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

December 6, 2012

Brian J. O'Grady, Vice President-Nuclear
and Chief Nuclear Officer
Nebraska Public Power – Cooper
Nuclear Station
72676 648A Avenue
Brownville, NE 68321

SUBJECT: COOPER NUCLEAR STATION – NRC POST-APPROVAL LICENSE RENEWAL INSPECTION REPORT 05000298/2012008

Dear Mr. O'Grady:

On November 1, 2012, U.S. Nuclear Regulatory Commission inspectors performed a Post-Approval Site Inspection for License Renewal at your Cooper Nuclear Station. The enclosed report documents the inspection findings, which were discussed on November 1, 2012, with Mr. J. Anderson, Director, Projects, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based upon the results of this inspection, no findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, and its enclosure, will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Geoffrey Miller, Chief
Engineering Branch 2
Division of Reactor Safety

Docket: 50-298
License: DPR-46

cc w/Enclosure:
Electronic Distribution for Cooper Nuclear Station

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SUNSI Rev Compl.	■ Yes ☐ No	ADAMS	■ Yes ☐ No	Reviewer Initials	GAP
Publicly Avail	■ Yes ☐ No	Sensitive	☐ Yes ■ No	Sens. Type Initials	GAP

DRS/EB2	DRS/EB2	C:DRS/EB	C:DRP/C	C:DRS/EB2
GPick	SMakor	GMiller	BHagar	GMiller
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12/ 06/2012	11/26/2012	11/27/2012	11/27/2012	12/06/2012

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	05000298
License:	DPR-46
Report:	05000298/2012008
Applicant:	Nebraska Public Power District
Facility:	Cooper Nuclear Station
Location:	72676 648A Ave Brownville, NE 68321
Dates:	October 29 – November 1, 2012
Inspectors:	G. Pick, Senior Reactor Inspector S. Makor, Reactor Inspector
Approved By:	Geoffrey Miller, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000298/2012008; 10/29 – 11/01/2012; Cooper Nuclear Station, Post-Approval Site Inspection for License Renewal

The report covers an inspection conducted by regional inspectors in accordance with NRC Manual Chapters 2515 and NRC Inspection Procedure 71003.

The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG–1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified Findings and Self-Revealing Findings

None

B. Licensee-Identified Violations

None

REPORT DETAILS

4. OTHER ACTIVITIES (OA)

4OA5 Other - Post-Approval Site Inspection for License Renewal (Phase 1) – IP 71003

The inspectors reviewed a sample of license renewal activities scheduled in fall 2012 while the plant was shut down for Refueling Outage 27. The inspectors selected this period because it allowed an opportunity to evaluate inaccessible areas prior to entry into the period of extended operation. The period of extended operation is the additional 20 years beyond the original 40-year licensed term, and begins after midnight on January 18, 2014. The inspectors confirmed that in-service inspections reviewed for this outage were documented in Inspection Report 05000298/2012004.

Specific areas walked down and activities reviewed during this inspection included:

- Drywell
- Torus
- Underwater inspection video of the torus
- Heater bays
- Flow accelerated corrosion ultrasonic measurement

NRC inspectors performed this inspection to evaluate whether the licensee: (1) completed the necessary actions to comply with the license condition and commitments that are a part of the renewed operating license; (2) implemented the aging management programs and time-limited aging analyses as described in the updated final safety analysis report; (3) followed the guidance in NEI 99-04, “Guidelines for Managing NRC Commitment Changes,” for changing license renewal commitments; (4) identified, evaluated, and incorporated “newly identified” structures, systems, and components into their aging management programs; (5) implemented programs that agreed with those approved in the safety-evaluation report and described in the updated final safety analysis report; and (6) implemented operating experience review and corrective action programs that account for aging effects. Specific activities evaluated during this inspection are described in the following paragraphs.

.01 Review of Commitments

a. Scope

The inspectors evaluated whether the licensee met the commitments listed below, as described in NUREG-1944, “Safety Evaluation Report (SER) Related to the License Renewal of Cooper Nuclear Station.” The inspectors verified that the licensee implemented procedures, documented inspection results, initiated corrective action documents, and provided training to implementing personnel.

The inspectors reviewed supporting documents including implementing procedures, work orders, inspection reports, engineering evaluations, and condition reports; conducted interviews with licensee staff; observed in-process outage activities; and

performed visual inspection of structures, systems, and components including those not accessible during power operation to verify that the licensee completed the necessary actions to comply with the license conditions stipulated in the renewed facility operating license.

NUREG-1944 and Updated Final Safety Analysis Report, Appendix K listed 40 commitments made during the license renewal application process. During this inspection, the inspectors reviewed 8 of the 40 commitments and closed 4 of the commitments received.

The inspectors listed specific documents reviewed in the attachment.

b. Findings and Observations

1. Commitment 4

Commitment 4 specified, "Enhance the BWR Vessel Internals Program to include actions to replace the plugs in the core plate bypass holes based upon their qualified life."

From review of the Cooper Nuclear Station Vessels Internal Program, Revision 19.8, the inspectors verified that Section 12.20, "Core Plate Plugs," specified that the licensee will change the 88 core plate plugs in Refueling Outage 29, which should occur in the fall of 2016. The inspectors verified the licensee had included this activity in their commitment list for Refueling Outage 29. The inspectors reviewed design calculations that demonstrated the core support plate plugs had and effective life of 32 Effective Full Power Years. The inspectors verified that the core support plate plugs will not exceed 32 Effective Full Power Years when the licensee replaces them in fall 2016.

Based on review of the planned actions for replacing the core plate plugs, the inspectors determined that the licensee met the conditions of Commitment 4 by scheduling the replacement of their core plate plugs prior to exceeding 32 Effective Full Power Years and by including this requirement in the Cooper Nuclear Station Vessels Internal Program. This commitment is closed.

2. Commitment 8

Commitment 8 specified, "Consideration of the effect of the reactor water environment will be accomplished through implementation of one or more of the following options for the reactor vessel shell and lower head, feedwater nozzles, core spray nozzles and RHR pipe transition.

1) Update the fatigue usage calculations using refined fatigue analyses to determine valid CUFs less than 1.0 when accounting for the effects of reactor water environment. This includes applying the appropriate F_{en} factors to valid CUFs determined using an NRC-approved version of the ASME code or NRC-approved alternative (e.g., NRC-approved code case). NPPD will use NUREG/CR-6909 when determining the effects of the reactor coolant environment on the fatigue life of Alloy 600 components.

2) Repair or replace the affected locations before exceeding an environmentally adjusted CUF of 1.0.

The CNS Fatigue Monitoring Program will be enhanced to require the recording of each transient associated with the actuation of a safety/relief valve (SRV)."

The licensee notified the NRC in Letter NLS2011114, "Completion of License Renewal Commitment NLS2008071 – 08," dated December 23, 2011, that Commitment 8 was closed. The inspectors determined that the licensee performed Calculation NEDC 08-014, "Reconstitution of Selected Reactor Pressure Boundary Components," Revision 0, which demonstrated that the licensee had sufficient margin to accommodate the anticipated number of cycles up to 60 years of operation. The calculation recommended that the fatigue management be revised to accommodate the environmental factors. The licensee performed Engineering Evaluation 10-023, "Reactor Pressure Boundary Components Fatigue Management Plan," Revision 0, which described the planned method for monitoring fatigue based upon the information in Calculation NEDC 08-014.

The inspectors determined that Procedure 3.20, "Reactor Pressure Vessel and Torus Thermal Transient Review," Revision 18, included a requirement to record each transient associated with the actuation of a safety-relief valve. The licensee had not revised their implementing procedures to incorporate environmental factors and implement the methodology described in Engineering Evaluation 10-023.

Based on review of the actions implemented, the inspectors determined that the licensee had not included all aspects of Commitment 8 in the implementing procedures. This commitment remains open and will be reviewed during the commitment inspection in the fall of 2013.

3. Commitment 26

Commitment 26 specified, "Implement the Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program."

The licensee notified the NRC in Letter NLS2011111, "Completion of License Renewal Commitments NLS2009100-2, NLS2009100-3, and NLS2008071-26," dated December 28, 2011, that Commitments 26, 28, and 29, were closed. The inspectors determined that the licensee had revised the Updated Final Safety Analysis, Appendix K, to reflect that no susceptible material was present in the reactor vessel; consequently, the licensee planned to conduct no aging management activities, as specified in NUREG-1801, "Generic Aging Lessons Learned (GALL) Report."

From review of the Cooper Nuclear Station Vessels Internal Program, Revision 19.8, the inspectors verified that Section 12.25, "VIP-234, Thermal Aging and Neutron Embrittlement Evaluation of Cast Austenitic Stainless Steels," described the facility cast austenitic stainless steel program. The inspectors verified that the licensee had added the review of cast austenitic stainless steel to their Vessels Internals program.

Based on review of the timeliness and adequacy of the actions implemented, the inspectors concluded that the licensee met the conditions of Commitment 26. This commitment is considered closed since the licensee had established a program in the Cooper Nuclear Station Vessels Internal Program.

4. Commitment 27

Commitment 27 specified, "NPPD will submit (or otherwise make available for NRC review and approval) a complete proprietary version of an analysis of the core plate rim bolts that demonstrates their adequacy considering potential loss of pre-load through the period of extended operation. This will be provided at least two years prior to the period of extended operation. NPPD expects to satisfy this commitment using the generic analysis being developed by the BWRVIP, provided that it is applicable to CNS."

The licensee notified the NRC in NLS2012002, "Completion of License Renewal Commitment NLS2009100-1," Revision 1," dated January 16, 2012, that Commitment 27 was closed. The inspectors reviewed Calculation 02-053, "Core Plate Bolt Stress Analysis Report," Revision 3, which accepted the vendor analysis of the loss of pre-load in the core plate rim bolts. Report NEDC-33674P, "Cooper Nuclear Station Core Plate Bolt Stress Analysis Report," dated October 2011, calculated that the core plate rim bolt relaxation using the methodology described in BWRVIP-25, "BWR Core Plate Inspection and Flaw Evaluation Guidelines." The inspectors identified no concerns with the analysis and confirmed that the core plate rim bolt stresses should not exceed American Society of Mechanical Engineers limits.

Based on review of the timeliness and adequacy of the actions implemented, the inspectors concluded that the licensee met the conditions of Commitment 27. This commitment is closed.

5. Commitment 28

Commitment 28 specified, "NPPD will confirm that there are no niobium-bearing CASS materials used for vessel internal components, or provide a flaw evaluation methodology for niobium-bearing CASS internal components for staff review and approval. This will be provided at least two years prior to the period of extended operation. NPPD expects to implement this commitment by a generic analysis sponsored by the BWRVIP in collaboration with EPRI."

The inspectors reviewed licensing correspondence, materials information, and the licensee analysis of the content of their cast austenitic stainless steel reactor vessel components. The inspectors reviewed Engineering Evaluation 11-045, "Reactor Vessel Internals CASS Material Review," which accepted the evaluation completed by a vendor on the materials of construction for the in-scope cast austenitic stainless steel components. The inspectors verified that the materials specified on design drawings called for material that had no requirements to include niobium. Further, the supplier confirmed that the chemistry specifications for the material used in the cast austenitic stainless steel components at Cooper Nuclear Station did not call for the use of niobium.

Based on review of the timeliness and adequacy of the actions implemented, the inspectors concluded that the licensee met the conditions of Commitment 28. This commitment is closed.

6. Commitment 29

Commitment 29 specified "NPPD will confirm there are no CASS materials with greater than 25 percent ferrite or provide a flaw evaluation methodology for CASS internal components with greater than 25 percent ferrite for staff review and approval. This will be provided at least two years prior to the period of extended operation. NPPD expects to implement this commitment by a generic analysis sponsored by the BWRVIP in collaboration with EPRI."

The Electric Power Research Institute submitted BWRVIP-234, "Thermal Aging and Neutron Embrittlement Evaluation of Cast Austenitic Stainless Steels," which evaluated whether the cast components for all boiling water reactor types had enough ferrite content to be of concern. The licensee credited the submittal of BWRVIP-234 in a letter to the NRC as meeting this commitment. The inspectors determined that the result of the NRC review and safety evaluation was being tracked for required corrective actions by Condition Report CNSLO-2011-00258.

Based on review of the timeliness and adequacy of the actions implemented, the inspectors concluded that the licensee had supplied information that demonstrated they did not have greater than 25 percent ferrite as specified in Commitment 29. The inspectors did not close this commitment and will review this commitment further during the Phase 2 inspection in fall 2013. This commitment remains open.

7. Commitment 34

Commitment 34 specified, "NPPD will remove sludge and inspect the wetted portion of the torus every refueling outage from now until the torus is recoated."

The inspectors reviewed the video from the inspection of the wetted portion of the torus conducted during Refueling Outage 26 and reviewed the results of the sludge removal. The team noted that divers were conducting the torus inspection and removing sludge during this inspection as part of Refueling Outage 27. The licensee will remove sludge and inspect the torus once more in Refueling Outage 28 (fall 2014) since the licensee plans to recoat the torus in Refueling Outage 29 (fall 2016). The inspectors verified the torus recoating was included in the outage schedule for Refueling Outage 29.

Because the licensee will complete the actions related to this commitment in the future, the inspectors did not close this commitment. The inspectors will review the results of the torus inspection performed during the current outage (RE27) in fall 2013. This commitment remains open.

8. Commitment 35

Commitment 35 specified “NPPD will complete an analysis following each torus inspection that demonstrates that the projected pitting of the torus up to the time that the torus is recoated, will not result in reduction of torus wall thickness below minimum acceptable values.”

The inspectors reviewed Calculation NEDC 94-214, “Evaluation of Torus Shell Corrosion and the Impact to Structural Integrity of the Torus,” Revision 6. The inspectors concluded that the analysis demonstrated that the torus continued to have sufficient margin and material thickness in the torus walls. Further, the licensee did not identify any areas that resulted in a significant increase in corrosion.

Because the licensee will complete the actions related to this commitment in the future, the inspectors did not close this commitment. The inspectors will review the analysis for the current inspection (RE27) in the fall 2013. This commitment remains open.

40A6 Meetings, Including Exit

The inspectors presented the inspection results to Mr. J. Anderson, Director, Projects, and other members of the licensee staff during an exit meeting conducted on November 1, 2012. The licensee acknowledged the NRC inspection observations. The inspectors returned or destroyed all proprietary information reviewed during this inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

PERSONNEL CONTACTED

Licensee

J. Anderson, Director, Projects
D. Bell, Engineer
D. Bremer, License Renewal Project Manager
D. Buman, Director, Engineering
D. Davis, Lead Project Engineer
K. Fike, Project Coordinator
K. Higgingbotham, General Manager Plant Operations
P. Leiningor, Flow-Accelerated Corrosion Program Engineer
B. Liesemeyer, License Renewal Engineer
J. Lowrantz, Nonlicensed Operator
J. Loynes, License Renewal
T. McClure, Program Engineer
E. Murphy, License Renewal Assistant
G. Travers, License Renewal
D. Vanderkamp, Acting Director, Nuclear Safety Assurance
B. Victor, Licensing Lead
J. Webster, Manager of Projects

NRC

C. Henderson, Resident Inspector

List of Commitments Reviewed

The inspectors closed Commitments 4, 26, 27, and 28 during this inspection.

The inspectors reviewed Commitments 8, 29, 34, and 35 during this inspection.

DOCUMENTS REVIEWED

General

License Renewal

NUMBER	TITLE	REVISION
Letter NLS2008071	License Renewal Application	September 28, 2008
NUREG-1801, Volume 2	Generic Aging Lessons Learned (GALL) Report	September 2005

License Renewal

NUMBER	TITLE	REVISION
NUREG-1944	Safety Evaluation Report Related to the License Renewal of Cooper Nuclear Station	September 2010
USAR Appendix K	License Renewal Supplement	

Miscellaneous

TITLE
Change Evaluation Document 6034320, “Electrical Manhole 6 & 6A Level Switch and Alarm Installation
List of activities being performed the week of October 29 credited with aging management
List of outstanding actions related to each commitment
NEI 99-04, “Guidelines for Managing NRC Commitment Changes,” Revision 0
Work Order 4838919

Commitments

Commitments 4 and 27

Drawings:

NUMBER	TITLE	REVISION
131C8585	Reactor Core Support Plate Plug	3
4555007171	Reactor	1
E282, Sheet 1	Core Structure Cooper Core Support	E
E852, Sheet 1	Core Structure Cooper Top Guide	C

Letters

NUMBER	TITLE	DATE
NLS2009061	Response to Request for Additional Information for the Review of the Cooper Nuclear Station License Renewal Application	August 13, 2009
NLS2009100	Response to Request for Additional Information for the Review of the Cooper Nuclear Station License Renewal Application	December 21, 2009
NLS2010019	Supplemental Information for the Review of Cooper Nuclear Station License Renewal Application	March 25, 2010
NLS2012002	Completion of License Renewal Commitment NLS2009100-1 (Revision 1)	January 16, 2012

License Renewal

NUMBER	TITLE	REVISION
CNS-RPT-07-LRD02, Section 4.6	Aging Management Program Evaluation Report – Class 1 Mechanical – BWR Vessel Internals	2
CNS-RPT-11-LRILR-03	B.1.9 Commitments Implementation Review	2

Miscellaneous

NUMBER	TITLE	REVISION/DATE
	Cooper Nuclear Station Vessel Internals Program	19.8
NEDC 98-057	Core Support Plate Plug Service Life Extension	2
NEDC 02-053	Core Plate Bolt Stress Analysis Report	3
NEDC 07-032	CNS Review of Transware Calculations NPP-FLU-002-R-003, -004, -005 Reactor Pressure Vessel Fluence Evaluation	0
NEDO-33674	Cooper Nuclear Station Core Plate Bolt Stress Analysis Report (Non-Proprietary)	0

Miscellaneous

NUMBER	TITLE	REVISION/DATE
NEDO-33674P	Cooper Nuclear Station Core Plate Bolt Stress Analysis Report (Proprietary)	0
TR-107284	BWR Core Plate Inspection and Flaw Evaluation Guidelines (BWRVIP-25)	December 1996
USAR Appendix K, Section 2.1.9	BWR Vessel Internals Program	
USAR Appendix K, Section 2.2.5	Core Plate Plugs	

Commitment 8

Letters

NUMBER	TITLE	DATE
NLS2009040	Response to Request for Additional Information for License Renewal Application – Aging Management Programs	June 15, 2009
NLS2009061	Response to Request for Additional Information for the Review of the Cooper Nuclear Station License Renewal Application	08/13/2009
NLS2010044	Response to Open and Confirmatory Items from the Safety Evaluation Report Related to the License Renewal of Cooper Nuclear Station	04/28/2010
NLS2010100	Revision to License Renewal Commitment	11/15/2010
NLS2010102	Clarification to Revision to License Renewal Commitment	11/18/2010
NLS2011114	Completion of License Renewal Commitment NLS2008071-08	12/23/2011

License Renewal

NUMBER	TITLE	REVISION
CNS-RPT-07-LRD02, Section 4.7	Aging Management Program Evaluation Report – Class 1 Mechanical – Fatigue Monitoring	2
CNS-RPT-11-LRILR-04	B.1.15 Commitments Implementation Review	1

Miscellaneous

NUMBER	TITLE	REVISION
EE 10-023	Reactor Pressure Boundary Components Fatigue Management Plan	0
NEDC 08-014	Reconstitution of Selected Reactor Pressure Boundary Components	0
Procedure 3.20	Reactor Pressure Vessel and Torus Thermal Transient Review	18
USAR Appendix K, Section 2.1.15	Fatigue Monitoring Program	

Commitments 26, 28 and 29

Letters

NUMBER	TITLE	DATE
NLS2009040	Response to Request for Additional Information for License Renewal Application – Aging Management Programs	June 15, 2009
NLS2009055	Response to Request for Additional Information for License Renewal Application Cooper Nuclear Station	July 29, 2009
NLS2009061	Response to Request for Additional Information for the Review of the Cooper Nuclear Station License Renewal Application	August 13, 2009

Letters

NUMBER	TITLE	DATE
NLS2009100	Response to Request for Additional Information for the Review of the Cooper Nuclear Station License Renewal Application	December 21, 2009
NLS2011111	Completion of License Renewal Commitments NLS2009100-2, NLS2009100-3, and NLS2008071-26	December 28, 2011

License Renewal

NUMBER	TITLE	REVISION
CNS-RPT-07-LRD02, Section 3.2	Aging Management Program Evaluation Report – Class 1 Mechanical – Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel	2
USAR Appendix K, Section 2.1.37	Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel	

Miscellaneous

NUMBER	TITLE	REVISION/DATE
1019060	BWRVIP-234, Thermal Aging and Neutron Embrittlement Evaluation of Cast Austenitic Stainless Steels	December 2009
ASTM A351/A351M – 12a	Standard Specification for Castings, Austenitic, For Pressure-Containing Parts	12a
EE 11-045	Reactor Vessel Internals CASS Material Review	December 15, 2011
GEH 0000-140-6139	Cooper Nuclear Station – Reactor Materials Review (CASS)	November 2011
LO-CNSLO-2011-00258	Tracking Corrective Action Awaiting NRC Issuance of Safety Evaluation Report for BWRVIP 234	
Regulatory Guide 1.44	Control of the Use of Sensitized Stainless Steel	May 1973

Commitments 34 and 35

Miscellaneous

NUMBER	TITLE	REVISION
NEDC 94-214	Evaluation of Torus Shell Corrosion and the Impact to Structural Integrity of the Torus	6
NUC2010117	Final Engineering Report – Torus Desludge, Inspection & Coating Repair	0