 8.4-1.

1995 USAR (Revision 13) – Section 2 indicated the following:
The Unit 1 design minimum storage capacity of diesel fuel oil is based on one diesel generator operating at the loads stated in Table 8.4-1 plus one diesel driven cooling water pump for 14 days. Under these conditions one diesel generator would require approximately 40,100 gallons of fuel oil and the diesel driven cooling water pump would require approximately 19,500 gallons. Each diesel has a 500 gallon day tank. In addition to the day tanks there are four Class I fuel oil storage tanks (19,500 nominal, 17,500 available gallons each) for the diesel generators and two Class I fuel oil storage tanks (19,500 nominal, 17,500 available gallons each) for the diesel driven cooling water pumps. The six Class I tanks are interconnected such that any tank can be manually aligned to supply any diesel day tank. Therefore any combination of four tanks will meet the storage capacity requirements. The Unit 1 Class I fuel oil storage tanks can also be refilled from either of the two non-Class I heating boiler fuel oil storage tanks (35,000 nominal gallons each).

The Unit 2 design minimum storage capacity of diesel fuel oil is based on (1) two diesel generators operating at the loads stated in Table 8.4-2 for 7 days or (2) one diesel generator operating at the loads stated in Table 8.4-2 for 14 days. For condition (1) the two diesel generators would require approximately 74,600 gallons of fuel oil and for condition (2) one diesel would require approximately 72,200 gallons. Each diesel generator has a 600 gallon day tank. There are four Class I fuel oil storage tanks (32,800 nominal, 30,800 available gallons each). The four tanks are interconnected such that any tank can be manually aligned to supply either diesel day tank. Therefore, any combination of three tanks will meet the storage capacity requirements.

2000 USAR (Revision 21) – Section 2 indicated the following:
As discussed in Section 10.3.13, any combination of four of the six Unit 1 Design Class I fuel oil storage tanks and any combination of three of four Unite 2 Design Class I fuel oil storage tanks will allow operation of one safety related Unit 1 emergency diesel generator, D1 or D2; one Unit 2

emergency diesel generator, D5 or D6; and one diesel driven cooling water pump, 12 or 22, for 14 days. This is longer that the 13 days that the river flood level for the probably maximum flood will remain above the plant grade elevation.

2013 USAR (Revision 33P) – Section 2 indicated the following:
As discussed in Section 10.3.13, any combination of the six Unit 1 Design Class I fuel oil storage tanks will allow operation of one safety related Unit 1 emergency diesel generator, D1 or D2, and one diesel driven cooling water pump, 12 or 22, for 14 days. Any combination of the four Unit 2 Design Class I fuel oil storage tanks will allow operation of one Unit 2 emergency diesel generator, D5 or D6 for 14 days. This is longer than the 13 days that the river flood level for the probable maximum flood will remain above the plant grade elevation.

EVENT ANALYSIS

Unit 1 Emergency Diesel Generator equipment is located in separate heated rooms, protected from atmospheric conditions, in a Class I portion of the Turbine Building, permitting nearly ideal rapid-start conditions. The rooms are connected by a single access opening which is provided with a Class "A" fire rated door. The door, which is normally closed, is furnished with an extra-strong door closer equipped with a fusible link arm. Since the wall separating the two emergency diesel generators is parallel with the rotation of the diesel generator, it is incredible that a missile generated by the failure of one diesel generator will breach the wall opening.

Unit 2 Emergency Diesel Generator equipment is also located in separate rooms, protected from atmospheric conditions, in the Class I D5/D6 Building. These rooms are separated by a twelve inch thick reinforced concrete barrier. There are no wall openings directly between the two rooms.

Each Emergency Diesel Generator, as a backup to the normal standby AC power supply, is capable of sequentially starting and supplying the power requirements of one of the redundant sets of engineered safety features for its reactor Unit. In addition, in the event of a station blackout (SBO) condition, each Emergency Diesel Generator is capable of sequentially starting and supplying the power requirements of the hot shutdown (Mode 3, Hot Standby in ITS) loads for its unit, as well as the essential loads of the blacked out unit, through the use of manual bus tie breakers interconnecting the 4160V buses.

Review of the FSAR and USAR shows that the original design and licensing basis requirement to address a flood included a strategy to supply both units using one emergency diesel generator and one diesel cooling water pump. The flood strategy was to top off all the tanks (Class I and non-safety related) and to refill the six Class I tanks from the non-safety related tanks.

With the addition of D5 and D6 (in 1992) and the additional fuel oil capacity, the basic flood strategy was applied to each unit. The strategy to top off all the tanks (Class I and non-safety related) and to refill the Class I tanks from the non-safety related tanks was applied to each unit.

A 2013 license amendment relocated the 14 day supply of fuel oil (to address a flood) from the technical specifications to the USAR.

As the licensing basis changed, words in the USAR that specifically credited filling the tanks full and utilizing the ability to refill the Class I tanks from the non-safety related tanks were replaced with the requirement to maintain 14 days of fuel per unit.

When AB-4 was generated, in 1981, there was a step to top off all fuel oil tanks. This step aligned with the FSAR requirements to increase the volume of fuel oil in the Class I tanks and use the non-safety related tanks as a back-up to increase the volume of fuel oil available.

SAFETY SIGNIFICANCE

There was no radiological, industrial, or environmental impact associated with this event. There is a potential nuclear risk, in the event of a flood with the loss of offsite fuel supplies may not be adequate to supply the emergency diesel generators. Each emergency diesel generator, as a backup to the normal standby AC power supply, is capable of sequentially starting and supplying the power requirements of one of the redundant sets of engineered safety features for its reactor Unit. In addition, in the event of a station blackout (SBO) condition, each emergency diesel generator is capable of sequentially starting and supplying the power requirements of the hot shutdown (Mode 3, Hot Standby in ITS) loads for its unit, as well as the essential loads of the blacked out unit, through the use of manual bus tie breakers interconnecting the 4160V buses.

There is regulatory impact that this issue is an unanalyzed condition and requires a 10 CFR 50.72 and 10 CFR 50.73 report.

CAUSE

The Abnormal Procedure AB-4, "Flood," was too generic and did not provide the needed information. The original design and licensing basis requirement to address a flood was to supply both units using one emergency diesel generator and one diesel cooling water pump. The flood strategy was to top off all the tanks (Class 1 and non-safety related) and to refill the six Class 1 tanks from the non-safety related tanks. This requirement was reflected in AB-4, "Flood," Revision 0, using generic language that did not fully describe the means available to refill the tanks.

CORRECTIVE ACTION

- Submit a procedure change request to revise AB-4, "Flood," procedure Section 2.4.4 for predicted levels of >685 feet to 688 feet such that it clearly describes the need to fill all Class I tanks (Unit 1 and Unit 2) and the non-safety related Heating Boiler tanks to the maximum usable volume.

- Submit a Section 2 USAR change that fully describes the licensing basis for maintaining fuel oil inventory in the event of a flood, include the following concepts:

  The original design and licensing basis requirement to address a flood included a strategy to supply both units using one emergency diesel generator and one diesel cooling water pump. The flood strategy was to top off all the tanks (Class I and non-safety related) and to refill the six Class I tanks from the non-safety related tanks.

  With the addition of D5 and D6 (in 1992) and the additional fuel oil capacity, the basic flood strategy was applied to each unit. The strategy to top off all the tanks (Class I and non-safety related) and to refill the Class I tanks from the non-safety related tanks was applied to each unit.

- To improve margin determine if during a flood condition additional fuel oil can be delivered and stored on site in tanker trucks at predicted level >698 until flood water recede. If this storage is acceptable under 10 CFR 50.59; then, add specific steps to AB-4, "Flood," to increase fuel oil inventory by ordering additional tanker trucks.

PREVIOUS SIMILAR EVENTS

None.