



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

July 23, 2019

Ms. Mary J. Fisher, Vice President
Energy Production & Nuclear
Decommissioning
Omaha Public Power District
Fort Calhoun Station
Mail Stop FC-2-4
9610 Power Lane
Blair, NE 68008

SUBJECT: FORT CALHOUN STATION – NRC INSPECTION REPORT 050-00285/2019-002

Dear Ms. Fisher:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted on May 13-16, 2019, at the Fort Calhoun Station (FCS) located near Blair, Nebraska. The NRC inspectors discussed the results of this inspection with members of your staff during an onsite debrief May 16, 2019, and then a final exit meeting was conducted telephonically on June 10, 2019. The inspection results are documented in the enclosure to this letter.

This inspection examined activities conducted under your license as they relate to public health and safety, common defense and security, and to confirm compliance with the Commission's rules and regulations, and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. Specifically, the inspectors reviewed your planned decommissioning activities to support SAFSTOR and DECON conditions at the facility, controls for spent fuel safety, maintenance and surveillance programs, and the implementation of your safety review and design change program. No violations within the scope of the inspection were identified and no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction.

M. Fisher

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If you have any questions regarding this inspection report, please contact Chris Steely at 817-200-1432, or the undersigned at 817-200-1249.

Sincerely,

/RA/

Gregory G. Warnick, Chief
Reactor Inspection Branch
Division of Nuclear Materials Safety

Docket No.: 050-00285

License No.: DPR-40

Enclosure:

NRC Inspection Report 05000285/2019-002

w/Attachment: Supplemental Information

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket No.: 050-00285

License No.: DPR-40

Report No.: 050-00285/2019-002

Licensee: Omaha Public Power District

Facility: Fort Calhoun Station

Location: 9610 Power Lane
Blair, Nebraska

Inspection Dates: May 13 – June 10, 2019

Inspectors: Chris D. Steely, Health Physicist
Reactor Inspection Branch
Division of Nuclear Materials Safety

Marti R. Poston, Health Physicist
Material Licensing and Decommissioning Branch
Division of Nuclear Materials Safety

W. Chris Smith, Health Physicist
Reactor Inspection Branch
Division of Nuclear Materials Safety

Approved By: Gregory G. Warnick, Chief
Reactor Inspection Branch
Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

Fort Calhoun Station NRC Inspection Report 050-00285/2019-002

This U.S. Nuclear Regulatory Commission (NRC) inspection was a routine, announced inspection of decommissioning activities being conducted at the Fort Calhoun Station under NRC Inspection Report 050-00285/2019-002. In summary, the licensee was conducting these activities in accordance with site procedures, license requirements, and applicable NRC regulations. Within the scope of the inspection, no violations were identified.

Decommissioning Performance and Status Review at Permanently Shutdown Reactors

The licensee was implementing the decommissioning activities in accordance with the regulations and license requirements. The inspectors determined that the licensee was adequately controlling decommissioning activities and radiological work areas at the facility. (Section 1.2)

Spent Fuel Pool Safety at Permanently Shutdown Reactors

The licensee's spent fuel pool was being maintained in accordance with permanently defueled technical specifications (PDTs) and procedural requirements. The licensee was safely storing the spent fuel assemblies contained in the spent fuel pool. (Section 2.2)

Maintenance and Surveillance at Permanently Shutdown Reactors

The licensee implemented its maintenance and surveillance program consistent with procedures and regulatory requirements. The licensee was maintaining plant systems in accordance with the PDTs. The licensee appropriately implemented the maintenance rule to ensure compliance with the requirements of Title 10 *Code of Federal Regulations* (CFR) 50.65 for structures, systems, and components associated with the storage, control, and maintenance of spent fuel. (Section 3.2)

Safety Reviews, Design Changes, and Modifications at Permanently Shutdown Reactors

The licensee's safety evaluation program and process for evaluating the safety impacts of facility changes and modifications were adequate for complying with the provisions of 10 CFR 50.59 and 10 CFR 72.48. The licensee's 10 CFR 50.59 safety evaluation program provided effective periodic training for personnel preparing, reviewing, and approving safety evaluations. Additionally, the licensee's program established an adequate process to assess training effectiveness. (Section 4.2)

Report Details

Summary of Plant Status

On June 24, 2016, Omaha Public Power District (OPPD), the licensee, formally notified the NRC by letter of its intent to permanently cease operations of the Fort Calhoun Station (FCS) (ADAMS Accession No. ML16176A213). By letter dated November 13, 2016, OPPD notified the NRC that it had permanently ceased power operations at the FCS on October 24, 2016, and certified pursuant to Title 10 of the *Code of Federal Regulations* (CFR) 50.82(a)(1)(ii), that as of November 13, 2016, all fuel had been permanently removed from the FCS's reactor vessel and placed into the spent fuel pool (ADAMS Accession No. ML16319A254).

On December 28, 2016, the NRC informed the licensee that it was no longer under NRC Inspection Manual Chapters 0305, "Operating Reactor Assessment Program"; 0608, "Performance Indicator Program"; and 2515, "Light-Water Reactor Inspection Program" when conducting oversight activities and assessing site performance (ADAMS Accession No. ML16363A449). The licensee was informed that the NRC's oversight of licensed activities under decommissioning would be conducted under the provisions in NRC Inspection Manual Chapter 2561, "Decommissioning Power Reactor Inspection Program."

The licensee submitted its Post-Shutdown Decommissioning Activities Report (PSDAR) on March 30, 2017 (ADAMS Accession No. ML17089A759). The PSDAR is not a licensing action, and therefore, is not approved by the NRC; however, the NRC reviews the report. The licensee's PSDAR described the decommissioning activities and schedule to support SAFSTOR strategy for the facility, which is one of the options allowed by the NRC for decommissioning. The NRC subsequently held a public meeting in Omaha, Nebraska, on May 31, 2017, to discuss and accept comments regarding the FCS's PSDAR. The transcript of the public meeting is available in ADAMS (ADAMS Accession No. ML17160A394).

The licensee initially selected the SAFSTOR decommissioning option, as described in the PSDAR. The PSDAR described that the licensee planned to continue in SAFSTOR until the spent fuel is transferred to the U.S. Department of Energy in 2058. On April 29, 2019, however, the OPPD board voted to change its decommissioning approach from SAFSTOR to DECON by contracting with Energy Solutions. DECON will consist of decontamination and deconstruction of the site in a process that will begin much sooner on a date to be determined by OPPD. FCS will be required to submit a new PSDAR to reflect the change from SAFSTOR to DECON.

On April 12, 2017, Region IV closed the confirmatory action letter regarding the resolution of design issues that had been documented during the NRC Inspection Manual Chapter 0350 operation period, based on the FCS's commitment to either: (1) complete the design and licensing basis reconstitution for spent fuel pool/cooling and supporting structures, systems, and components, or (2) submit a license amendment request for an independent spent fuel cooling system (ADAMS Accession No. ML17102B737). On December 14, 2017 (ADAMS Accession No. ML17348A383), the licensee requested to remove Option 2 above, and committed to complete Option 1 by June 25, 2018. The licensee entered its commitment into the corrective action program as Condition Report 2017-00842. By letter dated July 24, 2018 (ADAMS Accession No. ML18205A090), the licensee informed the NRC that the commitment actions and the associated condition report had been closed with documentation supporting the closure of those actions.

On March 6, 2018, the NRC issued License Amendment No. 297 for the Permanently Defueled Technical Specifications (PDTs) (ADAMS Accession No. ML18010A087). The license amendment establishes a licensing and safety basis that reflects the permanently shut down and defueled condition of the facility. In general, the amendment eliminated the requirements for operation MODES and MODES where fuel was emplaced in the reactor vessel.

On December 12, 2017, the NRC granted an exemption to OPPD from certain emergency planning requirements in 10 CFR 50.47, "Emergency Plans," and Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50 (ADAMS Accession No. ML17276B286). This exemption allows OPPD to discontinue off-site radiological emergency planning activities and reduce the scope of its on-site emergency planning at the FCS, to be effective no sooner than April 7, 2018. On April 9, 2018, the licensee implemented its NRC approved Permanently Defueled Emergency Plan.

The NRC received two requests for approval of partial site releases from OPPD, by letters dated June 29, 2018 (ADAMS Accession No. ML18215A187) and November 12, 2018 (ADAMS Accession No. ML18316A036). The requests seek approval for release for unrestricted use of a portion of the FCS site. On November 28, 2018, the NRC conducted a public meeting to discuss OPPD's request for approval of the partial site release (ADAMS Accession No. ML19003A117). The NRC reviewed the requests and determined OPPD had adequately evaluated the effect of releasing the properties per 10 CFR 50.83(a)(1) requirements. The NRC sent an approval for both phase 1 and phase 2 releases by letter dated April 10, 2019 (ADAMS Accession No. ML19074A301).

1 Decommissioning Performance and Status Review at Permanently Shutdown Reactors (71801)

1.1 Inspection Scope

The inspectors reviewed documents and interviewed plant personnel to assess the licensee's performance in the following areas:

- Status of ongoing decommissioning activities and planning for future activities;
- Operability and functionality of systems necessary for safe decommissioning were assessed through plant walkdowns, such as: radioactive effluent monitoring, spent fuel pool level and temperature control, and radiation protection monitors and alarms;
- Performed plant tours to assess field conditions and decommissioning activities; and
- Observed and assessed the status of facility housekeeping.

1.2 Observations and Findings

The inspectors observed the weekly senior leadership team meeting, which focused on the scheduled tasks necessary to begin the DECON process. The licensee's presentations were detailed, and management facilitated knowledgeable, wide ranging discussions to discern risk, schedule, resource needs, and how to improve the process controls and oversight. The licensee management discussions demonstrated a focus on safety in addition to efficiency and budget.

The inspectors also met with the Senior Director for Decommissioning and the Plant Manager to discuss plans for later stages of decommissioning, projected staffing levels as site activities progress, and estimated decommissioning milestones.

During this inspection, plant tours were conducted of the facility, including the control room, spent fuel pool, intake structure, component cooling water system and radioactive waste water processing system. The inspectors discussed the loss of raw water, component cooling water and spent fuel pool water with the control room staff and reviewed the associated procedures used by the control room staff to deal with those potential issues.

Through observations, discussions with staff and records review, the inspectors determined that the licensee was appropriately controlling and conducting facility operations in a safe manner. General observations by the inspectors identified good housekeeping practices, appropriate radiological postings and labelling, current changes on fire extinguishers and appropriate storage of flammables and combustibles. Independent radiation surveys were conducted during the plant tours using a Thermo Scientific RadEye – G (NRC Identification No. 086960, Serial No. 378, calibration due date of April 20, 2020). Background measurements ranged between 12-17 microrem per hour with the highest radiation measurement being 0.8 millirem per hour at the spent fuel pool liner leak drain.

The inspectors also reviewed selected condition reports and found them to be documented and processed in accordance with plant procedures.

The inspectors reviewed the fire protection program, associated procedures and fire brigade training records. Fire drills were conducted for fire brigade members in March of 2018. Drills and training records were documented and conducted in accordance with the procedural requirements.

1.3 Conclusion

The licensee was implementing the decommissioning activities in accordance with the regulations and license requirements. The inspectors determined that the licensee was adequately controlling decommissioning activities and radiological work areas at the facility.

2 Spent Fuel Pool Safety at Permanently Shutdown Reactors (60801)

2.1 Inspection Scope

The inspectors reviewed documents and interviewed plant personnel to assess the licensee's performance in the following areas:

- Design, operational, and administrative measures are in place to prevent a substantial reduction in Spent Fuel Pool (SFP) coolant inventory under normal and accident conditions;
- SFP instrumentation, alarms, and leakage detection systems are adequate to assure safe wet storage of spent fuel;

- SFP water chemistry and cleanliness control programs maintain water purity standards, limits on radionuclide concentration, and minimum boron concentration in accordance with the technical specification requirements;
- Criticality controls are consistent with the applicable nuclear criticality safety analyses;
- Procedures, drawings, and PSDAR descriptions and operations regarding the SFP operation and power supplies are adequate; and
- Problem identification issues related to SFP activities are entered into the corrective action program at an appropriate threshold.

2.2 Observations and Findings

The PDTs, Section 2.8.3, requires the SFP water level be maintained greater than or equal to 23 feet over the top of the irradiated fuel assemblies stored in the SFP and the SFP boron concentration to be greater or equal to 500 parts per million (ppm). The NRC inspectors reviewed the SFP level operational logs and reviewed chemistry data for the period since the last inspection. The inspectors concluded that the SFP level remained relatively steady at 41 feet, which is roughly 28 feet above the top of irradiated fuel, for the monitoring periods reviewed. The boron concentration in the SFP was 2625 ppm, which sufficiently met the refueling operational requirements in the PDTs, as stated above.

The SFP temperature was procedurally required to be maintained between 45 and 100 degrees Fahrenheit (°F). The temperature was tracked in the control room, where alarm panel annunciators were set to alert operators if SFP temperatures exceeded 120°F or fell below 50°F. The SFP temperature was approximately 64°F at the time of the inspection.

The licensee was continuing to monitor the leaks from the spent fuel pool to the liner and subsequently to the drain lines. The licensee monitored the leak rate monthly and calculated the approximate leak rate at 1.3 quarts per day (total for both SFP and fuel transfer canal). All leakage was contained and had not impacted the external environment.

2.3 Conclusion

The licensee's SFP was being maintained in accordance with PDTs and procedural requirements. The licensee was safely storing the spent fuel assemblies contained in the SFP.

3 **Maintenance and Surveillance at Permanently Shutdown Reactors (62801)**

3.1 Inspection Scope

The inspectors reviewed documents and interviewed plant personnel to assess the licensee's performance in the following areas:

- Maintenance and surveillance for structures, systems, and components (SSCs) are being conducted in a manner that results in safe storage of spent fuel and proper operation of radiation monitoring and effluent control equipment;
- Evaluate the effectiveness of the licensee maintaining adequate material and structural integrity of SSCs important to safe decommissioning; and
- Licensee has an effective maintenance program that implements the maintenance rule requirement.

3.2 Observations and Findings

The inspectors reviewed the licensee's work identification process to determine and evaluate how deficient items were captured and prioritized. The process to capture deficient items was being effectively implemented via required surveillances, normal watch rounds, and daily work requests. The inspectors determined that the prioritization process for work requests was being effectively implemented based on the inspectors' review of the work schedule and discussions with the licensee staff and management, who determined the necessary resources and overall effect on plant status.

The inspectors also reviewed surveillance records, system health reports, the maintenance schedule, and items that were currently on the maintenance backlog. Interviews with maintenance management helped the inspectors determine that the maintenance and surveillance program was being effectively implemented with the appropriate amount of management oversight.

The inspectors evaluated the licensee's ability to implement the maintenance rule as required by 10 CFR 50.65. The regulations under 10 CFR 50.65(a)(1) require, in part, that licensees monitor the performance or condition of all SSCs associated with the storage, control, and maintenance of spent fuel in a safe condition, and in a manner sufficient to provide reasonable assurance that such SSCs were capable of performing their intended functions. The licensee was implementing the maintenance rule under 10 CFR 50.65 as required for decommissioning SSCs and was adequately evaluating the maintenance monitoring during decommissioning.

The licensee had identified those SSCs associated with the storage, control, or maintenance of spent fuel in a safe condition, as well as those SSCs relied upon to remain functional during or following design basis events associated with spent fuel storage, as defined in 10 CFR 50.65. The licensee maintained a maintenance rule functional record for each SSC identified, which specified the acceptable functions of the SSC in order to determine its success during the monitoring period. The inspectors concluded that the licensee had identified the appropriate SSCs under the maintenance rule program and were monitoring them sufficiently.

3.3 Conclusions

The licensee implemented its maintenance and surveillance program consistent with procedures and regulatory requirements. The licensee was maintaining plant systems in accordance with the PDTs requirements. The licensee appropriately implemented the maintenance rule to ensure compliance with the requirements of 10 CFR 50.65 for

structures, systems, and components associated with the storage, control, and maintenance of spent fuel.

4 Safety Reviews, Design Changes, and Modifications at Permanently Shutdown Reactors (37801)

4.1 Inspection Scope

The inspectors reviewed documents and interviewed plant personnel to assess the licensee's performance in the following areas:

- Determination that licensee procedures and processes conform to the regulations and guidance associated with 10 CFR 50.59;
- Implementation of a sampling of design change modifications to verify that procedures and controls were followed;
- Verify that the applicable changes were effectively implemented in the plant and in plant procedures, drawings, and training programs if applicable; and
- Verify that the changes made under 10 CFR 50.59 did not require prior NRC approval.

4.2 Observations and Findings

The inspectors conducted a detailed review of the activities associated with the licensee's Design and License Basis Reconstitution (DLBR) project. This review sampled key calculations, engineering changes, and decommissioning safety analysis report changes associated with SSCs necessary to maintain spent nuclear fuel within safety limits before, during, and after a design basis spent fuel accident.

On April 12, 2017, the NRC closed the remaining open commitments associated with Fort Calhoun Station Confirmatory Action Letter (CAL), issued on December 17, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13351A395). NRC Inspection Report 05000285/2016007 dated February 11, 2016, (ADAMS Accession No. ML 16042A542), documented the status of NRC inspection activities related to the CAL commitments. Based on NRC inspection activities to that point, all but eight actions associated with the CAL had been closed. In a letter dated October 31, 2016, (ADAMS Accession No. ML 16305A104), Omaha Public Power District (OPPD) requested that the NRC close the remaining eight open commitments in the CAL. OPPD requested closure of these open commitments based on their decision to permanently cease operations of the Fort Calhoun Station. On March 10, 2017, OPPD provided additional information to support the request (ADAMS Accession No. ML 17069A441). OPPD proposed that the remaining open commitments associated with the DLBR be closed to a new commitment that is more appropriate for the facility's decommissioning status.

As part of the DLBR for this decommissioning inspection, the inspectors reviewed the following areas of the Decommissioning Safety Analysis Report (DSAR):

1. DSAR Section 9.5, Refueling Systems
2. DSAR Section 9.6, Spent Fuel Pool Cooling
3. DSAR Section 14.18, Fuel Handling Accident in Spent Fuel Pool

For the relevant DSAR sections described above, the inspectors reviewed a sample of the calculations for each section. The inspectors verified that the systems that were required for the decommissioning phase were adequately described in the DSAR. In addition, the inspectors verified that the associated calculations supported the design and safety function described in each reviewed DSAR section. The inspectors found that the changes associated with SSCs to a decommissioned status continued to maintain spent nuclear fuel within safety limits before, during, and after a design basis spent fuel accident.

The inspectors identified one minor issue, associated with the available water inventory of the spent fuel pool. Specifically, EA17-007, Attachment 3 (Deviation/Open Items and CRs) states the following for Statement of Fact (SOF) 960033: the volume for the spent fuel pool was typed incorrectly as 198,886. This number should have been 193,886 to correspond with the spent fuel pool volume available with all spent fuel racks full of assemblies as calculated in FC06765 (Rev. 1) and discussed in DSAR-9.6 (Rev. 2), DSAR-9.5 (Rev. 2). The licensee generated CR 2019-00498 in response to this issue.

4.3 Conclusions

The inspectors did not identify any regulatory issues associated with the selected samples for the safety reviews, design changes, or modifications, and found that they are being performed in accordance with the regulatory and procedural requirements.

5 Exit Meeting Summary

On June 10, 2019, the NRC inspectors presented the final inspection results, telephonically, to Mr. Brad Blome, Director, License and Regulatory Assurance. Within the scope of the inspection, no violations were identified. No proprietary information was identified with the exception of certain budgeting documents, which were not retained by the inspectors.

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

T. Uehling, Senior Director, Fort Calhoun Station Decommissioning
T. Maine, Plant Manager
B. Blome, Director, License and Regulatory Affairs
C. Cameron, Principal Regulatory Specialist
J. Dolton, System Engineer
A. Koenig, System Engineer
J. Layton, Supervisor, Planning and Scheduling

INSPECTION PROCEDURES USED

IP 71801 Decommissioning Performance and Status Review at Permanently Shutdown Reactors
IP 60801 Spent Fuel Pool Safety at Permanently Shutdown Reactors
IP 62801 Maintenance and Surveillance at Permanently Shutdown Reactors
IP 37801 Safety Reviews, Design Changes, and Modifications at Permanently Shutdown Reactors

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed

None

Discussed

None

LIST OF ACRONYMS

ADAMS Agencywide Documents Access and Management System
CFR *Code of Federal Regulations*
FCS Fort Calhoun Station
NRC Nuclear Regulatory Commission
OPPD Omaha Public Power District
PDTS Permanently Defueled Technical Specifications
PSDAR Post-Shutdown Decommissioning Activities Report
SFP Spent Fuel Pool
DLBR Design and License Basis Reconstitution
DSAR Decommissioning Safety Analysis Report
SSC Structure, System and Components

FORT CALHOUN STATION – NRC INSPECTION REPORT 050-00285/2019-002 - DATED
 JULY 23, 2019

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