



## Nebraska Public Power District

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NLS2017012  
February 8, 2017

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
11555 Rockville Pike  
Rockville, MD 20852

**Subject:** Response to Nuclear Regulatory Commission Request for Information Regarding Near Term Task Force Recommendation 2.1 (Seismic) - Spent Fuel Pool Evaluation Report  
Cooper Nuclear Station, Docket No. 50-298, DPR-46

- References:**
1. NPPD Letter to NRC, "Nebraska Public Power District's Spent Fuel Pool Evaluation Report - Response to Nuclear Regulatory Commission Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated September 14, 2016
  2. NRC letter, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012
  3. Email from Frankie Vega, NRC, to Brenda Kirkpatrick, NPPD, "Rec 2.1 Seismic: Cooper's SFP Evaluation," dated December 15, 2016

Dear Sir or Madam:

In Reference 1, Nebraska Public Power District (NPPD) submitted the Spent Fuel Pool (SFP) Evaluation Report in response to the seismic aspects of Recommendation 2.1 in Reference 2. In Reference 3, the Nuclear Regulatory Commission (NRC) requested information/clarification regarding the piping evaluation documented in the SFP evaluation. The attachment to this letter provides NPPD's response to Reference 3.

There are no new regulatory commitments contained in this correspondence.

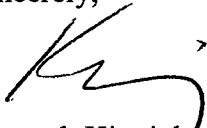
Should you have any questions or require additional information, please contact Jim Shaw, Licensing Manager, at (402) 825-2788.

AD10  
NR

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: 2/8/17

Sincerely,



Kenneth Higginbotham  
Vice President - Nuclear  
and Chief Nuclear Officer

/bk

Attachment: Response to Nuclear Regulatory Commission Request for Information  
Regarding Near Term Task Force Recommendation 2.1 (Seismic) - Spent Fuel  
Pool Evaluation Report

cc: Regional Administrator, w/attachment  
USNRC - Region IV

Director, w/attachment  
USNRC - Office of Nuclear Reactor Regulation

Cooper Project Manager, w/attachment  
USNRC - NRR Plant Licensing Branch IV

Senior Resident Inspector, w/attachment  
USNRC - CNS

NPG Distribution, w/attachment

CNS Records, w/attachment

## ATTACHMENT

### Response to Nuclear Regulatory Commission Request for Information Regarding Near Term Task Force Recommendation 2.1 (Seismic) - Spent Fuel Pool Evaluation Report

#### Cooper Nuclear Station, Docket No. 50-298, DPR-46

By letter dated September 14, 2016, Nebraska Public Power District (NPPD) submitted the Spent Fuel Pool Evaluation Report for Cooper Nuclear Station (CNS). In an email dated December 15, 2016, the Nuclear Regulatory Commission (NRC) transmitted the following request for information/clarification:

#### NRC Request:

*The piping evaluation section states that piping attached to the SFP could not be confirmed to have been evaluated to the SSE. In addition, this section states that piping is attached such that drain-down is possible to 10' above top of fuel, which is a "safe storage depth."*

*However, analyses in EPRI's SFP Seismic Evaluation Guidance (EPRI 3002007148) considered initial SFP water losses only from seismically induced sloshing, and did not consider additional water losses such as from a potential SFP pipe-break located 10' above the top of the spent fuel. Additional information is needed to evaluate the potential for boil-off and uncovering the top third of the spent fuel within 72 hours of a seismically induced pipe-break that resulted in unmitigated water loss to 10' above the top of the spent fuel, which is the event sequence outlined in the SPID (EPRI 1025287).*

#### NPPD Response:

The piping evaluation within the "Non-Structural Parameters" section of the Spent Fuel Pool (SFP) Evaluation Report reiterates an Updated Safety Analysis Report statement that describes the SFP "safe storage level" as 10 feet above the top of the fuel and that there are no penetrations below the "safe storage level."

Furthermore, this section states that there are two lines (6" FC-1S and 4" FC-2) designated as seismic Class IIS. Class IIS piping may be required for the operation of the station, but are not required for a safe shutdown. Based on a review of CNS drawings, the 4" FC-2 line does not penetrate the SFP liner. The 4" FC-2 line is part of the SFP skimmer that branches off to the 2" FC-2 lines connected to the skimmer around the pool at elevation 1000'-0", approximately 5.5" above the SFP normal water level; therefore the 4" FC-2 lines cannot cause a rapid drain-down of the SFP leading to uncovering more than one third of the fuel in 72 hours.

The 6" FC-1S lines enter the SFP at elevation 997'-10". Outside the SFP, the lines are connected to check valves at elevation 999'-4" and the check valves are approximately 2'-10" from the

outside face of the SFP wall. These check valves prevent backflow out of the pool in the event of a pipe break upstream of the check valve below the water level in the pool.

Furthermore, there are anti-siphoning devices on the 6" FC-1S lines at elevation 996'-10". If the check valves in the 6" FC-1S line were to fail during a break of the upstream piping, or in the event of a pipe break on the short section of piping between the check valve and the fuel pool, these devices limit the potential loss due to siphoning to 2'-11½" (i.e., 35.5 inches), the SFP remains within the range of the EPRI analyzed plants.

The potential loss due to siphoning is:  $(999'-9\frac{1}{2}" - (996'-10")) = 2'-11\frac{1}{2}" = 35.5$  inches. SFP sloshing and siphoning losses are not accumulative; therefore, any loss due to SFP sloshing would reduce the potential loss due to siphoning. Hence, given the potential losses due to siphoning, the remaining water inventory above the top elevation of fuel assemblies is 37.54 ft. - 2.96 ft. - 15.2 ft. (height of racks) = 19.38 ft., which is within the range of the EPRI analyzed plants (i.e., 16.8 ft. to 29.2 ft.). Accounting for allowed inventory losses down to one third the height of the fuel assemblies in accordance with the Screening, Prioritization, and Implementation Details report (EPRI 1025287), the increased inventory height is 19.38 ft. +  $(1/3) * 15.2$  ft. (height of racks) = 24.45 ft., which is within the range of the EPRI analyzed plants (i.e., 21.8 ft. to 34.2 ft.).

Finally, Table 3-4 of the EPRI Guidelines (EPRI 3002007148) summarizes the SFP non-structural evaluation criteria with the following statement for sloshing:

*"Site-specific sloshing analyses show that inventory losses are minor. For plants with peak Sa less than 0.8g, a conservative estimate of SFP inventory lost to sloshing is 3 feet. This lost inventory is accounted for in estimating evaporative losses (below)."*

Since the maximum potential loss due to siphoning, (i.e. 2'-11½"), is less than the estimates of SFP inventory loss due to sloshing/evaporation, (i.e. 3'); any potential loss due to siphoning has already been accounted for in EPRI's evaporation loss analysis.

Given the aforementioned justification, the potential losses due to siphoning from the 6" FC-1S lines are within the bounds of the EPRI analyzed plants; therefore there will not be a rapid drain-down of the SFP leading to uncovering more than one third of the fuel in 72 hours.