

June 15, 2009

Mr. Stewart B. Minahan  
Chief Nuclear Officer, Vice President - Nuclear  
Cooper Nuclear Station  
Nebraska Public Power District  
72676 648A Ave.  
Brownville, NE 68321

SUBJECT: AUDIT REPORT REGARDING THE COOPER NUCLEAR STATION, LICENSE  
RENEWAL APPLICATION (TAC NO. MD9763)

Dear Mr. Minahan:

By letter dated September 24, 2008, Nebraska Public Power District, submitted an application pursuant to 10 *Code of Federal Regulations* Part 54 (10 CFR Part 54), to renew the operating license for Cooper Nuclear Station for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). On April 20, 2009, the NRC audit team completed the on-site audit of aging management programs in accordance with the regulatory audit plan of April 9, 2009 (ADAMS ML090930256). The audit report is enclosed.

If you have any questions, please contact Tam Tran at 301-415-3617 or by e-mail at [tam.tran@nrc.gov](mailto:tam.tran@nrc.gov), or Emmanuel Sayoc at 301-415-1924 or by e-mail at [emmanuel.sayoc@nrc.gov](mailto:emmanuel.sayoc@nrc.gov).

**/RA/**

Tam Tran, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulations

Docket No. 50-298

Enclosure:  
As stated

cc w/encl: See next page

June 15, 2009

Mr. Stewart B. Minahan  
Chief Nuclear Officer, Vice President - Nuclear  
Cooper Nuclear Station  
Nebraska Public Power District  
72676 648A Ave.  
Brownville, NE 68321

SUBJECT: AUDIT REPORT REGARDING THE COOPER NUCLEAR STATION, LICENSE  
RENEWAL APPLICATION (TAC NO. MD9763)

Dear Mr. Minahan:

By letter dated September 24, 2008, Nebraska Public Power District, submitted an application pursuant to 10 *Code of Federal Regulations* Part 54 (10 CFR Part 54), to renew the operating license for Cooper Nuclear Station for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). On April 20, 2009, the NRC audit team completed the on-site audit of aging management programs in accordance with the regulatory audit plan of April 9, 2009 (ADAMS ML090930256). The audit report is enclosed.

If you have any questions, please contact Tam Tran at 301-415-3617 or by e-mail at [tam.tran@nrc.gov](mailto:tam.tran@nrc.gov), or Emmanuel Sayoc at 301-415-1924 or by e-mail at [emmanuel.sayoc@nrc.gov](mailto:emmanuel.sayoc@nrc.gov).

**/RA/**

Tam Tran, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulations

Docket No. 50-298

Enclosure:  
As stated

cc w/encl: See next page

DISTRIBUTION: See next page

ADAMS Accession Number: ML091380365

OFFICE	LA:DLR	PM:RPB2:DLR	PM:RPB1:DLR	BC:RER1:DLR	BC:RER2:DLR
NAME	SFigueroa	ESayoc	TTran	JDozier	RAuluck
DATE	06/04/09	05/26/09	05/26/09	05/29/09	06/01/09
OFFICE	BC:RPB1:DLR	PM:RPB1:DLR			
NAME	DPelton (DAshley for)	TTran			
DATE	06/12/09	06/15/09			

OFFICIAL RECORD COPY

Letter to S. Minahan from T. Tran, dated June 15, 2009

DISTRIBUTION:

SUBJECT: AUDIT REPORT REGARDING THE COOPER NUCLEAR STATION  
UNIT 1, LICENSE RENEWAL APPLICATION (TAC NO. MD9763)

**HARD COPY**

DLR RF

**E-MAIL:**

PUBLIC

RidsNrrDirResource  
RidsNrrDirRpb1 Resource  
RidsNrrDirRpb2 Resource  
RidsNrrDirRer1 Resource  
RidsNrrDirRer2 Resource  
RidsNrrDirRerb Resource  
RidsNrrDirRpob Resource  
RidsNrrDciCvib Resource  
RidsNrrDciCpnb Resource  
RidsNrrDciCsgb Resource  
RidsNrrDraAfpb Resource  
RidsNrrDraApla Resource  
RidsNrrDeEmcb Resource  
RidsNrrDeEeeb Resource  
RidsNrrDssSrxb Resource  
RidsNrrDssSbpb Resource  
RidsNrrDssScvb Resource  
RidsOgcMailCenter Resource

-----  
T. Tran  
E. Sayoc  
F. Lyon  
D. Roth (OGC)  
A. Jones (OGC)  
N. Taylor (RIV)  
E. Collins (RIV)  
C. Casto (RIV)  
B. Maier (RIV)  
V. Dricks (RIV)  
D. Chamberlain (RIV)  
A. Vogel (RIV)  
W. Walker (RIV)  
G. Miller (RIV)  
G. Pick (RIV)  
S. Burnell (RIV)

Cooper Nuclear Station

cc:

Mr. Ronald D. Asche  
President and Chief Executive Officer  
Nebraska Public Power District  
1414 15th Street  
Columbus, NE 68601

Mr. Gene Mace  
Nuclear Asset Manager  
Nebraska Public Power District  
P.O. Box 98  
Brownville, NE 68321

Mr. John C. McClure  
Vice President and General Counsel  
Nebraska Public Power District  
P.O. Box 499  
Columbus, NE 68602-0499

Mr. David Van Der Kamp  
Licensing Manager  
Nebraska Public Power District  
P.O. Box 98  
Brownville, NE 68321

Mr. Michael J. Linder, Director  
Nebraska Department of Environmental  
Quality  
P.O. Box 98922  
Lincoln, NE 68509-8922

Chairman  
Nemaha County Board of Commissioners  
Nemaha County Courthouse  
1824 N Street  
Auburn, NE 68305

Ms. Julie Schmitt, Manager  
Radiation Control Program  
Nebraska Health & Human Services R&L  
Public Health Assurance  
301 Centennial Mall, South  
P.O. Box 95007  
Lincoln, NE 68509-5007

Mr. H. Floyd Gilzow  
Deputy Director for Policy  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102-0176

Senior Resident Inspector  
U.S. Nuclear Regulatory Commission  
P.O. Box 218  
Brownville, NE 68321

Regional Administrator, Region IV  
U.S. Nuclear Regulatory Commission  
612 E. Lamar Blvd., Suite 400  
Arlington, TX 76011-4125

Director, Missouri State Emergency  
Management Agency  
P.O. Box 116  
Jefferson City, MO 65102-0116

Chief, Radiation and Asbestos  
Control Section  
Kansas Department of Health  
and Environment  
Bureau of Air and Radiation  
1000 SW Jackson  
Suite 310  
Topeka, KS 66612-1366

Ms. Melanie Rasmussen  
Radiation Control Program Director  
Bureau of Radiological Health  
Iowa Department of Public Health  
Lucas State Office Building, 5th Floor  
321 East 12th Street  
Des Moines, IA 50319

Mr. Keith G. Henke, Planner  
Division of Community and Public Health  
Office of Emergency Coordination  
930 Wildwood P.O. Box 570  
Jefferson City, MO 65102

Cooper Nuclear Station

- 2 -

cc:

Mr. Art Zaremba, Director of Nuclear  
Safety Assurance  
Nebraska Public Power District  
P.O. Box 98  
Brownville, NE 68321

Mr. John F. McCann, Director  
Licensing, Entergy Nuclear Northeast  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601-1813

Stewart Minahan  
Vice President  
Nuclear and Chief Nuclear Officer  
Cooper Nuclear Station  
72676 – 648A Avenue  
Brownville, NE 68321

Mike Boyce  
Cooper Strategic Initiatives Manager  
Cooper Nuclear Station  
72676 – 648A Avenue  
Brownville, NE 68321

Dave Bremer  
License Renewal Project Manager  
Cooper Nuclear Station  
72676 – 648A Avenue  
Brownville, NE 68321

Bill Victor  
License Renewal Project Licensing Lead  
Cooper Nuclear Station  
72676 – 648A Avenue  
Brownville, NE 68321

Jim Loynes  
License Renewal Project Engineer  
Cooper Nuclear Station  
72676 – 648A Avenue  
Brownville, NE 68321

Garry Young  
License Renewal Manager  
Entergy Nuclear  
1448 S.R. 333, N-GSB-45  
Russellville, AK 72802

Alan Cox  
License Renewal Technical Manager  
Entergy Nuclear  
1448 S.R. 333, N-GSB-45  
Russellville, AK 72802

Dave Lach  
LRP Entergy Project Manager  
Entergy Nuclear  
1448 S.R. 333, N-GSB-45  
Russellville, AK 72802

U.S. NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION - DIVISION OF LICENSE RENEWAL

Docket No: 050-298

License No: DPR-46

Licensee: Nebraska Public Power District

Facility: Cooper Nuclear Station

Location: Nebraska Public Power District  
72676 648A Ave.  
Brownville, NE 68321

Dates: April 20-24, 2009

Reviewers: E. Sayoc, Project Manager, Division of License Renewal (DLR)  
S. Lee, Deputy Director, DLR  
J. Dozier, Branch Chief, DLR  
R. Auluck, Branch Chief, DLR  
B. Brady, Project Manager, DLR  
R. Li, Electrical Engineer, DLR  
D. Nguyen, Electrical Engineer, DLR  
C. Douthett, Electrical Engineer, DLR  
J. Davis, Sr. Materials Engineer, DLR  
J. Gavula, Sr. Materials Engineer, DLR  
W. Smith, Sr. Materials Engineer, DLR  
D. Alley, Materials Engineer, DLR  
G. Cheruvenki, Materials Engineer, DLR  
S. Min, Materials Engineer, DLR  
D. Hoang, Structural Engineer, DLR  
C. Yang, Sr. Mechanical Engineer, DLR  
A. Wong, Sr. Mechanical Engineer, DLR  
R. Sun, Mechanical Engineer, DLR  
O. Yee, Mechanical Engineer, DLR  
B. Fu, Materials Engineer, DLR  
A. Hiser, Branch Chief, DLR  
E. Wong, Chemical Engineer, DLR

ENCLOSURE

Approved By:

Jerry Dozier, Chief  
Engineering Review Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Rajender Auluck, Chief  
Engineering Review Branch 2  
Division of License Renewal  
Office of Nuclear Reactor Regulation

## **Introduction**

An audit was conducted by the U.S. Nuclear Regulatory Commission (NRC) project team at Cooper Nuclear Station (CNS) in Brownville, NE on April 20-24, 2009. The purpose of this audit was to examine the applicant's Aging Management Programs (AMPs) documentation for CNS and to verify the applicant's claim of consistency with the corresponding NUREG-1801, "Generic Aging Lessons Learned (GALL) Report" AMPs. Exceptions to the GALL AMP elements will be evaluated separately as part of the NRC staff's (the staff) review of CNS license renewal application (LRA) and documented in the staff's Safety Evaluation Report (SER).

The Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (NUREG-1800) provides the staff guidance for reviewing an LRA. The Standard Review Plan allows an applicant to reference the GALL AMPs described in the LRA. By referencing the GALL Report AMPs, the applicant concludes that its GALL AMPs correspond to those AMPs which are reviewed and approved in the GALL Report. If an applicant credits an AMP as being consistent with a GALL Report program, it is incumbent on the applicant to ensure that the AMP contains all of the elements of the referenced GALL AMP.

During this audit, the staff audited program Elements 1-6, and program Element 10, (operating experience), of the applicant's AMPs claimed to be consistent with the GALL Report against the related elements of the associated AMP described in the GALL Report, unless otherwise indicated in this Audit report. Elements 7-9 which address corrective actions, confirmation process, and administrative controls were audited by another NRC project team during the Scoping and Screening Methodology audit and are evaluated separately. The NRC project team audited all AMPs that the applicant stated were consistent with the GALL Report.

In addition, the staff verified the conditions at the plant were bounded by the conditions for which the GALL Report program was evaluated. This was done by comparing each Aging Management Review (AMR) line item in the LRA with a corresponding line item on the GALL Report, to ensure bounded as appropriate.

Finally, the staff examined the applicant's program bases documents and related references for these AMPs. The NRC project team also interviewed CNS representatives to obtain additional clarification related to the CNS AMPs.

### LRA AMP B.1.1, Aboveground Steel Tanks

In the CNS LRA, the applicant stated that AMP B.1.1 is a new program that is consistent with the program elements described in the GALL Report AMP XI.M29, "Aboveground Steel Tanks."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL Report AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD07	Aging Management Program Evaluation Report Non-Class 1 Mechanical	Revision 2 9/25/2008
2. Surveillance Procedure 6FP.611	Fire Protection Tank Internal Painted Surface 5 Year Examination	Revision 9 8/06/2007
3. Pittsburg Tank & Tower Company Report	Inspection Report – Acceptance Criteria Met	10/30/2007

In comparing the 7 program elements in the applicant's program, the staff reviewed the program elements contained in AMP B.1.1 to verify that they are consistent with GALL AMP XI.M29 program elements. The staff confirmed that the applicant's program was consistent with the GALL Report AMP XI.M29 for the element of preventive actions, and that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.M29. The staff also verified that the applicant provided an adequate summary description of the program. However, the staff has a concern pertaining to the adequacy of the applicant's description of the AMP elements for scope of program, parameters monitored or inspected, detection of aging effects, monitoring and trending, and acceptance criteria. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The staff noted that the applicant conducted a full robotic visual internal inspection of the two fire water storage tanks covered by this AMP to verify that degradation is not occurring. The staff conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.1. The search resulted in a review of 136 results through the use of keywords: "steel tank interface" and "concrete-metal." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience from the independent search did not indicate age-related degradation that would be applicable to this program. In the application, the applicant stated that the program is a new program and therefore there is no operating experience for the effectiveness of the program. In order to be consistent with the staff's recommendations in Section A.1.2.3.10, Item 2 of SRP-LR Branch Position RLSB-1 (i.e. Branch Position RLSB-1 of Appendix A to NUREG-1800), an applicant may have to commit to providing operating experience in the future for new programs to confirm their effectiveness. The staff may request, consistent with the statement in the SRP-LR, that the applicant make a commitment to provide future operating experience to the staff for those new AMPS to confirm effectiveness for the period of extended operation.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.M29 not including any areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.2, Bolting Integrity**

In the Cooper Nuclear Station LRA, the applicant stated that CNS AMP B.2.1.6 is an existing program that is consistent with GALL AMP XI.M18, "Bolting Integrity" with enhancements. The enhancements are related to the use of GALL approved guidance EPRI TR-104213, and EPRI NP-5769, consideration of SCC to selection of materials, use of lubricants containing MoS<sub>2</sub>, and proper gasket compression.

During its audit, the staff reviewed the applicant's on-site documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following on-site documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD07	Aging Management Program Evaluation Report Non-Class 1 Mechanical	Revision 2, 9/25/08
2. CNS-RPT-07-LRD05	Operating Experience Review Report	Revision 2, 10/7/08
3. Admin Procedure 0.30	ASME Section XI Repair/Replacement and Temporary Non-Code Repair Procedure	Revision 23, 3/1/06
4. Admin Procedure 0.5	Conduct of the Condition Report Process	Revision 59, 9/26/07
5. Admin Procedure 0-QA-01	CNS Quality Assurance Program	Revision 11, 11/16/07
6. Engineering Procedure 3.28.1	Inservice Inspection Program Implementation	Revision 11, 3/23/07
7. Engineering Procedure 3.28.1.1	Visual VT-1 Examination of Pressure Retaining Bolting and Integral Attachments	Revision 7, 8/13/07
8. Engineering Procedure 3.28.1.6	Visual Examination of Containment Bolting	Revision 3, 4/12/07
9. Maintenance Procedure 7.2.71	Bolting and Torque Program	Revision 23, 11/29/07

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in CNS AMP B.1.2 are consistent with GALL AMP XI.M18 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP. The staff also verified that the applicant provided an adequate summary description of the program.

The staff found that the GALL Report "monitoring and trending" program element recommending leak rate to be monitored on a particularly defined schedule was not properly

documented in its bolting integrity program. The staff also found that in the Bolting Integrity program description, the applicant identifies EPRI NP-5067 as a reference document in addition to the GALL approved guidance documents. The use of 2 sets of guidance brings into question whether or not there are contradictions which would lead the applicant to use a requirement less restrictive than what is recommended in GALL. Furthermore, the staff found that the Bolting Integrity Program is supplemented by other AMPs, which is contrary to what is stated in the LRA. Additionally, the staff found that the enhancements taken would need additional clarification explaining the actual items to be modified. The staff will consider issuing RAIs to address these issues, and the staff's evaluation will be documented in the SER.

The staff also reviewed the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. A condition report indicated that in 2003, numerous recordable conditions such as arc strikes, necking, washer gouging, galling on bolt shafts, and "machining" chatter on threads were noted. The applicant evaluated the conditions and determined the gouged washers and galled bolts were acceptable "as is." The staff reviewed the detailed condition report, response and evaluation and found that proper corrective actions were taken to address the issue as well as proper follow up inspections on the components.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.2. The search resulted in a review of over 100 results through the use of keywords: "bolt," "preload," "lubricant," and "crack." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process, and administrative controls, were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.M18, except for the areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.3, Buried Piping and Tanks Inspection**

In the Cooper Nuclear Power Station LRA, the applicant stated that AMP B.1.3 is a new program that is consistent with the program elements in GALL AMP XI.M34, "Buried Piping and Tanks Inspection."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. 10 CFR Part 50 App B	Quality Assurance Criteria for Nuclear Power Plants	2008
2. CR-CNS-2001-02879	Cathodic protection system	2001
3. CR-CNS-2001-04637	Cathodic protection system	2001
4. CR-CNS-2001-06359	Cathodic protection system	2001
5. CR-CNS-2003-07435	Install cathodic protection system in diesel generator system	2003
6. CR-CNS-2004-05914	Diesel generator fuel system corrosion	2004
7. CR-CNS-2004-07525	Cathodic protection system investigation	2004
8. CR-CNS-2005-01370	Diesel generator fuel system corrosion	2005
9. CR-CNS-2006-06140	Aging management program required for buried piping	2006
10. CR-CNS-2006-06141	Cathodic protection system	2006
11. CR-CNS-2006-06142	Cathodic protection system PM	2006
12. CR-CNS-2006-06143	Periodic inspection of buried pipe	2006
13. CR-CNS-2007-07783	Cathodic protection out of spec	2007
14. CR-CNS-2007-07830	Cathodic protection panel powered wrong	2007
15. CR-CNS-2007-07831	Cathodic protection out of spec	2007
16. CR-CNS-2007-07832	Cathodic protection powered incorrectly	2007
17. CR-CNS-2008-06127	Cathodic protection Volts Amps high	2008
18. CR-CNS-2008-06128	Cathodic protection Volts Amps high	2008

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.3 are consistent with GALL AMP XI.M34 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP B.1.3. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited operating experience and interviewed the applicant's technical staff to confirm that plant-specific operating experience did not reveal any degradation outside the bounds of industry experience.

In the LRA, the applicant stated that the Buried Piping and Tanks Inspection is a new program and therefore there is no operating experience for the effectiveness of the program. In order to be consistent with the staff's recommendations in Section A.1.2.3.10, Item 2 of SRP-LR Branch Position RLSB-1 (i.e. Branch Position RLSB-1 of Appendix A to NUREG-1800), an applicant may have to commit to providing operating experience in the future for new programs to confirm

their effectiveness. The staff may request, consistent with the statement in the SRP-LR, that the applicant make a commitment to provide future operating experience to the staff for those new AMPS to confirm effectiveness for the period of extended operation.

Given the absence of operating experience prepared by the applicant, the staff searched the applicant's condition report data base for relevant operating experience. 24 relevant items were identified based on searches using the key words "buried piping" and "cathodic protection."

During the audit, several questions concerning the proposed aging management program arose. These questions are summarized in the paragraphs which follow. The staff will consider issuing RAI's to address these issues; the staff's evaluation will be documented in the SER.

The proposed aging management program includes buried stainless steel piping and tanks. The program recommended by the GALL report includes only steel piping and tanks. Compliance with both the proposed program and the program recommended by the GALL Report requires that a protective coating be applied to the piping. Stainless steel is an active-passive metal which is generally in the passive state. Coating the pipe could cause oxygen to be excluded from the surface of the pipe. This could cause a reduction in the corrosion resistance of the pipe. The applicant was requested to justify the inclusion of stainless steel in this aging management program or to propose an alternate program suitable for stainless steel piping and tanks.

The aging management program recommended by the GALL Report states that an external coating consistent with industry standards should be applied to buried piping. The proposed aging management program states that an external coating will be applied without stating that the coating will conform to industry standards. The applicant was requested to confirm that the coatings used on buried piping conform to industry standards.

Operating experience documents indicate that at least some of the buried piping present is cathodically protected. Information concerning which piping was protected was not immediately available. Some information contained in condition reports indicated that the system may have been improperly operated or connected. Incorrect hookup or operation of a cathodic protection system can aggravate rather than mitigate corrosion. It was determined that this issue was one of current operations rather than license renewal. A condition report (CR-CNS-2009-03278) was initiated by the applicant.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.M34 not including any areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.4, BWR CRD Return Line Nozzle**

In the CNS LRA, the applicant stated that AMP B.1.4 is an existing program that is consistent with the program elements in GALL AMP XI.M6, “BWR Control Rod Drive Return Line Nozzle.” The applicant stated that this program will assure that the aging degradation due to fatigue is adequately monitored in CNS’s control rod drive (CRD) return line nozzle so that its intended function is maintained. The program consists of enhanced inspection and system modifications and maintenance programs to mitigate cracking.

During its audit, the staff reviewed the applicant’s onsite documentation supporting the applicant’s conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant’s technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD02	CNS License Renewal Project, Aging Management Program Evaluation Report Class 1 Mechanical, BWR CRD Return Line Nozzle	Revision 1 9/2/2008

In comparing the 7 program elements in the applicant’s program, the staff found that in CNS-RPT-07-LRD02 the applicant adequately discussed these elements and the elements contained in AMP B.1.4 are consistent with GALL AMP XI.M6 program elements. The applicant stated that CNS has cut and capped the CRD return line nozzle to mitigate fatigue and CNS also conducts UT examination of the CRD return line nozzle-to-cap weld in accordance with the staff approved BWRVIP-75-A document. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.M6. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant’s technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant’s condition report database for operating experience relevant to AMP B.1.4. The staff verified that the operating experience described in the applicant’s basis document adequately addresses the plant specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared the other 7 program elements in the applicant’s program and verified that these elements for the AMP were consistent with those specified in GALL AMP XI.M6 not including any areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.5, BWR Feedwater Nozzle**

In the CNS LRA, the applicant stated that AMP B.1.5 is an existing program that is consistent with the program elements in GALL AMP XI.M5, "BWR Feedwater Nozzle," with an exception. The applicant stated that this program will assure that the aging degradation due to fatigue is adequately monitored in CNS's feedwater nozzle so that its intended function is maintained. The program entails enhanced inspection to monitor the effects of cracking and system modifications to mitigate cracking. The exception is related to system modification to mitigate cracking.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
CNS-RPT-07-LRD02	CNS License Renewal Project, Aging Management Program Evaluation Report Class 1 Mechanical, BWR Feed Water Nozzle	Revision 1 9/2/2008

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.5 are consistent with GALL AMP XI.M5 program elements with one exception described below. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.M5. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed an exception to GALL program element "Preventive Action" that would negate performing low-flow modifications of the feedwater control system and rerouting of the reactor water cleanup (RWCU) system as recommended in NUREG-0619 to decrease the magnitude and frequency of temperature fluctuations. The applicant stated that augmented inspection in accordance with GE-NE-523-A71-0594-A coupled with plant-specific fracture mechanics assessments negated the need for system modifications to assure that the feedwater nozzles can perform their intended function through the period of extended operation. The staff will review the exception and may consider issuing an RAI that requests the applicant provide additional information concerning the exception related to system modification to mitigate cracking.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.5. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared the other 7 program elements in the applicant's program and verified that these elements for the AMP were consistent with those specified in GALL AMP XI.M5, not including the exception identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER.

**LRA AMP B.1.6, BWR Penetration**

In the CNS LRA, the applicant stated that AMP B.1.6 is an existing program that is consistent with the program elements in GALL AMP XI.M8, "BWR Penetration." The applicant states that this program will assure that the aging degradation due to IGSCC is adequately monitored in CNS's penetrations so that their intended function is maintained. The program entails inspection and evaluation to monitor the effects of cracking and monitoring and control of the reactor coolant water chemistry to mitigate cracking.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD02	CNS License Renewal Project, Aging Management Program Evaluation Report Class 1 Mechanical, BWR Penetrations	Revision 1 9/2/2008

In comparing the 7 program elements in the applicant's program, the staff found that in CNS-RPT-07-LRD02 the applicant adequately discussed these elements and these elements contained in AMP B.1.6 are consistent with GALL AMP XI.M8 program elements. The applicant stated that inspection and flaw evaluation and control of water chemistry are in accordance with the guidelines of applicable staff-approved BWRVIP documents. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.M8. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.6. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP. However, recent industry experience at Pilgrim Nuclear Power of cracking of the CRD return line cap weld (Inconel 182) due to IGSCC indicated greater susceptibility of the Inconel 182 weld to SCC compared to the stainless steel welds. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared the other 7 program elements in the applicant's program and verified that these elements for the AMP were consistent with those specified in GALL AMP XI.M8, not including any areas in which the staff felt additional clarification might be warranted as described above.

**LRA AMP B.1.7, BWR Stress Corrosion Cracking Program**

In the CNS LRA, the applicant stated that AMP B.1.7 is an existing program that is consistent with the program elements in GALL AMP B.1.7, "BWR Stress Corrosion Cracking," with an exception. The exception is related to the selection of welds based on risk-informed inservice inspection (RI-ISI) methodology.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents and related references:

Document	Title	Revision / Date
1. CNS-RTP-05-LRD-05	Operating Experience Review Report, Section 4.1.4	Revision 2 10/7/2008
2. CNS-RPT-07-LRD02	CNS License Renewal Project Aging Management Program Evaluation Report - Class 1 Mechanical: Section 4.4 BWR Stress Corrosion Cracking	Revision 1 9/2/2008
3.	Technical Specifications, Section 3.4.4	Revised by letter dated 8/9/2007
4. NLS2008093	Updated Safety Analysis Report Revision XXIII, Cooper Nuclear Station, Enclosure 5, Revisions to Inservice Inspection Program	Revision - 11/3/2008
5. NRC Letter	Cooper Nuclear Station RE: Risk-Informed Inservice Inspection Program for the Fourth 10-yr Interval; Relief Request No. RI-34 (TAC No. MD0283)	Revision - 10/23/2006
6. NLS2000069	Inservice inspection Summary Report, Cooper Nuclear Station, NRC Docket No. 50-298, DPR-46 Year 2000 Refueling Outage Inspection	8/28/2000
7. NLS2003080	Inservice inspection Summary Report, Cooper Nuclear Station, NRC Docket No. 50-298, DPR-46 Year 2003 Refueling Outage Inspection	7/21/2003
8. NLS2005049	Inservice inspection Summary Report, Cooper Nuclear Station, NRC Docket No. 50-298, DPR-46 Year 2005 Refueling Outage Inspection	5/16/2005
9. NLS2007013	Inservice inspection Summary Report, Cooper Nuclear Station, NRC Docket No. 50-298, DPR-46 Year 2006 Refueling Outage Inspection	2/20/2007
10. NLS2008065	Inservice Inspection Summary Report, Cooper Nuclear Station, NRC Docket No. 50-298, DPR-46 Year 2008 Refueling Outage Inspection	8/14/2008

Document	Title	Revision / Date
11. CR-CNS-1983-00061	CR regarding weld overlay repairs on IGSCC in the RWCU system	6/29/1983
12. CR-CNS-2001-06041	ISI CS P8A (B20) Weld Crack Indication Note: The CR is not in the scope of B.1.7 AMP	12/25/2001
13. CR-CNS-2002-04331	ISI – Core Spray P4B Indications P8A (B20) Weld Crack Indication Note: The CR is not in the scope of B.1.7 AMP	8/8/2002

In comparing the 7 program elements of the applicant’s program to the GALL Report, the staff verified that the program elements contained in AMP B.1.7 are consistent with the GALL Report AMP B.1.7 program elements except for the items further described below. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL Report AMP except for the area that the applicant takes an exception to the GALL Report AMP B.1.7 and the areas that are additionally described below. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed an exception to the GALL program elements, Parameters Monitored/Inspected and Detection of Aging Effects that would allow a different inspection schedule in comparison with the GALL Report BWR Stress Corrosion Cracking AMP. In its LRA and program document, the applicant states that the program has an exception to the program elements because the selection of the welds for inspections is based on risk-informed inservice inspection (RI-ISI) methodology approved by the NRC as well as BWRVIP-75-A. In comparison, the GALL Report BWR Stress Corrosion Cracking Program recommends the extent and schedule of inspections in accordance with GL 88-01 or BWRVIP-75-A. The staff will review the exception and may consider issuing an RAI that requests the applicant to provide additional information concerning the extent and schedule of the inspections.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant’s technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. The staff also reviewed a sample of Work Orders and ASME Code Section XI Inservice Inspection Reports to evaluate the applicant’s aging management of SCC in piping and piping elements. In its review of CR-CNS-1983-00061 dated August 29, 1983, the staff noted that IGSCC was observed in a suction line circumferential weld in the reactor water cleanup system and the IGSCC was repaired by weld overlay method. The staff found that the applied repair method was consistent with the recommendations of GL 88-01 and BWRVIP-75-A.

The staff conducted an independent search of the applicant’s condition report database for operating experience relevant to AMP B.1.7. The search resulted in a review of over 27 results through the use of keywords: “weld,” “crack,” and “indication.” The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant’s operating experience review. The staff verified that the operating experience described in the applicant’s basis document adequately addresses the plant-specific operating experience for this AMP.

The LRA described that the examinations during RE19 (Refueling Outage 19) in 2000 and RE22 in 2005 revealed recordable indications on a CRD nozzle-to-cap weld which were caused by ID geometry and determined to be acceptable. The staff reviewed Inservice Inspection Summary Reports NLS2000069 and NLS2005049 for Refueling Outages RE19 and RE22, respectively, and confirmed that the indications were acceptable. The applicant also stated in the LRA that during RE19, safe end nozzles and piping components were examined using ultrasonic technology and found acceptable. The staff reviewed the relevant Inservice Inspection Summary Report and confirmed that the applicant's statement in the LRA was consistent with the inspection results.

The scope of the applicant's program included implementing countermeasures to mitigate intergranular stress corrosion cracking (IGSCC) and performing inservice inspections to monitor IGSCC and its effect. During the audit and interview, the applicant stated that most of the piping welds were replaced with a SCC-resistant material in 1984 and 1985, which is consistent with the recommendations of the GALL Report to mitigate IGSCC. The staff also confirmed that the material used for the replacements was SCC-resistant in accordance with GL 88-01 and BWRVIP-75-A as referred in the GALL Report. The staff also noted that these replacements of welds were consistent with the Preventive Action element of the GALL Report BWR Stress Corrosion Cracking Program. In its review, the staff reviewed the Updated Safety Analysis Report of the applicant and confirmed that the applicant implemented an inspection program to monitor IGSCC in stainless steel and nickel alloy piping. The staff found that the implemented inspection program was consistent with the GALL Report in terms of the program elements, Scope of Program and Parameters Monitored/Inspected.

As part of its Preventive Actions program element, the GALL Report BWR Stress Corrosion Cracking AMP states that nickel alloys other than Inconel 82, such as Alloy 600, are evaluated on an individual basis in terms of SCC resistance. In relation to this, the staff found that a CRD nozzle-to-cap weld was included in the applicant's fourth 10-year inservice inspection plan that was started in 2006, which is consistent with the recommendation of the GALL Report.

The staff found that the on-site Technical Specifications of the applicant implement the requirements for leakage detection in accordance with GL 88-01, which is also consistent with the GALL Report in terms of the program element Parameters Monitored/Inspected.

The staff also noted that the program element Monitoring and Trending of the applicant's program implemented sample expansion that increases the extent of samples to be inspected if one or more cracks are observed in the inspected welds, which is consistent with the GALL Report BWR Stress Corrosion Cracking AMP.

In its audit and review, the staff found that the following item needed additional information and is considering an RAI in the following area:

In its review, the staff found that ASME Code Section XI, 2001 Edition 2003 Addenda, of the ASME Boiler and Pressure Vessel was used for the program elements, Acceptance Criteria and Corrective Actions, of the applicant's program rather than ASME Code Section XI, 1986 Edition as recommended by the GALL Report. Therefore, the staff is considering issuing an RAI regarding this code edition issue.

The 3 program elements, corrective actions, confirmation process and administrative controls are audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP B.1.7, not including any exceptions identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER, and the areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.8, BWR Vessel ID Attachment Welds**

In the CNS LRA, the applicant stated that AMP B.1.8 is an existing program that includes inspection and evaluation to detect and monitor the effects of cracking, and the control of reactor coolant water chemistry to mitigate cracking. The applicant further stated that this program is consistent with the program elements in GALL AMP XI.M4, "BWR Vessel ID Attachment Welds."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD02	CNS License Renewal Project, Aging Management Program Evaluation Report Class 1 Mechanical, BWR CRD Return Line Nozzle	Revision 1 9/2/2008

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.8 are consistent with GALL AMP XI.M4 program elements. The program entails (a) inspection and evaluation in accordance with the guidelines of staff-approved BWRVIP-48-A and (b) monitoring and control of reactor coolant water chemistry in accordance with the guidelines of BWRVIP-130 to ensure the long-term integrity and safe operation of reactor vessel inside diameter (ID) attachment welds and support pads. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.M4. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.6. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant specific operating experience for this AMP. However, recent industry experience at Pilgrim Nuclear Power of CRD return line cap weld (Inconel 182) cracking due to IGSCC indicated greater susceptibility of the Inconel 182 weld to SCC compared to the stainless steel welds. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared the other 7 program elements in the applicant's program and verified that these elements for the AMP were consistent with those specified in GALL AMP XI.M4, not including any areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.9, BWR Vessel Internals**

In the CNS LRA, the applicant stated that AMP B.1.9 is an existing program that will assure that this AMP including the enhancement is consistent with the program elements in GALL AMP XI.M9, "BWR Vessel Internals." The applicant stated that the aging degradation due to IGSCC, IASCC and fatigue is adequately monitored in the CNS reactor vessel internals (RVI), so that their intended function is maintained. This AMP including the enhancement entails inspection and evaluation of the aging effects due to cracking and provides guidelines for mitigating cracking.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD02	CNS License Renewal Project, Aging Management Program Evaluation Report Class 1 Mechanical, BWR Vessel Internals	Revision 1 9/2/2008

In comparing the 7 program elements in the applicant's program, the staff found that in CNS-RPT-07-LRD02 the applicant adequately discussed these elements and these elements contained in AMP B.1.9 are consistent with GALL AMP XI.M9 program elements with the exception of aging management issues related to core shroud and top guide components. The applicant stated that inspection and flaw evaluation and control of water chemistry are in accordance with the guidelines of applicable BWRVIP documents. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

During the Aging Management Program audit, the staff found that two issues related to core shroud components, and one issue related to top guide components required clarification. These three issues are: (1) reduced fracture toughness for core shroud materials exposed to a greater neutron fluence, (2) fatigue/cyclic or crack growth analysis that is necessary for the core shroud, and (3) augmented inspections for the top guide grid beams. The staff issued a request for additional information (RAI) to address these issues and the RAIs are discussed in the staff's safety evaluation for AMP B.1.9. The staff confirmed that the boundary conditions of the plant

program with the exception of issues related to top guide and core shroud components are enveloped by the boundary conditions described in GALL AMP XI.M9.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.M9 not including any areas in which the staff felt additional clarification might be warranted as described above.

**LRA AMP B.1.10, Containment Inservice Inspection**

In the CNS LRA, the applicant stated that AMP B.1.10 is an existing program that is consistent with the program elements in GALL AMP XI.S1, "ASME Section XI, Subsection IWE" with enhancements. The enhancements are related to providing guidance in the CNS CII Program for surface areas requiring augmented examinations.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD05	Operating Experience Review Report	Revision 2 10/7/2008
2. CNS-RPT-07-LRD08	CNS License Renewal Project Aging Management Program Evaluation Report Civil/Structural	Revision 2 10/8/2008
4. Engineering Procedure 3.28.1.4	General Visual Inspection of Containment Surfaces	8/27/2001
5. Engineering Procedure 3.28.1.6	Visual Examination of Containment Bolting, VT-1	4/12/2007
6. 2 <sup>nd</sup> Ten-Year Interval, CII	Cooper Station 2 <sup>nd</sup> Interval Inservice Inspection Program	Revision 0 3/31/2008

In comparing 6 of the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.20 are consistent with GALL AMP XI.S3 program elements. A partial review of the 7<sup>th</sup> element, operating experience, was performed and further review will be completed at a later date. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.S3. The staff also verified that the applicant provided an adequate summary description of the program.

The applicant has committed to implement an enhancement affecting the "detection of aging effects" program element. For surface areas requiring augmented examination, a visual examination method will be used for accessible areas and an ultrasonic thickness measurement method will be used for inaccessible areas. The applicant has also committed to enhance the "acceptance criteria" program element to require the CNS CII program to document material loss in a local area exceeding or projected to exceed 10% of the nominal containment wall

thickness before the next examination in accordance with IWE-3511.3 for volumetric inspections. The applicant stated that the enhancements are consistent with current implementation practices, and the enhancements formally incorporate these practices into applicable implementing procedures.

The staff performed a partial audit of the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also went on a walk down of the torus. Issues identified are addressed in the Structures Monitoring Program. The staff asked how the issue of loss of material due to corrosion near the sand bed region of the Mark 1 steel containment drywell shell has been addressed and the licensee responded by saying that a vacuum test was performed and no water was found. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.S3, not including the areas in which the staff felt additional clarification might be warranted as described above. The staff only completed a partial review of the operating experience program element during the audit, and will complete the remainder of the review at a later date.

#### **LRA AMP B.1.11, Containment Leak Rate**

In the CNS LRA, the applicant stated that AMP B.1.11 is an existing program that is consistent with the program elements in GALL AMP XI.S4, "10 CFR Part 50, Appendix J" with exceptions. The exceptions are related to Type C tests performed by local pressurization, testing on containment isolation valves and containment penetrations, and tests used to measure an overall containment integrated leak rate and local leakage rates at pressure retaining boundaries and isolation valves.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD05	Operating Experience Review Report	Revision 2 10/7/2008
2. CNS-RPT-07-LRD08	CNS License Renewal Project Aging Management Program Evaluation Report Civil/Structural	Revision 2 10/8/2008
3. PCLT Program Document	Primary Containment Leakage Rate Testing Program Document	Revision 9 5/18/2007
4. Engineering Procedure 3.40	Primary Containment Leakage Rate Testing Program	10/31/2007

Document	Title	Revision / Date
5. NRC Letter – Appendix J Exemption	Exemption from Appendix J to 10 CFR Part 50 to Allow Reverse Direction Local Rate Testing of Four Containment Isolation Valves at Cooper Nuclear Station (TAC No. M89769)	7/22/1994

In comparing the 7 program elements in the applicant’s program, the staff verified that 6 of the 7 program elements contained in AMP B.1.20 are consistent with GALL AMP XI.S3 program elements. A partial review of the 7<sup>th</sup> element, operating experience, was performed and further review will be completed at a later date. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.S3. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed an exception to GALL program elements Monitoring and Trending and Acceptance Criteria. The staff will review the exception and may consider issuing an RAI to address it.

The staff performed a partial audit of the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant’s technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant’s program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.S3, not including the areas in which the staff felt additional clarification might be warranted as described above. The staff only completed a partial review of the operating experience program element during the audit, and will complete the remainder of the review at a later date.

**LRA AMP B.1.12, Diesel Fuel Monitoring**

In the CNS LRA, the applicant stated that AMP B.1.12 is an existing program that is consistent with the program elements in GALL AMP XI.M30, “Fuel Oil Chemistry,” with enhancements and exceptions. The exception is related to the use of only certain ASTM Standards that are recommended by the GALL Report, and the enhancement is related to the use of multi-level sampling and additional inspections of fuel oil storage tanks, and their associated acceptance criteria.

During its audit, the staff reviewed the applicant’s onsite documentation supporting the applicant’s conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant’s technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD07	CNS License Renewal Project – Aging Management Program Evaluation Report – Non-Class 1 Mechanical	Revision 2 10/7/2008
2. CNS-RPT-07-LRD05	CNS License Renewal Project – Operating Experience Report	Revision 2 9/25/2008
3. Chemistry Procedure 8.7.1.30	Particulate Contaminant Analysis for Diesel Fuel Oil	Revision 6 12/2/1999
4. Surveillance Procedure 6.DG.601	Diesel Fuel Oil Day Tank Particulate Contamination Test	Revision 10 1/4/2006
5. Surveillance Procedure 6.DG.604	Diesel Fuel Oil Storage Tank, Bunker A&B, Quality Test	Revision 15 12/15/2006
6. Surveillance Procedure 6.DG.605	Diesel Fuel Oil Incoming Truck Sampling	Revision 13 1/9/2006
7. Surveillance Procedure 6.FP.103	Diesel Fire Pump Inspection	Revision 10 11/15/2007
8. Surveillance Procedure 6.FP.612	Diesel Fire Pump Fuel Quality Test	Revision 6 8/28/2002
9. System Operating Procedure 2.2.12	Diesel Fuel Oil Transfer System	Revision 47 8/9/2006
10. CR-CNS-2009-03164	Rejection of Diesel Fuel Oil Tanker based on test results (flash point)	Revision N/A 4/21/2009
11. CR-CNS-2008-09537	Rejection of Diesel Fuel Oil Tanker based on test results (ULSD)	Revision N/A 12/29/2008
12. CR-CNS-2005-06170	Rejection of Diesel Fuel Oil Tanker based on test results (distillation)	Revision N/A 8/24/2005
13. File 12724.01.024	Subject: Analysis of Sludge Samples, SwRI Project 08.12724.01.024	10/25/2007
14. CR-CNS-2007-05830	Scaly Debris in DG1 diesel fuel oil day tank	8/27/2007
15. CR-CNS-2007-05878	Additional info for CR-CNS-2007-05830	8/28/2007
16. CR-CNS-2007-06049	Schedule cleaning of DG2 diesel fuel oil day tank	9/05/2007
17. CR-CNS-2007-06216	Thin brown film layer found in DG2 fuel oil day tank	9/10/2007
18. Apparent Cause Evaluation	Scaly Debris found in DG1 Day Tank (CR-CNS-2007-05830 and CR-CNS-2007-06216)	9/28/2007
19. CR-CNS-2003-01730	Pitting Corrosion - bottom of 2B DG fuel oil storage tank	4/10/2003
20. CR-CNS-2003-6775	Fuel Oil Transfer Pump Failure	2/24/2003
21. CR-CNS-2006-0778	Impact of Ultra Low Sulfur Diesel	11/24/2006
22. Action #03786	Emergency Diesel Generators – Ultra Low Sulfur Diesel Fuel Oil Impact to CNS Emergency Diesel Generators (CR-CNS-2006-05672 and CR-CNS-2006-07780)	2/25/2007
23. CNS P.O. 4500044172	Status of Diesel Tank and Cross-Tie Pipe Integrity Assessment	11/18/2004
24. CNS P.O. 4500044172	API 570 – Inspection Report – Diesel Fuel Oil Tank “B”	4/18/2005
25. CNS P.O. 4500044172	API 570 – Inspection Report – Diesel Fuel Oil Tank “A”	4/18/2005

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.12 are consistent with GALL AMP XI.M30 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.M30. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed an exception to GALL program elements Scope of Program, Parameters Monitored/Inspected, and Acceptance Criteria, to utilize unmodified ASTM Standards D2276 Method A instead of ASTM Standards D6217 for particulate testing. The applicant also proposed an exception to GALL program elements Scope of Program, Parameters Monitored/Inspected, and Acceptance Criteria, to utilize ASTM Standards D1796 instead of ASTM D1796 for water and sediment testing. The staff will review the exceptions and their associated justifications and may consider issuing an RAI that requests the applicant provide additional information concerning its use of the ASTM standards.

The applicant has committed to implement an enhancement to GALL program elements Scope of Program, Parameters Monitored/Inspected, and Acceptance Criteria to utilize ASTM Standard D4057 for the diesel fire pump fuel oil storage tank. The applicant also committed to an enhancement to GALL program element Preventative Actions to perform periodic visual inspections and cleanings of all the tanks in scope of the program. The applicant committed to an enhancement to GALL program element Detection of Aging Effects to include multilevel sampling for the diesel fuel oil day tanks and diesel fire pump fuel oil storage tank and UT bottom measurements for all tanks in scope of the program. The applicant finally committed to an enhancement to GALL program element Acceptance Criteria to have an acceptance criterion for (1) particulate testing of the diesel fire pump fuel oil storage tank and (2) UT bottom measurements for all tanks in scope of the program. The staff will review these enhancements and will consider issuing RAIs, if appropriate. The staff's evaluation will be documented in the SER.

The staff confirmed in the applicant's System Operating Procedure that long term storage additives and biocides are added to the fuel oil prior to being added to the storage tanks. The staff reviewed laboratory results of fuel oil samples from the diesel fuel oil storage tanks and day tanks, dated January 2009. The results of the laboratory tests indicate that particulate contamination and water and sediment were within acceptable limits of  $\leq 10\text{mg/L}$  for particulates and  $< 0.05\%$  for water and sediment. The staff reviewed the applicant's current procedures and noted that it utilizes: (1) ASTM D4057 for oil sampling in the diesel fuel oil storage tanks and diesel fuel oil day tanks, (2) multilevel sampling for the diesel fuel oil storage tanks and (3) an acceptance criterion of  $\leq 10\text{mg/l}$  for the determination of particulates for the diesel fuel oil storage tanks and diesel fuel oil day tanks.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.12. The search resulted in a review of over 390

results through the use of keywords: “fuel oil,” “contaminant,” “particulates,” and “water”. The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant’s operating experience review. The staff verified that the operating experience described in the applicant’s basis document adequately addresses the plant-specific operating experience for this AMP.

In 1997 the applicant cleaned and performed ultrasonic testing of both Diesel Fuel Oil Storage Tanks. It was concluded from these inspections that the tanks were relatively healthy. In 2003 during a tank inspection, the applicant discovered corrosion in the 2B Diesel Fuel Oil Storage Tank after over 20 years of operation. The staff noted that the value for the wall thickness to initiate further action is 0.25”. The applicant evaluated the condition and noted that the minimal wall thickness is 0.453”. In 2004 the applicant performed UT inspections of both storage tanks to 2’x2’ surface grids representing areas of the tank bottom, sides, top and heads and the results indicated that the minimum acceptable thickness was not exceeded. The applicant also coated the interiors of the tanks with a single coat of a thick-film epoxy after the UT inspections. The staff noted the applicant initiated appropriate corrective actions which include evaluation to determine minimal wall thickness was maintained, UT inspections of representative areas of the interiors and coating the interior of the tanks.

In 2007 the applicant performed an evaluation to determine the effects of ultra-low-sulfur diesel fuel oil. The staff reviewed this report and noted that the applicant evaluated the individual effects of using ULSD, as described in Information Notice 2006-22. The staff noted the applicant has taken corrective actions to monitor the progress of ULSD fuel oil testing and future impact when more data is available. The applicant has currently amended its purchase orders for fuel oil to require sulfur content to be greater than 200ppm.

The staff reviewed several condition reports during the time frame of 2005-2009 in which the applicant has rejected several diesel fuel oil tankers because they did not meet the required acceptance criteria. The staff noted that in each instance the applicant has taken appropriate corrective actions to reject the diesel fuel oil and not add it to the storage.

The staff noted in August 2007 the applicant discovered scale debris in the DG1 diesel fuel oil day tank. The applicant collected a sample to be analyzed, inspected the interior of the tank to determine if degradation has occurred and then subsequently cleaned the tank. Based on this discovery, the applicant appropriately issued a work order to inspect and clean the DG2 diesel fuel oil day tank. The applicant discovered the same type of debris in this day tank and then had the tank interior inspected and cleaned. The applicant had the samples from each diesel fuel oil day tank analyzed by Southwest Research Institute which determined that the debris was a mixture of fuel degradation products, rust, dirt/clay and possibly microbiological growth. The applicant also performed an “Apparent Cause Evaluation” which determined that the debris resulted from time based mechanisms that settled from either fuel oil decomposition and suspended fuel oil particulates. The staff reviewed the applicant’s current maintenance plan to perform an internal inspection of both diesel fuel oil day tanks on a 234-week frequency. The staff noted that the applicant has taken appropriate corrective actions to clean and inspect both diesel fuel oil day tanks, to analyze the debris and perform an “apparent cause evaluation” and perform periodic internal inspections of tank interiors.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.M30, not including any exceptions identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER.

### **LRA AMP B.1.13 Environmental Qualification (EQ) of Electric Components**

In the Cooper Nuclear Station LRA, the applicant stated that AMP B.1.13 is an existing program that is consistent with the program elements in GALL AMP X.E1, "Environmental Qualification (EA) of Electric Components."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. NUREG 1801	Generic Lessons Learned (GALL) Report Chapter X, "Time-Limited Aging Analysis Evaluation of Aging Management Programs Under 10 CFR 54.21(c)(1)(iii)," AMP X.E1, "Environmental Qualification of Electric Components."	Vol. 2, Revision 1 9/2005
2. Regulatory Guide 1.89	Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants	Revision 1 6/1984
3. CNS-RPT-07-LRD09	Aging Management Program Evaluation Results	Revision 2 10/20/2008
4. QAD 20040048	Quality Assurance Surveillance Report	11/03/2004
5. QAD 20040010	QA Audit 04-02, "Environmental Qualification (EQ)	2/23/2004
6. N/A	CNS Environmental Qualification (EQ) 1 <sup>st</sup> Quarter 2009	N/A
6. N/A	EQ Implementation Plan – To Support Extended Power Uprate (EPU) Implementation	Revision 0 3/2009
7. CNS-RPT-07-LRD05	Operating Experience Review Report	Revision 2 10/07/2008

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.13 are consistent with the GALL AMP X.E1 program elements except for AMP B.1.13, program element "Acceptance Criteria." GALL AMP X.E1 program element "Acceptance Criteria" states in part that the 10 CFR 50.49 acceptance criteria are that an inservice EQ component is maintained within the bounds of its qualification basis, including (a) its established qualified life and (b) continued qualification for projected accident conditions. LRA Section B.1.13 does not specify as part of the Acceptance Criteria Program element that the EQ component qualification basis includes continued qualification for the projected accident conditions. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP X.E1. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. The review by the staff noted that the number of sample condition reports were limited and not specifically identified as relating to environmental qualification. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP X.E1. The search resulted in a review of over 1000 results through the use of keywords: "EQ", "environmental qualification," "electrical," "cable," "wire," "crack," and "component." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. For example, condition report CR-CNS-2005-00821 stated that field wire failed QC inspection and the cover was not installed on the conduit. The condition report further stated that moisture intrusion will occur during abnormal conditions. The applicant repaired the field wire and installed the cover and gasket. Another example, condition report CR-CNS-2000-01020, stated that the power leads had hard outer jacket on wire and one of the leads had a crack in the outer and inner insulation. The damaged cable was repaired, the flex conduit replaced, and new lugs and splices installed. The cable was tested and the splices inspected. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP X.E1, not including any areas in which the staff felt additional clarification might be warranted as described above.

#### **LRA AMP B.1.14, External Surfaces Monitoring Program**

In the CNS LRA, the applicant stated that AMP B.1.14 is an existing program that is consistent with the program elements in GALL AMP X1.M36, "External Surfaces Monitoring," with an enhancement. The enhancement is related to the scope of the program.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD-07	Aging Management Program Evaluation Report, Non-Class 1 Mechanical, Section 4.3	Revision 2 9/25/2008
2. CNS-RPT-07-LRD05	CNS License Renewal Project – Operating Experience Report	Revision 2 9/25/2008

Document	Title	Revision / Date
3. Administrative Procedure 0.5	CNS Operations Manual, Administrative Procedure 0.5, Conduct of the Condition Report Process	Revision 59 9/26/2007
4. Administrative Procedure 0.5 CR	CNS Operations Manual, Administrative Procedure 0.5.CR, Condition Report Initiation, Review and Classification	Revision 9 9/26/2007
5. 98-03-08	System Engineer Desktop Guide, System in Scope	Revision 6 9/22/2005
6. 98-03-04	System Engineer Desktop Guide, Section IV, System Walkdown	Revision 7 6/30/2005
7. CNS-RPT -07-AMM06	Aging Management Review of the Residual Heat Removal System	Revision 2 9/22/2008
8. CNS-CR-2002-2143	Valve leaks in RWCU	2/01/2005
9. HPCI Monthly System Walkdown	Mechanical seal leak on the HPCI booster pump	7/31/2007
10. HPCI Monthly System Walkdown	Leak on HPCI turbine casing	6/27/2007
11. CR-CNS-2002-2146	Heat exchanger leak in RWCU	2/18/2005
12. CR-CNS-2002-2143	Valve leak in RWCU	2/22/2005
13. CR-CNS -2004-7354	Corrosion on Fire Protection piping	1/07/2004
14. CR-CNS-2004-3132	Steam leak on the weld from valve body to pipe connection	5/04/2004

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements in AMP B.1.14 are consistent with GALL AMP XI.M36 program elements, not including the program elements in which the staff felt additional clarification might be warranted as discussed below. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP. The staff also verified that the applicant provided an adequate summary description of the program.

The applicant has committed to implement an enhancement affecting the "scope of the program" program element. The enhancement specifies that periodic inspections of systems within the scope of license renewal will be performed. Further, the enhancement states that inspections will include surrounding areas to identify hazards to the subject systems and SSCs in nearby systems that (a) could impact the subject systems and (b) are also within the scope and subject to aging management review for license renewal in accordance with 10 CFR 54.4 (a)(2). The applicant stated that the enhancement is consistent with current implementation practices, and the enhancement formally incorporates these practices into applicable implementing procedures. The staff will consider issuing an RAI to ask the applicant to provide examples of these additional areas and SSCs to be inspected under the applicant's program. The staff's evaluation will be documented in the SER.

The staff audited the operating experience reports, including a sample of condition reports, prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.14. The search resulted in a review of over 2200

results through the use of keywords: “crack,” “leak,” and “rust” for valve, pipes, and flanges. The staff screened a sample of these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant’s operating experience review. The staff verified that the operating experience described in the applicant’s basis document adequately addresses the plant-specific operating experience for this AMP.

GALL AMP X1.M36, External Surfaces Monitoring, is recommended only for steel components. The staff noted that the applicant had expanded the program to managing the loss of material in aluminum, copper alloy, gray cast iron, nickel alloy, and stainless steel components. The staff will consider issuing an RAI to address this issue, and the staff’s evaluation will be documented in the SER.

The staff also noted the applicant’s “scope of the program” program element will inspect (a) surfaces that are inaccessible or not readily visible during both plant operations and refueling outages and (b) will manage loss of material from internal surfaces for situations in which material and environment combinations are the same for internal and external surfaces such that the external surface condition is representative of the internal surface condition. The staff will consider issuing an RAI to address these issues, and the staff’s evaluation will be documented in the SER.

Under the “detection of aging effects” program element, the staff questioned whether general corrosion of the surface of aluminum, copper alloy, gray cast iron, nickel alloy, and stainless steel surfaces will manifest itself as visible rust or rust byproducts (e.g., discoloration or coating degradation) as claimed by the applicant. The staff will consider issuing an RAI to address this issue, and the staff’s evaluation will be documented in the SER.

The staff noted that the “monitoring and trending” program element had not provided sufficient description and documentation of the trending that will be conducted under this program. The staff will consider issuing an RAI to ask the applicant to describe the trending activities that will be used for this program. The staff’s evaluation will be documented in the SER.

Under the “acceptance criteria” program element, GALL AMP X1.M36, External Surfaces Monitoring, says acceptance criteria include design standards, procedural requirements, current licensing basis, industry codes or standards, and engineering. The staff asked the applicant to cite the specific codes or standards that will be used to determine acceptability and will consider issuing an RAI to address this issue. The staff’s evaluation will be documented in the SER.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant’s program and verified that the elements for the AMP were consistent with those specified in the GALL AMP X1.M36, not including the areas in which the staff felt additional clarification might be warranted as described above.

### LRA AMP B.1.15, Fatigue Monitoring Program

In the CNS LRA, the applicant stated that AMP B.1.15 is an existing program that is consistent with the program elements in GALL AMP X.M1, "Fatigue Monitoring Program" with two enhancements. The first enhancement is concerning monitoring high fatigue usage locations as a response to the environmental fatigue issue. The second enhancement is concerning monitoring the safety/relief valve actuations.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD02	Fatigue Monitoring (B.1.15)	Revision 1 09/09/2008
2. CNS-RPT-07-LRD04	TLAA – Mechanical Fatigue	Revision 1 09/09/2008
3. CNS Operational Manual Administrative Procedure 0.5	Conduct of the Condition Report Process	Revision 59 9/26/2007
4. CNS Operational Manual Administrative Procedure 0-QA-01	CNS Quality Assurance Program	Revision 11 11/16/2007
5. CNS Operational Manual Administrative Procedure 3.20	Reactor Pressure Vessel Thermal Transient Review	Revision 15 10/15/2007
6. NPPD Work order 4498459	Review RPV Fatigue usage factors	07/02/2007
7. NPPD Work order 4259025	Review RPV Fatigue usage factors	02/18/2003
8. NPPD Work order 4345765	Review RPV Fatigue usage factors	01/03/2005

In comparing the 7 program elements in the applicant's program, the staff found several program elements require clarification. The staff interviewed the applicant's technical staff and found that, with clarifications, AMP B.1.15 is consistent with GALL AMP X.M1. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP. CNS Fatigue Monitoring Program (FMP) claims no exceptions, only two enhancements. The staff also verified that the applicant provided an adequate summary description of the program.

The applicant has committed to implement an enhancement. The applicant states that this enhancement will affect the "Preventive Actions", "Detection of Aging Effects", "Acceptance Criteria", and "Corrective Actions" program elements. The enhancement is to;

Implement one or more of the following options to manage fatigue including environmental effects for the feedwater nozzles, core spray nozzles and RHR pipe transition. (1) Refine stress and environmental fatigue analyses with the goal to keep the  $CUF_{en}$  within the limit of 1.0 if possible. (2) Repair or replace the affected locations before exceeding a  $CUF_{en}$  of 1.0.

The applicant has also committed to enhance the "Parameters Monitored/Inspected" program element to;

Require the CNS Fatigue Monitoring Program to record each transient associated with the actuation of a safety/relief valve (SRV).

The applicant stated that the enhancements are consistent with current implementation practices, and the enhancements formally incorporate these practices into applicable implementing procedures.

The staff audited the operating experience reports, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff found that 6 out of the 7 program elements audited require clarifications to be consistent with those described in GALL AMP X.M1, as described below.

On Element 2, Preventive Actions, the CNS FMP explicitly shows only to monitor the feedwater nozzles, core spray nozzles and RHR pipe transition locations while the GALL Report requires the entire reactor coolant pressure boundary (RCPB) components to be monitored. During the onsite audit, the applicant explained to the staff that CNS FMP will monitor the entire RCPB components and the reason that only 3 locations were listed was because these locations have environmentally adjusted fatigue usage factors exceeding the design limit. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

On Element 3, Parameter Monitored/Inspected, the CNS FMP states that it will monitor the design cycles assumed in the RCS component design analyses while the GALL Report requires all plant transients that cause significant fatigue usage for each critical RCPB component to be monitored. During the onsite audit, the applicant explained to the staff that CNS FMP monitors all thermal activities of the plant, which include the design transients. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

On Element 4, Detection of Aging Effects, and Element 5, Monitoring and Trending, the CNS FMP states that design cycles will be used as basis for detecting aging effects and for ensuring that fatigue sensitive components remain within the design limit. The staff found this basis inadequate because the design transients do not include all thermal events actually experienced by the RCPB components. In addition, it was the 60-year projected cycles that were used for the environmentally assisted fatigue evaluations, but the 60-year projected cycles for most of the transients are less than those of the design cycles, meaning that components could have failed before the design cycles are reached. Furthermore, the CNS FMP Element 5 indicates that only the feedwater nozzle will be monitored while the GALL Report requires the applicant to include all applicable NUREG/CR-6260 locations, as minimum. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER. On Element 6, Acceptance Criteria, the CNS FMP states that the acceptance criteria are that none of the transients exceeded the allowable cycles in USAR Table III-3-1. This is the same

mistake as in Elements 4 and 5 and must be corrected. In addition, the GALL Report recommends maintaining fatigue usage below the design code limit considering environmental fatigue effects but the CNS FMP Element 6 does not mention the environmental effects. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

On Element 10, Operating Experience, the CNS FMP did not mention industry operating experience. The only operating experience presented is concerning transient cycle tracking of CNS' own plant. The staff reviewed the onsite document CNS Operational Manual Administrative Procedure 3.20, which provides collections of RPV operational transients, and also reviewed chronological P-T (pressure and temperature) data and fatigue evaluations from 2003 to 2007. The staff found that transients were recorded properly. However, in reviewing Operational Manual Administrative Procedure 3.20, the staff identified some QA issues on bookkeeping. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

During the audit, the staff also interviewed the applicant's technical staff on some of the TLAAs areas. Mainly, on 60-year CUF projections, environmental fatigue adjustment factor calculations, and stress analysis methods. Since the applicant's did not provide adequate answers at the time of audit, the staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The staff audited the CNS' reactor water chemistry program, transient cycle monitoring records, and interviewed the applicant's technical staff. The staff confirmed that dissolved oxygen concentration data were recorded properly and the transient severity is bounded by the design specifications, and the cycles were logged properly. Since dissolved oxygen concentration level directly affects fatigue usage, the staff will consider issuing an RAI to request a summary of CNS's oxygen concentration data and its experience in control of dissolved oxygen concentration in the reactor water, as well as the control parameters used to maintain and demonstrate chemistry control. The staff's evaluation will be documented in the SER.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During audit of the Aging Management Program, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP X.M1, not including the areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B1.16, Fire Protection**

In the CNS LRA, the applicant stated that AMP B.1.16 is an existing program that is consistent with the program elements in GALL AMP XI. M26, "Fire Protection," with six enhancements and one exception. The exception is related to performing the functional testing of the Halon/CO<sub>2</sub> fire suppression systems at an 18-month basis, and the enhancements are related to visual inspections of the diesel fire pump engine subsystems carbon steel exhaust components, the fire damper framing, the Halon/CO<sub>2</sub> fire suppression systems, the cardox hose reels and concrete flood curbs, manways, hatches and hatch covers.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. Cooper Nuclear Station License Renewal CNS-RPT-07-LRD01	System and Structures Scoping Results	Revision 2 10/16/2008
2. CNS-RPT-07-LRD07	Aging Management Program Evaluation Report Non-Class 1 Mechanical, Section 4.4.1 Fire Protection	Revision 2 10/16/2008
3. CNS Operations Manual Surveillance Procedure 6.FP.103	Diesel Fire Pump Inspection	Revision 9 11/15/2007
4. CNS Operations Manual Surveillance Procedure 6. FP.203	Fire Damper Assembly Examination Fire Protection System 18 Month Examination	Revision 7 6/27/2007
5. CNS Operations Manual Surveillance Procedure 6. FP.204	Fire Door 31 Day Examination	Revision 10 7/03/2007
6. CNS Operations Manual Surveillance Procedure 6. FP.205	Halon 1301 Service Water Pump Room Fire Suppression Surveillance Checks	Revision 8 9/20/2002
7. CNS Operations Manual Surveillance Procedure 6. FP.601	Fire Protection System 31 Day Examination	Revision 16 9/20/2007
8. CNS Operations Manual Surveillance Procedure 6. FP.604	Fire Door Annual Examination	Revision 18 12/10/2007
9. CNS Operations Manual Surveillance Procedure 6. FP.606	Fire Barrier/Fire Wall Visual Examination	Revision 11 7/03/2007
10. CNS Operations Manual Surveillance Procedure 6.1FP.301	Diesel Generator CO <sub>2</sub> Operability Test (Div 1)	Revision 7 6/09/2005
11. CNS Operations Manual Surveillance Procedure 6.2FP.301	Diesel Generator CO <sub>2</sub> Operability Test (Div 2)	Revision 8 6/09/2005
12. CNS Operations Manual Surveillance Procedure 15.FP.652	Critical Switchgear Room Duct Wrap Visual Inspection	Revision 1 8/03/2000
13. CR-CNS-2008-08695	Door 200 Found Partially Open	11/30/2008

Document	Title	Revision / Date
14. NPPD Notification 10192856 RCR 2002-1258, CR- CNS-2002-4784	Repair Grout Fire Seal FP23ABL1E	9/11/2002
15. CR-CNS-2004- 1804	Fire Seal C8ABL2S Found to Be Unsat	3/10/2004
16. CR-CNS-2004- 3726	CNS-0-BLDG-DOOR-B202 Door Inoperable	5/24/2004

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.16 are consistent with GALL AMP XI.M26, program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.M26. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed an exception to GALL program elements for "Parameters Monitored/Inspected," and "Detection of Aging Effects" that would allow the applicant to perform the functional testing of the Halon/CO<sub>2</sub> fire suppression systems at an 18-month basis, instead of the typical 6-month interval specified in GALL. The applicant stated in the LRA that the 18-month frequency "is sufficient based on station operating experience." The staff will review the exception and is considering issuing an RAI that requests the applicant provide additional information to explain why the extended interval of functional testing is justified based on the plant operating experience.

The applicant has committed to implement two enhancements affecting the "parameters monitored/inspected," "detection of aging management," "monitoring and trending," and "acceptance criteria" program elements. The enhancements are visual inspections of the diesel fire pump engine subsystems (including the fuel supply line) during pump operation, and its carbon steel exhaust components for corrosion. Additionally, the applicant has committed to implement another two enhancements affecting the "parameters monitored/inspected," "detection of aging management," and "monitoring and trending" program elements. The enhancements are to visually inspect the fire damper framing, and the Halon/CO<sub>2</sub> fire suppression systems at least once every six months for signs of degradation. Furthermore, the applicant commits to implement an additional enhancement affecting "parameters monitored/inspected," and "acceptance criteria" program elements. This enhancement involves inspecting the cardox (low pressure CO<sub>2</sub>) hose reels for corrosion. Finally, the applicant commits to implement one more enhancement affecting "detection of aging effects." This enhancement calls for the visual inspections of concrete flood curbs, manways and hatch covers for signs of degradation. The applicant stated that the enhancements are consistent with current implementation practices, and the enhancements will be formally incorporated into applicable implementing procedures.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP XI.M26. The search resulted in a review of over 100 results through the use of keywords: "corrosion," "drips," "leaks, and "piping." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The staff reviewed Condition Report CR-CNS-2008-08695 (11/30/08) pertaining to a fire door not being in the required closed position. The level of detail of the condition report and associated corrective action(s) (including the root cause investigation) taken by the applicant appears to be of sufficient level of thoroughness.

CNS proposed to enhance the Fire Protection program by incorporating a corrosion inspection requirement on the diesel fire pump engine carbon steel exhaust components at a 5-year cycle. Staff requested the basis for the 5-year inspection cycle and why it is adequate to protect the diesel fire pump engine carbon steel exhaust components. The applicant stated that, in accordance with the EPRI guideline (Ref: EPRI Preventive Maintenance Basis Document 2.0), engines are to be inspected at a six-year frequency. CNS follows an Entergy corporate guideline of 5-year engine inspection cycle. Staff reviewed the applicant's response and concluded it was acceptable.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.M26, not including any exceptions identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER, and the areas in which the staff felt additional clarification might be warranted as described above.

**LRA AMP B1.17, Fire Water System**

In the CNS LRA, the applicant stated that AMP B.1.17 is an existing program that is consistent with the program elements in GALL AMP XI. M27 "Fire Water System" with two exceptions and four enhancements. The exceptions are related to the fire hydrant hoses and gaskets not subject to the aging management review, and the enhancements are related to the visual inspections of the hose reels, spray and sprinkler system internals, evaluations of the fire protection piping thickness through non-intrusive means, and testing and/or replacement of the sprinkler heads per NFPA 25.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD07	Aging Management Program Evaluation Report Non-Class 1 Mechanical, Section 4.4.2 Fire Water System	Revision 2 10/16/2008

Document	Title	Revision / Date
2. CNS Operations Manual Surveillance Procedure 6.FP.301	Operations Power Block Sprinkler System Testing	Revision 13 11/15/2007
3. CNS Operations Manual Surveillance Procedure 6.FP.302	Automatic Deluge and Pre-Action Systems Testing	Revision 15 12/12/2007
4. CNS Operations Manual Surveillance Procedure 6.FP.303	Operations Deluge and Pre-Action Systems Testing	Revision 12 07/05/2007
5. CNS Operations Manual Surveillance Procedure 6.FP.304	Fire Detection System Circuitry Operability	Revision 6 1/02/2003
6. CNS Operations Manual Surveillance Procedure 6.FP.602	Engineers Fire Protection Examination	Revision 6 1/02/2003
7. CNS Operations Manual Surveillance Procedure 6.FP.603	Fire Hose Station Annual Examination	Revision 8 1/02/2003
8. CNS Operations Manual Surveillance Procedure 6.FP.610	Yard Hydrant Flow Check and Fire Protection System Flow Test	Revision 12 7/02/2007
9. CNS Operations Manual Surveillance Procedure 6.FP.611	Fire Protection Tank Internal Painted Surface 5 Year Examination	Revision 9 8/06/2007
10. CNS Operations System Operating Procedure 2.2.30	Fire Protection System	Revision 53 11/08/2006
11. NPPD Notification 10175383 RCR 2002-1258	Microbiologically Influenced Corrosion	Notification Date: 7/01/2002
12. CR-CNS-2003-05986	Fire Protection System No. 2 Sprinkler Head Leak	10/06/2003
13. CR-CNS-2006-00551	Fire Protection Piping Leak Near Valve FP-V-451	1/24/2006
14. CR-CNS-2006-00721	Fire Protection Piping Leak at a Union South of Valve FP-CV-29CV in the Diesel Fire Pump Room	1/30/2006
15. CR-CNS-2007-03008	Small Leak on Piping Joint in the Fire Protection Piping in the Diesel Fire Pump Room	4/27/2007

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.17 are consistent with GALL AMP XI.M27, program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.M27. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed two exceptions to GALL program element "Detection of Aging Effects" that would allow the applicant to exempt the fire hydrant hoses and gaskets from the aging management review. The staff will review the exceptions and document the result in the SER.

The applicant has committed to implement two enhancements affecting the "parameters monitored/inspected," and "acceptance criteria" program elements. The elements are: (1)

inspecting the hose reels for corrosion, and (2) inspecting the spray and sprinkler system internals for corrosion. The applicant has also committed to enhance the “parameters monitored/inspected,” and “detection of aging effects” program elements to require evaluating the fire protection piping wall thickness for loss of material. Finally, the applicant committed to enhance the “detection of aging effects” program element with either testing or replacing the sprinkler heads in accordance with NFPA-25 (2002), Section 5.3.1.1.1. The applicant stated that the enhancements are consistent with current implementation practices, and the enhancements will be formally incorporated into applicable implementing procedures. The staff will evaluate these enhancements and document the result in the SER.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant’s technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant’s condition report database for operating experience relevant to AMP XI.M27. The search resulted in a review of over 300 results through the use of keywords: “corrosion,” “drips,” “leaks, and “piping.” The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant’s operating experience review. The staff verified that the operating experience described in the applicant’s basis document adequately addresses the plant-specific operating experience for this AMP.

The applicant indicated that they had discovered evidence of microbiologically influenced corrosion (MIC) in part of their fire protection piping in 2002. The staff reviewed the MIC condition report (Ref: NPPD Notification 10175383, RCR 2002-1258), and discussed the issue with the applicant’s cognizant staff to confirm the applicant had taken appropriate actions to address the MIC issue. No additional MIC was revealed in subsequent inspections.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant’s program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.M27, not including any exceptions identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER.

#### **LRA AMP B.1.18, Flow-Accelerated Corrosion**

In the Cooper LRA, the applicant stated that AMP B.1.18 is an existing program that is consistent with the program elements in GALL AMP XI.M17, “Flow-Accelerated Corrosion,” with an enhancement and an exception. The exception is related to the specified non-destructive examination methods being used to detect wall thinning. The enhancement is related to updating the program’s System Susceptibility Analysis.

During its audit, the staff reviewed the applicant’s onsite documentation supporting the applicant’s conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant’s technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD07	Aging Management Program Evaluation Report, Non-Class 1 Mechanical, Section 4.5, Flow-Accelerated Corrosion	Revision 2 9/25/2008
2. Engineering Procedure 3.10	Erosion/Corrosion Program	Revision 11 9/8/2004
3. VM1400.003	Duke Engineering Flow-Accelerated Corrosion Program System Susceptibility Analysis	Revision 1 8/29/1998
4. CNS-RPT-07-LRD05	Operating Experience Review Report, Section 4.1.15, Flow-Accelerated Corrosion Program	Revision 2 10/7/2008
5. CNS PBD-EC	Erosion/Corrosion Program Basis Document	Revision 0 9/12/2003
6. CNS Operations Manual Proc. 11.2	Station Computer Procedure Software Classification	Revision 15 2/5/2009
7. E/C Program RE22 Outage Summary	E/C Program RE22 Outage Summary Report	Not provided
8. Report No. BS-E-7-EC93877SP-1A	Ultrasonic Thickness Measurement Data Sheet	4/23/2008
9. Inspection Results Evaluation RE-21	Component: MS-E-6-2841-8, Iso Dwg: 2841-8, 3" Elbow including US & DS pipe, Thickness Data from R-03-077	3/20/2003
10. LO-CNSLO-2006-00029	Snapshot Assessment On: Erosion/Corrosion Program	August 2006
11. CR-CNS-2005-01190	E/C Examination of Extraction Steam Elbow revealed an area of thinning below the DED specified $T_{min}$	2/3/2005
12. CR-CNS-2005-01243	3x6 reducer immediately downstream of RF FCV11A has areas that are too thin to last until RE23	2/4/2005
13. CR-CNS-2005-05009	North steam inlet nozzle to FW Heater B3 has an estimated remaining service life of approximately 2 years	7/13/2005
14. CR-CNS-2006-08712	During RE23, trip pilot valves did not have seat. Condition would have allowed erosion of pipe to condenser	11/7/2006
15. CR-CNS-2007-01210	ES AOV-DV1 is failed open. Impact on condenser and piping needs to be assessed. Refer to INPO SER 02-03	2/19/2007
16. CR-CNS-2008-03145	E/C exams of MS-E-1-2841-8 and MS-E-6-2841-1 show them below min wall and require repair.	4/30/2008
17. CR-CNS-2008-04265	Operating Experience Digest 2008-02 LP FW Heater Shell Leakage.	5/27/2008
18. CR-CNS-2008-05077	Replace MC piping near FWH B3	6/26/2008
19. CR-CNS-2008-05078	Replace 2-inch piping and fittings on drawing X2841-207	6/26/2008

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B1.18 are consistent with GALL AMP XI.M17 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.M17, and where clarification was requested below. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed an exception to GALL program element "detection of aging effects," that would limit the non-destructive examination method for detecting wall thinning to only ultrasonic testing instead of, ultrasonic and radiographic testing. During audit discussions between the staff and the program owner, the applicant indicated that while examinations using radiographic techniques have not been used in the past, the Erosion/Corrosion program does not preclude its use in the future, given the right set of

circumstances. The staff will review the exception and may consider issuing an RAI that requests the applicant provide additional information concerning the use of only the ultrasonic examination method, and the staff's evaluation will be documented in the SER.

The applicant has committed to implement an enhancement affecting the "scope of program" program element. According to the applicant, the System Susceptibility Analysis for the program will be updated to "reflect the lessons learned and new technology that became available after the publication of NSAC-202L, Revision 1." The applicant stated that the enhancement is consistent with current implementation practices, and the enhancement formally incorporates these practices into applicable implementing procedures. The staff noted that the previous System Susceptibility Analysis was conducted in 1998. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

Relating to the above issue for the scope of the program, the staff noted that the applicant's description did not specify a revision of Electric Power Research Institute (EPRI) guideline NSAC-202L, which the program will meet. During audit discussions between the staff and the program owner, the applicant indicated that the program has kept current with the latest version of the EPRI guideline; however, there was no available documentation to support this claim. The staff will consider issuing an RAI to clarify this issue, and the staff's evaluation will be documented in the SER.

Also relating to the scope of the program, the applicant's description in the LRA indicated that the existing program applied to systems containing high-energy fluids that operate greater than or equal to two percent of plant operating time, in accordance with the criteria given in EPRI guideline NSAC-202L. The staff noted that, although the EPRI guidance contained this operating time limitation, a cautionary statement immediately afterward indicated that systems should not be excluded solely based on operating time, and that some lines operating less than two percent of the time had experienced damage caused by flow accelerated corrosion. During audit discussions between the staff and the program owner, the applicant provided examples where lines operating less than two percent of the time were included in the program. The staff will consider issuing an RAI to clarify this issue, and the staff's evaluation will be documented in the SER.

The staff noted EPRI guideline NSAC-202L, Revision 2, Section 5.2, "Training and Engineering Judgment" indicated that training of key personnel is essential and that personnel involved in the program be trained in flow accelerated corrosion. The staff also noted that CNS Engineering Procedure 3.10, "Erosion/Corrosion Program," Section 2.1, "Training and Qualification," indicated that CNS personnel responsible for implementing the Erosion/Corrosion Program were to be qualified to TQD 0993, "Erosion/Corrosion Program Engineer." Based on staff's discussions during the audit with the program owner, the applicant routinely uses non-CNS personnel to implement certain engineering aspects of the Erosion/Corrosion Program. However, the controlling procedure does not address any training for non-CNS personnel involved in the program. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The staff noted EPRI NSAC-202L, Revision 2, Section 2.1 "Corporate Commitment" indicated that one of the commitments for an effective flow accelerated corrosion program included ensuring appropriate quality assurance is applied. Based on discussions with the program

owner during the audit, the applicant indicated that computer program CHECWORKS was classified as Level C software, "Business Important." It was not clear to the staff why this software was not classified as Level B, "Licensing Basis," since CHECWORKS apparently represented CNS' implementation of regulatory commitments in response to NRC Bulletin 87-01, "Thinning of Pipe Walls in Nuclear Power Plants." According to CNS Operations Manual, Station Computer Procedure 11.2, "Software Classification," Level B software are programs that are important to compliance with regulatory commitments. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The staff audited the operating experience reports, including a sample of condition reports, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.18. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.M17, not including any exceptions identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER, and the areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B1.19, Inservice Inspection**

In the CNS LRA, the applicant stated that AMP B1.19 is an existing program that is consistent with the program elements in GALL AMP XI.M1, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD," with exceptions. The exceptions are related to ISI relief requests approved for use during the current 4<sup>th</sup> 10-year interval.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD05 Rev. 2	Operating Experience Review Report	Revision 2 10/7/2008
2. Engineering Procedure	Fourth Ten-Year ISI Program for Cooper Nuclear Station	Revision 1 3/2006
3. Engineering Procedure 3.28.1	Inservice Inspection Program Implementation	Revision 11 3/23/2007
4. CR-CNS-2001-05536	Corrective Action Program Report: Unexpected Flaw Detected in CS weld	12/03/2001
5. CR-CNS-2001-05674	Corrective Action Program Report: ISI indications detected in CS weld	12/07/2001

Document	Title	Revision / Date
6. CR-CNS-2001-05675	Corrective Action Program Report: ISI indications detected in CS weld	12/07/2001
7. NLS2000069	Inservice Inspection Summary Report	8/28/2000
8. NLS2003080	Inservice Inspection Summary Report	7/21/2003
9. NLS2005049	Inservice Inspection Summary Report	5/16/2005
10. NLS2007013	Inservice Inspection Summary Report	2/20/2007
11. NLS2008065	Inservice Inspection Summary Report	8/14/2008

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.19 are consistent with GALL AMP XI.M1 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.M1. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed exceptions to GALL program elements Parameters Monitored/Inspected that would allow alternative selection criteria using a risk-informed approach to determine the scope of inspections; and Detection of Aging Effects that would allow alternative detection techniques for inspections. The staff is currently reviewing these exceptions.

The staff reviewed a number of operating experience reports provided by the applicant, including a sample of condition reports, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience based on the reports provided. The staff also conducted an independent search of the applicant's database search for CNS plant-specific operating experience, including condition reports, examination summary reports, and data packages relevant to AMP B.1.19. The search resulted in a review of Class 1 weld examination through the use of keywords: "Class 1, weld, examination, inspection, indication, crack, internal." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.M1, not including any exceptions identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER, and the areas in which the staff felt additional clarification might be warranted as described above.

**LRA AMP B.1.20, Inservice Inspection - IWF**

In the CNS LRA, the applicant stated that AMP B.1.20 is an existing program that is consistent with the program elements in GALL AMP XI.S3, “ASME Section XI, Subsection IWF,” with enhancements and an exception. The exception is related to the maximum direct examination distance requirement for VT-3 examination, and the enhancements are related to the inclusion of MC piping and component supports in the scope of the program and clarification that the successive inspection requirements are applied.

During its audit, the staff reviewed the applicant’s onsite documentation supporting the applicant’s conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant’s technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD05	Operating Experience Review Report	Revision 2 10/7/2008
2. CNS-RPT-07-LRD08	CNS License Renewal Project Aging Management Program Evaluation Report Civil/Structural	Revision 2 10/8/2008
3. NRC 2006027 Docket No. 50-298	Safety Evaluation by the Office of Nuclear Reactor Regulation Related to the Inservice Inspection Program Request for Relief No. RI-37 Cooper Nuclear Station Nebraska Public Power District	8/23/2006
4. 4 <sup>th</sup> Ten-Year Interval	Cooper Station 4 <sup>th</sup> Interval Inservice Inspection Program	Effective 3/1/2006
5. Maintenance Procedure 7.2.57	ASME Category F-A Component Supports Examination and Adjustments	6/27/2007

In comparing 6 of the 7 program elements in the applicant’s program, the staff verified that the program elements contained in AMP B.1.20 are consistent with GALL AMP XI.S3 program elements. A partial review of the 7<sup>th</sup> element, operating experience, was performed and further review will be completed at a later date. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.S3. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed an exception to GALL program element “detection of aging effects” that would allow VT-3 visual examinations to be performed at distances greater than the Code-required maximum distance criteria. In the LRA, the applicant stated that experience has shown that the general mechanical and structural conditions of components and their supports can be detected effectively at distances greater than the Code-required maximum distance criteria. The staff will review the exception and may consider issuing an RAI to address it.

The applicant has committed to implement an enhancement affecting the “scope of program” program element and “detection of aging effects” program element. The ISI-IWF Program will be enhanced to include Class MC piping and component supports. The applicant has also committed to enhance the “acceptance criteria” program element to clarify that the successive inspection requirements of IWF-2420 and the additional examination requirements of IWF-2430

are applied. The applicant stated that the enhancements are consistent with current implementation practices, and the enhancements formally incorporate these practices into applicable implementing procedures. The staff will consider issuing an RAI to address these issues, and the staff's evaluation will be documented in the SER.

The staff performed a partial audit of the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.20. The search resulted in a review of 23 results through the use of keywords: "Inservice Inspection," and "IWF." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.S3, not including the areas in which the staff felt additional clarification might be warranted as described above. The staff only completed a partial review of the operating experience program element during the audit, and will complete the remainder of the review at a later date.

#### **LRA AMP B.1.21, Masonry Wall Program**

In the CNS LRA, the applicant stated that AMP B.1.21 is an existing program that is consistent with the program elements in GALL AMP XI.S5, "Masonry Wall Program," with an enhancement. The enhancement is to include control house-161 kv switchyard and to clarify structures with conditions into the corrective action program.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. Administrative Procedure 0.27.1	Periodic Structural Inspections of structures	Revision 4 04/02/08
2. Administrative Procedure 0.5. CR	Condition Report initiation, review, and classification	Revision 11 06/16/08
3. Calc. NEDC 96-20	Structural Inspections of CNS Structures	10/25/00
4. LRD-08	Aging Management Program Evaluation Report – Civil/Structural	10/08/08

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.21 are consistent with GALL AMP XI.S5 program elements. In addition, the staff asked the applicant's technical staff to confirm whether all of the walls that perform intended functions in accordance with 10 CFR 54.4 and 10 CFR 50.48 required masonry walls and are included in the program. In its responses, the applicant confirmed that they are. Based on the applicant responses, the staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.S5. The staff also verified that the applicant provided an adequate summary description of the program.

The applicant has committed to implement an enhancement affecting the "scope of program" program element to include the control house – 161 kv switchyard. The applicant has also committed to enhance the "corrective actions" program element to clarify that structures with conditions classified as "acceptable with deficiencies" or "unacceptable" into the corrective action program. The applicant stated that the enhancements are consistent with current implementation practices, and the enhancements formally incorporate these practices into applicable implementing procedures.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.21. The search resulted in a review of over 121 results through the use of keywords: "rack," "spall," and "crack/rust." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP B.1.21, not including any exceptions identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER, and the areas in which the staff felt additional clarification might be warranted as described above.

#### **LRA AMP B.1.22, Metal-Enclosed Bus Inspection**

In the CNS LRA, the applicant stated that AMP B.1.22 is an existing program that is consistent with the program elements in GALL AMP XI.E4, "Metal-Enclosed Bus," with an exception. The exception is related to integrating the "Structures Monitoring" program for external visual surfaces inspection into the internal metal-enclosed bus program.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. NUREG 1801	Generic Lessons Learned (GALL) Report Chapter XI, "Aging Management Programs (AMPS)," AMP XI.E4, "Metal Enclosed Bus."	Vol. 2, Revision 1 9/2005
2. 3001	CNS Main One Line Diagram	Revision N16 5/1/2008
3. LRA-E-001 Sheet 1	CNS Offsite Power Recovery Diagram	Revision 0 3/14/2008
4. 3002 Sheet 1	CNS Auxiliary One Line Diagram MCC Z, SWGR Bus 1A, 1B, 1E, and Critical SWGR Bus 1F 1G	Revision N44 1/31/2008
5. CNS-RPT-07-LRD05	Operator Experience Review Report	Revision 2 10/7/2008
6. CR-CNS-2009-1390	TEC-FI-418 is dirty and hard to read	2/23/2009
7. CR-CNS-2009-01815	The environmental condition in the main transformer yard has degraded considerably	3/06/2009
8. CR-CNS-2005-03975	Rubber boot on start-up transformer non-segregated buss is degraded.	5/25/2005
9. CR-CNS-2005-03982	The flex links of the emergency transformer above the turbine building railroad airlock has shown some signs of corrosion inside the bus duct	5/26/2005
10. Maintenance Procedure 7.0.14.4	Thermographic Monitoring and Analysis	Revision 3 8/27/2001
11. Maintenance Procedure 7.3.41	Examination and Meggering of Non-Segregated Buses and Associated Equipment	Revision 7 6/13/2006

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.22 are consistent with the applicable GALL AMP XI.E4 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.E4 except for the areas that the applicant took exception to GALL AMP X1.E4. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed an exception to GALL AMP XI-E4, program elements "Parameters Monitored or Inspected," and "Detection of Aging Effects" that incorporates the "Structures Monitoring Program" program elements for visual inspection of loss of material and elastomer degradation into these program elements. The staff reviewed the exception and issued RAI B.1.22-1 requesting the applicant provide additional information concerning the justification for merging the program elements of GALL AMP XI.S6 and XI.E4. The staff's evaluation will be documented in the SER.

The staff audited the operating experience reports, including a sample of condition reports, and preventive maintenance procedures and also interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.22. The search resulted in a review of over 100 results through the use of keywords: "non-segregated," "bus duct," "connection," "elastomer," "boot," and "bolted." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. During the audit walkdown of the in-scope non-segregated metal-enclosed bus duct between emergency station service transformer and 4.16 kV switchgear buses 1F and 1G and between start-up station service transformer and 4.16 kV switch gear buses 1A and 1B, the staff noted a potential for degraded environmental conditions due to numerous birds around and on the non-segregated bus duct and associated support structure. The applicant stated that condition report CR-CNS-2009-01815 had been generated to address the degraded environment. The staff issued RAI B.1.22-2 to document this issue and the applicant's resolution. The staff's evaluation will be documented in the SER.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP X1.E4, not including the exception identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER, and the areas in which the staff felt additional clarification might be warranted as described above.

#### **LRA AMP B.1.25, Non-EQ Inaccessible Medium-Voltage Cable**

In the Cooper Nuclear Station LRA, the applicant stated that AMP B.1.25 is a new program that is consistent with the program elements in GALL AMP XI.E3, "Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD09	Aging Management Program Evaluation Results - Electrical	Revision 2 10/20/2008
2. CR-CNS-2009-03078	Manhole Inspection Documentation	Revision 1 4/17/2009
3. DWG 2520	Underground duct banks plan	3/04/1968
4. CR-CNS-2009-00192	Unexpected enunciator on X sump	1/10/2009
5. CR-CNS-2003-04318	Yard Manhole C-3 Sump W HI-Hi Level Alarm	1/08/2003
6. Procedure 15.sump.101	Non-TS surveillance procedure 15.SUMP.101	Revision 18 1/20/2009
7. CR-CNS-2009-03273	Manhole Inspection Documentation	4/23/2009

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.25 are consistent with GALL AMP XI.E3 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.E3. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff performed an inspection of Manhole P1 and C1, which are located inside the control building. These manholes were found to contain dry cables. During the P3 (manhole just east of DG building) inspection, water was noticed in the bottom of the manhole by staff. This manhole contains Division 1 power to the CW pump motors, SW pump motors, SCWP pump motors, and DG feed to bus 1F. The depth of the water was determined by maintenance to be approximately 1 inch or less. The bottom rows of conduits are at least 7 inches off the bottom of the duct bank.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.25. The search resulted in a review of over 400 results through the use of keywords: "sump," "electric manhole," and "submergence." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff identified an instance where the applicant performed a manhole inspection that was done for the license renewal aging management audit. As a result of this inspection significant water was found in the following manholes: MH7, MH8, and MH9. MH5 was not inspected since it is inside the main power transformer yard; the applicant concluded that since it is part of the same duct it is likely there is water inside that manhole as well. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

In the application, the applicant stated that the Non-EQ Inaccessible Medium-Voltage Cable program is a new program and therefore there is no operating experience for the effectiveness of the program. In order to be consistent with the staff's recommendations in Section A.1.2.3.10, Item 2 of SRP-LR Branch Position RLSB-1 (i.e. Branch Position RLSB-1 of Appendix A to NUREG-1800), an applicant may have to commit to providing operating experience in the future for new programs to confirm their effectiveness. The staff may request, consistent with the statement in the SRP-LR, that the applicant make a commitment to provide future operating experience to the staff for those new AMPs to confirm effectiveness for the period of extended operation.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.E3, not including any areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.26, Non-EQ Instrumentation Circuits Test Review**

In the Cooper Nuclear Station LRA, the applicant stated that AMP B.1.26 is a new program that is consistent with the program elements in GALL AMP XI.E2, "Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD09	Aging Management Program Evaluation Results - Electrical	Revision 2 10/20/2008
2. CR-CNS-2006-02880	Jacket for cable CR220 is cracked (CRD sys)	4/13/2006
3. SAND96-0344	Aging Management Guideline for Commercial Nuclear Power Plants – Electrical Cable and Terminations	9/1996

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.26 are consistent with GALL AMP XI.E2 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.E2. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.26. The search resulted in a review of over 80 results through the use of keywords: "crack," and "cable." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. Condition Report CR-CNS-2006-02880 states that outer jacket for cable CR220 is cracked at a bend in the cable where the cable connects to PC penetration box X104, 903 Reactor SE above TIP room. The insulation on the internal wires is satisfactory, subsequently a cosmetic repair was performed in accordance with accepted practice. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

In the application, the applicant stated that the Non-EQ Instrumentation Circuits Test Review program is a new program and therefore there is no operating experience for the effectiveness of the program. In order to be consistent with the staff's recommendations in Section A.1.2.3.10, Item 2 of SRP-LR Branch Position RLSB-1 (i.e. Branch Position RLSB-1 of Appendix A to NUREG-1800), an applicant may have to commit to providing operating experience in the future for new programs to confirm their effectiveness. The staff may request,

consistent with the statement in the SRP-LR, that the applicant make a commitment to provide future operating experience to the staff for those new AMPs to confirm effectiveness for the period of extended operation.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.E2.

### **LRA AMP B.1.27, Non-EQ Insulated Cables and Connections**

In the Cooper Nuclear Station LRA, the applicant stated that AMP B.1.27 is a new program that is consistent with the program elements in GALL AMP XI.E1, "Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-AME01	Aging Management Review of Electrical System	Revision 1 7/02/2008
2. CNS-RPT-07-LRD09	Aging Management Program Evaluation Results - Electrical	Revision 2 10/20/2008
3. CNS-RPT-07-LRD-05	Operating Experience Review Report	Revision 2 10/07/2008
4. CR-CNS-2001-05389	Two Cables in The MCC Bucket for REC-P-1D Have Visible Cracks	11/29/2001

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.27 are consistent with GALL AMP XI.E1 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.E1. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. The staff noted in condition report # CR-CNS-2001-05389 that described two 4KV cables with visible cracked insulations. The method of discovery was by a planned maintenance performed by electricians. The cables were subsequently replaced and restored back to service. Proper corrective actions taken in this condition report were demonstrated.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.27. The search resulted in a review of over 80 results through the use of keywords: "crack," and "cable." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating

experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

In the application, the applicant stated that the Non-EQ Insulated Cables and Connections program is a new program and therefore there is no operating experience for the effectiveness of the program. In order to be consistent with the staff's recommendations in Section A.1.2.3.10, Item 2 of SRP-LR Branch Position RLSB-1 (i.e. Branch Position RLSB-1 of Appendix A to NUREG-1800), an applicant may have to commit to providing operating experience in the future for new programs to confirm their effectiveness. The staff may request, consistent with the statement in the SRP-LR, that the applicant make a commitment to provide future operating experience to the staff for those new AMPs to confirm effectiveness for the period of extended operation.

The staff also reviewed the applicant's method for indentifying adverse localize environment. Table 4.1.4-1 of Aging Management Review of Electrical Systems reveals that 112° F is the lowest 60-year service limiting temperature, and  $2 \times 10^6$  is the lowest 60-year service limiting radiation level. Staff was informed by applicant that these lowest temperature and radiation levels will be used as a set point for determination of adverse localize environment.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.E1.

**LRA AMP B.1.28, Oil Analysis Program**

In the CNS LRA, the applicant stated that AMP B.1.28 is an existing program that is consistent with the program elements in GALL AMP XI.M39, "Lubricating Oil Analysis," with enhancements. The enhancement is related to the tests performed for components with routine oil changes and those components that don't have regular oil changes.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD07	CNS License Renewal Project – Aging Management Program Evaluation Report – Non-Class 1 Mechanical	Revision 2 10/7/2008
1. CNS-RPT-07-LRD05	CNS License Renewal Project – Operating Experience Report	Revision 2 9/25/2008
3. Maintenance Procedure 7.0.14	Predictive Maintenance Program	Revision 4 8/27/2001
4. Maintenance Procedure 7.0.14.2	Lubrication/Oil Analysis Program	Revision 6 1/24/2007
5. Oil Analysis Scope List	Identification Codes for Lube Oil Samples	Revision N/A N/A
6. NPPD Work Order - 4546779	Change Oil SWBP A Outboard BRG	9/20/2007

Document	Title	Revision / Date
7. Maintenance Order 4540005	Replace SW-P-BPA	9/2007
8. CR-CNS-2007-03859	Oil reports SWBP-A show rising levels of iron and copper	5/31/2007
9. CR-CNS-2008-00130	Oil reports SWBP-A show elevated levels of iron and copper	1/8/2008
10. Oil Analysis Results (SWBP A)		3/2004 – 02/2009
11. Quarterly Oil Analysis Reports	Quarterly oil analysis reports from 2004 to 2007	2004-2007
12. CR-CNS-2006-04167	Trace amounts of water – High particulates	6/07/2006
13. Apparent Cause Evaluation	Apparent Cause for Turbine Lube Oil High Particulate and Elevated Water Content	6/05/2006
14. CR-CNS-2008-06234	Lube oil – high particulates	8/14/2008
15. Apparent Cause Evaluation	Apparent Cause Evaluation - CR-2008-06234	9/09/2008

In comparing the 7 program elements in the applicant’s program, the staff verified that the program elements contained in AMP B.1.28 are consistent with GALL AMP XI.M39 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the applicant took exceptions to GALL AMP XI.M39. The staff also verified that the applicant provided an adequate summary description of the program.

The applicant has committed to implement an enhancement to GALL program element Parameters Monitored/Inspected to perform viscosity, neutralization number, flash point, analytical ferrography and elemental analysis for oil samples in components that don’t have regular oil changes. The applicant has also committed to implement an enhancement to GALL program elements Acceptance Criteria to formalize preliminary oil screening for water and particulates and lab analyses, including established acceptance criteria for components in the scope of this program. The applicant clarified that this enhancement will be addressed by revising the appropriate procedures to formally include acceptance criteria and oil screening for water/particulates and for laboratory analyses. The staff will review these enhancements and will consider issuing RAIs, if appropriate. The staff’s evaluation will be documented in the SER.

The staff noted that the applicant provided the details of how the sampling frequencies are determined, which are based on accessibility during plant operation, safety-related/operation importance, repair cost, and previous test results/maintenance history. The staff further noted that the applicant’s procedures have provisions for reviewing and trending oil analysis results to determine if corrective actions are required. The staff noted that the acceptance criteria will be based on manufacturer’s recommendations or industry standards for each specific component type, which is consistent with the GALL Report.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant’s technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant’s condition report database for operating experience relevant to AMP B.1.28. The search resulted in a review of over 300

results through the use of keywords: “lubricating oil,” “particulates,” and “lube oil.” The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant’s operating experience review. The staff verified that the operating experience described in the applicant’s basis document adequately addresses the plant-specific operating experience for this AMP.

The staff reviewed the applicant’s quarterly oil analysis reports from 2004, 2005, 2006 and 2007. The staff noted that these oil analysis reports indicated for the most part that oil reports were satisfactory and within the acceptance limit. In those instances in which the applicant noted increases in particulate or water content, the applicant took appropriate actions to have the samples trended. The staff noted that the applicant took appropriate corrective actions to trend the results of oil samples that indicated excess water or particulates.

The staff reviewed the applicant’s condition reports and noted that in 2007, the applicant identified the service water outboard bearing oil samples appeared to be dark and contain debris. Oil analysis performed by the applicant indicated that iron and copper content had risen. The staff noted that based on the increase in iron and copper, the applicant took corrective actions to increase the frequency of sampling from 6 months to monthly in order to improve the trending of copper and iron content. In March 2007 the applicant replaced the oil slinger ring (component is made of copper) on the out board side and subsequently sampled the oil. The applicant weighed the oil slinger ring that was removed and noted that there was a decreased in mass compared to the new oil slinger ring. The staff noted the results of the oil analysis were satisfactory based on the acceptance criteria. In September 2007 the applicant took corrective actions to replace the service water booster pump A. The staff noted that an oil analysis subsequent to the pump being replaced (January 2008), indicated that there was a spike in iron content. The applicant evaluated this spike in iron content and determined that this is normal for a new pump. The staff finally noted that from July 2008 until February 2009 the iron and copper content has been relatively level. The staff noted that the applicant took appropriate corrective actions to trend the results then replace the oil slinger ring which was the cause of the excess copper content, replace the service water booster pump A to address this issue and continue to monitor and trend the lubricating oil of this component.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant’s program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.M39.

### **LRA AMP B.1.29, One-Time Inspection Program**

In the CNS LRA, the applicant stated that AMP B.1.29 is a new program that is consistent with the program elements in GALL AMP XI.M32, “One-Time Inspection.”

During its audit, the staff reviewed the applicant’s onsite documentation supporting the applicant’s conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant’s technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD05	CNS License Renewal Project – Operating Experience Report	Revision 2 9/25/2008
2. EPRI TR-107514	Age-Related Degradation Inspection Method and Demonstration: In Behalf of Calvert Cliffs Nuclear Power Plant License Renewal Application	4/1998
3. CNS-RPT-07-LRD07	CNS License Renewal Project – Aging Management Program Evaluation Report – Non-Class 1 Mechanical	Revision 2 10/7/2008

In comparing the 7 program elements in the applicant’s program, the staff verified that the program elements contained in AMP B.1.29 are consistent with GALL AMP XI.M32 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.M32. The staff also verified that the applicant provided an adequate summary description of the program. However the staff has a concern pertaining to the applicant’s reference to Chapter 4 of EPRI document 107514, which outlines a method to determine the sample size to achieve 90% confidence that 90% of the population does not experience degradation (90/90). The staff was also unsure how the locations for the sample inspections will be chosen. It was not clear to the staff what the applicant meant by the following statement, “Components with the same material-environment combinations at other facilities may be included in the sample”, in the program description. The staff will consider issuing an RAI to address this issue, and the staff’s evaluation will be documented in the SER.

The staff noted that if evidence of degradation is revealed by a one-time inspection, that evaluations will be performed in order to identify appropriate corrective actions. And also provides for an increase in the sample size and locations if degradation is detected.

The staff conducted an independent search of the applicant’s condition report database for operating experience relevant to AMP B.1.29. The search resulted in a review of over 350 results through the use of keywords: “degradation,” and “corrosion,” and relevant components in specific systems in which the applicant will use the One-Time Inspection to verify that aging-related degradation is not occurring. The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant’s operating experience review. The staff verified that the operating experience from the independent search did not indicate age-related degradation that would be applicable to this program.

In the application, the applicant stated that the One-Time Inspection program is a new program and therefore there is no operating experience for the effectiveness of the program. In order to be consistent with the staff’s recommendations in Section A.1.2.3.10, Item 2 of SRP-LR Branch Position RLSB-1 (i.e. Branch Position RLSB-1 of Appendix A to NUREG-1800), an applicant may have to commit to providing operating experience in the future for new programs to confirm their effectiveness. The staff may request, consistent with the statement in the SRP-LR, that the applicant make a commitment to provide future operating experience to the staff for those new AMPS to confirm effectiveness for the period of extended operation.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging

Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.M32 not including any areas in which the staff felt additional clarification might be warranted as described above.

**LRA AMP B1.30, One-Time Inspection - Small Bore Piping**

In the CNS LRA, the applicant stated that AMP B.1.30 is a new program that is consistent with the program elements in GALL AMP XI.M35, "One-Time Inspection of ASME Code Class 1 Small Bore Piping."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD05 Rev. 2	Operating Experience Review Report	Revision 2 10/7/2008
2. EPRI Report 1013389	BWRVIP-155: BWR Vessel and Internal Project, Evaluation of Thermal Fatigue Susceptibility in BWR Stagnant Branch Lines	Proposed to replace MRP-24
3. EPRI Report 1000701	Internal Thermal Fatigue Management Guidelines (MRP-24)	1/2001
4. Engineering Procedure	Fourth Ten-Year ISI Program for Cooper Nuclear Station	Revision 1 3/2006
5. Engineering Procedure 3.28.1	Inservice Inspection Program Implementation	Revision 11 3/23/2007
6. Examination Summary B5.20.0004	Examination Summary	Revision 1 1/28/2005
7. Examination Summary B5.20.0005	Examination Summary	Revision 1 1/24/2005
8. Examination Summary B9.21.0032	Examination Summary	Revision 1 1/26/2005
9. Examination Summary B9.21.0033	Examination Summary	Revision 1 1/26/2005

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B1.30 are consistent with GALL AMP XI.M35 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.M35. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the number of welds that are potentially available for examination. The applicant performed a search and informed the staff that there will be more than 20 welds that are within the selection criteria for examination, which will meet the inspection guidance.

Based on discussions with the applicant, this program was previously a part of the ISI program. Therefore, there is applicable operating experience on small bore piping inspection at CNS. The staff audited the operating experience reports, including three condition reports, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. The staff also conducted an independent search of the applicant's database search for CNS plant specific operating experience, including condition reports, examination summary reports, and data packages relevant to AMP B.1.30. The search resulted in a review of small bore piping inspection results through the use of keywords: "small bore," "small-bore," "examination," "inspection," "branch piping," and "socket weld." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The staff also discussed with the applicant how aging management of Class 1 socket welds will be addressed. Specifically, GALL AMP XI.M35 recommends volumetric examination of certain small bore piping welds including socket welds. The applicant stated that there have been no qualified techniques to volumetrically examine small bore socket welds, but did not provide any information to address the issue. The staff will consider issuing an RAI on this issue, and the staff's evaluation will be documented in the SER.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.M35, not including any areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.32, Reactor Head Closure Studs**

In the Cooper Nuclear Station LRA, the applicant stated that CNS AMP B.1.32 is an existing program that is consistent with GALL AMP XI.M3, "Reactor Head Closure Studs" with an exception. The exception is related to the requirements of the VT-2 visual examination for detection of leakage.

During its audit, the staff reviewed the applicant's on-site documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff reviewed the following on-site documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
CNS-RPT-07-LRD02	Aging Management Program Evaluation Results- Class 1 Mechanical	Revision 1 9/2/2008
CNS-RPT-07-LRD05	Operating Experience Review Report	Revision 2 10/7/2008
NSPT-91-1204	Reactor Vessel Studs for NPPD- Cooper Station	12/2/91
Admin Procedure 0.30	ASME Section XI Repair/Replacement and Temporary Non-Code Repair Procedure	Revision 23 3/1/2006
Admin Procedure 0.5	Conduct of the Condition Report Process	Revision 59 9/26/2007

Admin Procedure 0-QA-01	CNS Quality Assurance Program	Revision 11 11/16/2007
Engineering Procedure 3.28.1	Inservice Inspection Program Implementation	Revision 11 3/23/2007
Engineering Procedure 3.28.1.1	Visual VT-1 Examination of Pressure Retaining Bolting and Integral Attachments	Revision 7 8/13/2007
21A1100	Standard Requirements for Reactor Pressure Vessel	Revision 0 2/10/1967
Maintenance Procedure 7.2.71	Bolting and Torque Program	Revision 23 11/29/2007
Maintenance Procedure 7.4.4	Reactor Pressure Vessel Head Removal	Revision 36 10/29/2006
Maintenance Procedure 7.4.4.1	Reactor Pressure Vessel Head Installation	Revision 24 5/10/2007

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in CNS AMP B.1.32 are consistent with GALL AMP XI.M3 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP XI.M3 except for the areas that the applicant took exceptions to GALL AMP. The staff also verified that the applicant provided an adequate summary description of the program.

The staff verified consistency with the GALL Report "preventive actions" program element recommending the use of acceptable surface treatments and stable lubricants. The staff reviewed the material certification sheet as well as reviewed written confirmation from the vendor for the lubricant used and verified that the lubricant did not include any unstable compounds identified in RG 1.65.

The staff also reviewed the operating experience reports, including a sample of condition reports provided by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. An operating experience incident occurred during the RE20 examination in 2001 when one recordable indication for RPV nuts, two non-recordable indications for RPV studs, and a non-recordable indication for RPV washers were discovered during the examinations. The staff reviewed the detailed condition report, response and evaluation and found that proper corrective actions were taken to address the issue as well as proper follow up inspections on the components.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.32. The search resulted in a review of over 200 results through the use of keywords: "head stud," and "head bolt." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL

AMP XI.M3, not including any exceptions identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER.

**LRA AMP B.1.34, Selective Leaching**

In the CNS LRA, the applicant stated that AMP B.1.34 is a new program that is consistent with the program elements described in the GALL Report AMP XI.M33, "Selective Leaching of Materials."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL Report AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD07	Aging Management Program Evaluation Report Non-Class 1 Mechanical	Revision 2 9/25/2008

In comparing the 7 program elements in the applicant's program, the staff reviewed the program elements contained in AMP B.1.34 to verify that they are consistent with GALL AMP XI.M33 program elements. The staff confirmed that applicant's program was consistent with the GALL Report AMP XI.M33 for the element of monitoring and trending, and the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL Report AMP XI.M33. The staff also verified that the applicant provided an adequate summary description of the program. However, the staff has a concern pertaining to the adequacy of the applicant's description of the AMP elements for scope of program, preventive action, parameters monitored or inspected, detection of aging effects, acceptance criteria, and operating experience. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The staff conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.34. The search resulted in a review of over 400 condition report results from the eight systems that this AMP is credited with managing selective leaching through the use of keywords: "gray cast iron," "copper alloy," and "Selective Leaching." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience from the independent search did not indicate age-related degradation that would be applicable to this program. In the application, the applicant stated that the program is a new program and therefore there is no operating experience for the effectiveness of the program. In order to be consistent with the staff's recommendations in Section A.1.2.3.10, Item 2 of SRP-LR Branch Position RLSB-1 (i.e. Branch Position RLSB-1 of Appendix A to NUREG-1800), an applicant may have to commit to providing operating experience in the future for new programs to confirm their effectiveness. The staff may request, consistent with the statement in the SRP-LR, that the applicant make a commitment to provide future operating experience to the staff for those new AMPS to confirm effectiveness for the period of extended operation.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.M34 not including any areas in which the staff felt additional clarification might be warranted as described above.

**LRA AMP B.1.35, Service Water Integrity**

In the Cooper Nuclear Station LRA, the applicant stated that AMP B.1.35 is an existing program that is consistent with the program elements in GALL AMP XI.M20, "Open Cycle Cooling Water System."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. NRC Generic Letter 89-13	Service Water System Problems Affecting Safety-Related Components	7/18/1989
2.	Neb. Pub. Power Dist. Ltr to the NRC – Response to Generic Letter 89-13	1/29/1990
3.	Neb. Pub. Power Dist. Ltr to the NRC – Response to Generic Letter 89-13	10/15/1990
4.	Neb. Pub. Power Dist. Ltr to the NRC – Response to Generic Letter 89-13	1/9/1992
5. Eng Sup Dpt Self Assessment	Heat Exchanger GL 89-13 Program	8/4-22/2001
6. Eng Sup Dpt Self Assessment	Heat Exchanger Program Interface Assessment	10/14/2004 – 11/23/2004
7. NRC Insp Rept 04-04	Inspection Report	
8. NRC Insp Rept 06-05	Inspection Report	
9. PM 8000008784 /W04323494	Examine and Clean Heat Exchanger	
10. PM 8000008785 /W04410343	Examine and Clean Heat Exchanger	
11. PM 8000014853 /W04498771	Examine and Clean Heat Exchanger	
12. PM 8000016725 /W04498845	Examine and Clean Heat Exchanger	
13. PM 8000021942 /W04560602	Heat Exchanger Maintenance	
14. PM 8000021941 /W04560604	Heat Exchanger Maintenance	
15. CR-CNS-1997-02467	SW pump component erosion/corrosion	
16. CR-CNS-2002-	Recurring equipment issues	

Document	Title	Revision / Date
03882		
17. CR-CNS-2002-05946	Bio Monitoring	
18. CR-CNS-2003-01001	B REC heat exchanger	
19. CR-CNS-2004-02744	Plugging, Safety Injection Pump Oil Cooler	
20. CR-CNS-2005-01970	Erosion near SW Zurn strainer blowdown valve	
21. CR-CNS-2005-02115	Pinhole leak near SW Zurn strainer	
22. CR-CNS-2005-04187	Failure trend service water strainer backwash	
23. CR-CNS-2006-08450	SER 7-06 Degradation of Essential Service Water Piping	
24. CR-CNS-2007-00259	Asian Clams found in E-Bay of intake structure	
25. CR-CNS-2007-00559	Asian Clams found in E bay pump supports	
26. CR-CNS-2007-01192	Asian Clams in REC B SW HX outlet WB	
27. CR-CNS-2007-00716	Asian Clam shells in REC A SW HX outlet	
28. CR-CNS-2007-05589	Pipe wall thickness downstream of SW-AOV-2797BAV	
29. CR-CNS-2007-05831	Coal tar found in DGLO-HX-LO1	

In comparing the 7 program elements in the applicant’s program, the staff verified that the program elements contained in AMP B.1.35 are consistent with GALL AMP XI.M20 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.M20. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant’s technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant’s condition report database for operating experience relevant to AMP B.1.35. The search resulted in a review of over 141 results through the use of keywords: “Corrosion,” “Erosion/Corrosion,” “Biofouling,” and “Chlorine.” The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant’s operating experience review.

The staff identified several instances during the audit where clarification of the proposed aging management program is required. These instances are described in the paragraphs below. The staff will consider issuing RAIs to address these issues. The staff’s evaluations will be documented in the SER.

In the Preventive Actions section of the proposed aging management program, the applicant states that chemical treatment is not used for biological control. The applicant also states that

macro biofouling organisms have not been found at the plant. The operating experience reviewed and responses to staff questions indicate that both of these statements are no longer correct. Plant conditions and operating practices appear to be in conflict with the proposed aging management program. Additionally, none of the operating experience reviewed indicated the details of the chemical treatments used (frequency, chemicals, dose rates, durations) or the effectiveness of those treatments. Appropriate actions relative to the mitigation of macro biofouling are different when clams are or are not present. The presence of clams at the plant may require a change in the proposed aging management program. The applicant was requested to revise the proposed aging management program to reflect actual plant conditions and operations practices. The applicant was also requested to provide information concerning the chemical treatments used (frequency, chemicals, dose rates, durations) and the effectiveness of those treatments. The applicant was further requested to review the actions proposed by the aging management program in light of the presence of clams and revise the program as necessary.

In the Preventive Actions section of the proposed aging management program, the applicant states that "components are lined or coated only where necessary to protect the underlying metal surfaces". The aging management program recommended by the GALL Report states that all piping should be lined or coated. Plant personnel indicate that internal linings or coatings are used on all buried piping and that all above ground piping is not internally coated. Operating experience reviewed indicates a significant number of failures of unlined piping. The proposed aging management program appears to be inconsistent with the program recommended by the GALL Report in that some of the piping in use at the plant is not coated as recommended. Based on the operating experience reviewed, this piping appears to be failing at a greater rate than the piping which is coated as recommended by the GALL Report. The applicant was requested to justify why the proposed aging management program is consistent with the GALL report.

In the Parameters Monitored section of the proposed aging management program, the applicant states that the proposed aging management program ensures "cleanliness and material integrity." Alternatively, in the same section, the aging management program recommended by the GALL Report states that the system should be periodically "inspected, monitored or tested to ensure heat transfer capabilities." Ensuring cleanliness and material integrity differs from, and establishes a lower standard than, ensuring heat transfer capabilities. The applicant was requested to modify the proposed aging management program to be consistent with the aging management program recommended by the GALL Report.

In the Detection of Aging Effects section of the proposed aging management program, the applicant lists aging effects and mechanisms to be considered. This list does not include biofouling. The similar section of the aging management program recommended by the GALL report includes biofouling as an aging effect/mechanism. Biofouling is a critical issue in this aging management program which should be included in the Detection of Aging Effects section. The applicant was requested to revise the proposed aging management program to include the detection of biofouling in the Detection of Aging Effects section.

Generic Letter 89-13 establishes a variety of inspections and tests required to adequately maintain a service water system. Included within these requirements are testing intervals or frequencies. While many of these testing intervals are implicitly acknowledged by the applicant

in supporting documents, explicit acknowledgement of some of the testing intervals appears to be lacking in documentation which can be readily connected to this aging management program. The applicant was requested to identify all testing and inspection requirements imposed by Generic Letter 89-13. The applicant was also requested to provide all testing intervals being utilized by the plant and demonstrate that these intervals are consistent with the requirements of Generic Letter 89-13.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.M20, not including any areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.36, Structures Monitoring Program**

In the CNS LRA, the applicant stated that AMP B.1.36 is an existing program that is consistent with the program elements in GALL AMP XI.S6, "Structures Monitoring Program," with enhancements. The enhancements include guidance in licensee procedures to inspect for corrosion and wear where omitted, and ensure all components and structures subject to inspection are clearly identified, which affect the scope of program, detection of aging effects, and the corrective actions program element in which CNS commits to the guidance requirements of RG 1.160.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. Administrative Procedure 0.27	Maintenance Rule Program	Revision 18 03/05/07
2. Administrative Procedure 0.27.1	Periodic Structural Inspections of Structures	Revision 21 04/02/08
3. Administrative Procedure 0.5.CR	Condition Report Initiation, Review and Classification	Revision 11 06/16/08
4. Calc. NEDC 96- 20	Structural Inspection of CNS Structures	Revision 4 10/25/00
5. CR-2006-07835	Rusted on support CW-H95	10/24/2006
6. CR-2004-03558	Sparger J4A support WW-H88 & H89 has base metal corrosion at steel member edges	05/11/2004
7. CR-2006-09304	Rusted on angle bracing of support CW-H95	11/16/2006
8. CR-2006-07785	Hair line cracks on the floor and wall of Steam tunnel	10/23/2006
9. CR-2006-08028	Degraded at drywell 882 elev (270°) has 4x12x 2" depth	10/26/2006

During the review, the staff noticed that In the GALL Report AMP XI.S6, "acceptance criteria" program element stated that acceptance criteria are to be commensurate with industry codes, standards and guidelines, and are to also consider industry and plant-specific operating experience. CNS's program basic document procedure LRD08 AMP 3.3 for Structures

Monitoring Program, the applicant also stated that, "...Industry and plant-specific operating experience was also considered" (Ref. Section 7.3, 7.4 and 14.4, Administrative Procedure 0.27.1). However, the staff was unable to locate the "Industry and plant-specific operating experience" from the Administrative Procedure 0.27.1 Section 7.3, 7.4 and 14.4. The staff will consider issuing a RAI to address this issue, and the staff's evaluation will be documented in the SER.

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.36 are consistent with GALL AMP XI.S6 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the areas that the staff considers issuing RAIs. The staff also verified that the applicant provided an adequate summary description of the program.

The applicant has committed to implement enhancements affecting the "scope of program," "detection of aging effect," and the "corrective actions" program. The applicant stated that the enhancements are consistent with current implementation practices, and the enhancements formally incorporate these practices into applicable implementing procedures.

The staff also conducted a field walk-down with the applicant's technical staff to verify the existing condition of the torus room and found significant leaching deposits between torus support # 15 and # 16 and around RHR and HPCI piping penetrations and base of pipe support RH-H16; leaching deposits and water stains in the basement floor between torus support # 7 and 8, # 12 and 13, and at # 11; the nuts for several cast-in place anchors for the torus box beam assembly (main column support) have only couple of threads engaged. As a results, the applicant initiated CR-CNS-2009-03188, CR-CNS-2009-03185, and CR-CNS-2009-3194 respectively; for the sandbox region's 4" drain lines (8) appear to be dried; oil tank bunker crushed rock fill; treated wooden poles; intake structures: Division 1 and Division 2 of service water pump (E bay) where the staff identified rusty/spalling on Division 1SW discharge strainer concrete pedestal (CR-CNS-2009-03204); control building; turbine building and the general yard areas. Besides those CRs identified above, the staff found the structural components in good condition and performing well. The staff will consider issuing a RAI to address the CRs as indicated above, and the staff's evaluation will be documented in the SER.

The staff audited the operating experience reports, including a sample of condition reports provided by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.36. The search resulted in a review of over 212 results through the use of keywords: "rack," "rust," and "scal." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.S6, not including the areas in which the staff felt additional clarification might be warranted as described above.

**LRA AMP B.1.37, Thermal Aging and Neutron Embrittlement of Cast Austenitic Stainless Steel**

In the CNS LRA, the applicant stated that AMP B.1.37 is a new program that is consistent with the program elements in GALL AMP XI.M13, "Thermal Aging and Neutron Embrittlement of Cast Austenitic Stainless." The applicant states that this program will assure reduction of fracture toughness due to thermal aging and reduction of fracture toughness due to radiation embrittlement will not result in loss in intended function. This program will evaluate CASS components in the reactor vessel internals and requires non-destructive examinations as appropriate.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD02	CNS License Renewal Project, Aging Management Program Evaluation Report Class 1 Mechanical, Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel	Revision 1 9/2/2008

In comparing the 7 program elements in the applicant's program, the staff found that the applicant had not provided adequate information to verify whether element 1 "Program Scope" and element 6 "Acceptance Criteria" were consistent with GALL AMP XI.M13. The staff found that applicant had not identified if niobium-containing CASS material was used in any vessel internal components, or confirmed that there is no CASS material with >25% ferrite. The GALL report states that such steels require evaluation on a case-by-case basis. Consequently, the staff is considering two RAIs to address this issue. The staff's review of other elements showed that they were consistent with GALL AMP XI.M13 program elements. The staff also confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL program.

The staff audited the operating experience reports and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. In the application, the applicant stated that AMP B.1.37 is a new program, and industry's operating experience will be considered when implementing this program. The applicant further stated that the plant operating experience for this AMP will be gained as it is implemented during the period of extended operation, and will be factored into the program via the confirmation and corrective action elements of the CNS 10 CFR 50 Appendix B quality assurance program. In order to be consistent with the staff's recommendations in Section A.1.2.3.10, Item 2 of SRP-LR Branch Position RLSB-1 (i.e. Branch

Position RLSB-1 of Appendix A to NUREG-1800), an applicant may have to commit to providing operating experience in the future for new programs to confirm their effectiveness.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.37. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared the other 7 program elements in the applicant's program and verified that these elements for the AMP were consistent with those specified in GALL AMP XI.M13 not including the areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.39, Water Chemistry Control - BWR**

In the Cooper Nuclear Station LRA, the applicant stated that AMP B.1.39 is an existing program that is consistent with the program elements in GALL AMP XI.M2, "Water Chemistry."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD07	Cooper License Renewal Project, Aging Management Program Evaluation Report – Non-Class 1 Mechanical; Section 4.10.2, Water Chemistry Control – BWR	Revision 2 9/25/08
2. Procedure 0.5	CNS Operations Manual; Administrative Procedure 0.5 ("Conduct of the Condition Report Process")	Revision 59 9/26/07
3. Procedure 0-QA-01	CNS Operations Manual; Administrative Procedure 0.5-QA-01 ("CNS Quality Assurance Program")	Revision 11 11/16/07
4. Procedure 2.2.98	CNS Operations Manual; System Operating Procedure 2.2.98 ("OWC Gas Generation and Injection System")	Revision 3 12/18/07
5. Procedure 8.2.1	CNS Operations Manual; Chemistry Procedure 8.2.1 ("Chemistry Analysis Schedule")	Revision 52 12/13/07
6. Procedure 8.3	CNS Operations Manual; Chemistry Procedure 8.3 ("Control Parameters and Limits")	Revision 51 11/28/07
7. Procedure 8.3VIP	CNS Operations Manual; Chemistry Procedure 8.3VIP ("Vessel Internals Protection Control Parameters and Limits")	Revision 2 3/21/07
8. Procedure 8.12.1	CNS Operations Manual; System Operating Procedure 8.12.1 ("Depleted Zinc Oxide Injection System")	Revision 9 10/25/05
9. Procedure 8.12.2	CNS Operations Manual; System Operating Procedure 8.12.2 ("Mitigation Monitoring System")	Revision 8 12/15/06

Document	Title	Revision / Date
10. (not numbered)	Cooper Nuclear Station Strategic Chemistry Plan	Revision 1 3/23/07
11. CNS-RPT-07-LRD05	Operating Experience Review Report, Section 4.1.28, Water Chemistry Control-BWR Program	Revision 2 10/07/08

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.39 are consistent with GALL AMP XI.M2 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.M2, with the possible exceptions noted below. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.39. The search resulted in a review of over 115 results through the use of keywords: "chemistry," "corrosion," "cracking," and "leakage." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

CNS Operations Manual Chemistry Procedures 8.3 and 8.3VIP provide requirements for water chemistry parameters for three operating conditions, namely cold shutdown, startup/hot standby, and power operation. For startup/hot standby conditions, Procedure 8.3 specifies that an Action Level 3 condition is reached when the reactor water conductivity exceeds 2.0  $\mu\text{mho/cm}$ . This is consistent with and, in fact, more conservative than the corresponding value of 5.0  $\mu\text{mho/cm}$  given in EPRI Report 1008192 (BWRVIP-130), which supersedes EPRI Report TR-103515 (BWRVIP-29) and forms the basis for the GALL BWR water chemistry requirements. Procedure 8.3 also specifies that an alternative Action Level 3 value of 20  $\mu\text{mho/cm}$  applies during noble metal application, but no time duration for this increased conductivity transient is given. Footnote b to Table 6.3.2 of BWRVIP-130 likewise allows for unspecified increased conductivity above its stated Action Level 2 value of 1.0  $\mu\text{mho/cm}$  for a period of approximately 48 hours following noble metal application. In order to ensure consistency with GALL, the time duration for the conductivity transient following noble metal application should be explicitly stated by the applicant. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

In addition, for power operating conditions, Procedure 8.3 specifies that an Action Level 1 condition is reached when the reactor water conductivity reaches or exceeds 0.18  $\mu\text{mho/cm}$ , with certain exceptions noted during transient conditions. This is again more conservative than the corresponding value of 0.30  $\mu\text{mho/cm}$  given in EPRI 1008192 (BWRVIP-130). However, the applicant's Procedure 8.3 allows a higher limit value of 0.5  $\mu\text{mho/cm}$  when the conductivity is increased "due to soluble iron concentration." No such exception is noted in EPRI

BWRVIP-130. In order to ensure consistency with GALL, a justification for the applicant's higher conductivity limit and a discussion of the procedure for determining the relative contributions of soluble iron versus more aggressive species to the total conductivity should be provided. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.M2, not including any areas in which the staff felt additional clarification might be warranted as described above.

### **LRA AMP B.1.39, Water Chemistry Control - BWR**

In the Cooper Nuclear Station LRA, the applicant stated that AMP B.1.39 is an existing program that is consistent with the program elements in GALL AMP XI.M2, "Water Chemistry."

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

<b>Document</b>	<b>Title</b>	<b>Revision / Date</b>
1. CNS-RPT-07-LRD07	Cooper License Renewal Project, Aging Management Program Evaluation Report – Non-Class 1 Mechanical; Section 4.10.2, Water Chemistry Control – BWR	Revision 2 9/25/08
2. Procedure 0.5	CNS Operations Manual; Administrative Procedure 0.5 ("Conduct of the Condition Report Process")	Revision 59 9/26/07
3. Procedure 0-QA-01	CNS Operations Manual; Administrative Procedure 0.5-QA-01 ("CNS Quality Assurance Program")	Revision 11 11/16/07
4. Procedure 2.2.98	CNS Operations Manual; System Operating Procedure 2.2.98 ("OWC Gas Generation and Injection System")	Revision 3 12/18/07
5. Procedure 8.2.1	CNS Operations Manual; Chemistry Procedure 8.2.1 ("Chemistry Analysis Schedule")	Revision 52 12/13/07
6. Procedure 8.3	CNS Operations Manual; Chemistry Procedure 8.3 ("Control Parameters and Limits")	Revision 51 11/28/07
7. Procedure 8.3VIP	CNS Operations Manual; Chemistry Procedure 8.3VIP ("Vessel Internals Protection Control Parameters and Limits")	Revision 2 3/21/07
8. Procedure 8.12.1	CNS Operations Manual; System Operating Procedure 8.12.1 ("Depleted Zinc Oxide Injection System")	Revision 9 10/25/05
9. Procedure 8.12.2	CNS Operations Manual; System Operating Procedure 8.12.2 ("Mitigation Monitoring System")	Revision 8 12/15/06
10. (not numbered)	Cooper Nuclear Station Strategic Chemistry Plan	Revision 1 3/23/07
11. CNS-RPT-	Operating Experience Review Report, Section 4.1.28,	Revision 2

Document	Title	Revision / Date
07-LRD05	Water Chemistry Control-BWR Program	10/07/08

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.39 are consistent with GALL AMP XI.M2 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in GALL AMP XI.M2, with the possible exceptions noted below. The staff also verified that the applicant provided an adequate summary description of the program.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.39. The search resulted in a review of over 115 results through the use of keywords: "chemistry," "corrosion," "cracking," and "leakage." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP.

CNS Operations Manual Chemistry Procedures 8.3 and 8.3VIP provide requirements for water chemistry parameters for three operating conditions, namely cold shutdown, startup/hot standby, and power operation. For startup/hot standby conditions, Procedure 8.3 specifies that an Action Level 3 condition is reached when the reactor water conductivity exceeds 2.0  $\mu\text{mho/cm}$ . This is consistent with and, in fact, more conservative than the corresponding value of 5.0  $\mu\text{mho/cm}$  given in EPRI Report 1008192 (BWRVIP-130), which supersedes EPRI Report TR-103515 (BWRVIP-29) and forms the basis for the GALL BWR water chemistry requirements. Procedure 8.3 also specifies that an alternative Action Level 3 value of 20  $\mu\text{mho/cm}$  applies during noble metal application, but no time duration for this increased conductivity transient is given. Footnote b to Table 6.3.2 of BWRVIP-130 likewise allows for unspecified increased conductivity above its stated Action Level 2 value of 1.0  $\mu\text{mho/cm}$  for a period of approximately 48 hours following noble metal application. In order to ensure consistency with GALL, the time duration for the conductivity transient following noble metal application should be explicitly stated by the applicant. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

In addition, for power operating conditions, Procedure 8.3 specifies that an Action Level 1 condition is reached when the reactor water conductivity reaches or exceeds 0.18  $\mu\text{mho/cm}$ , with certain exceptions noted during transient conditions. This is again more conservative than the corresponding value of 0.30  $\mu\text{mho/cm}$  given in EPRI 1008192 (BWRVIP-130). However, the applicant's Procedure 8.3 allows a higher limit value of 0.5  $\mu\text{mho/cm}$  when the conductivity is increased "due to soluble iron concentration." No such exception is noted in EPRI BWRVIP-130. In order to ensure consistency with GALL, a justification for the applicant's higher conductivity limit and a discussion of the procedure for determining the relative

contributions of soluble iron versus more aggressive species to the total conductivity should be provided. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The 3 program elements, corrective actions, confirmation process and administrative controls were reviewed as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in GALL AMP XI.M2, not including any areas in which the staff felt additional clarification might be warranted as described above.

**LRA AMP B.1.40, Water Chemistry Control – Closed Cooling Water**

In the Cooper Nuclear Station LRA, the applicant stated that AMP B.1.40 is an existing program that is consistent with the program elements in GALL AMP XI.M21, "Closed-Cycle Cooling Water System," with an exception. The exception is related to equipment performance and functional testing.

During its audit, the staff reviewed the applicant's onsite documentation supporting the applicant's conclusion that the program elements are consistent with the elements in the GALL AMP. The staff interviewed the applicant's technical staff and reviewed the following onsite documents:

Document	Title	Revision / Date
1. CNS-RPT-07-LRD07	Cooper License Renewal Project, Aging Management Program Evaluation Report – Non-Class 1 Mechanical; Section 4.10.2, Water Chemistry Control – Closed Cooling Water	Revision 2 9/25/08
2. Procedure 0.5	CNS Operations Manual; Administrative Procedure 0.5 ("Conduct of the Condition Report Process")	Revision 59 9/26/07
3. Procedure 0-QA-01	CNS Operations Manual; Administrative Procedure 0.5-QA-01 ("CNS Quality Assurance Program")	Revision 11 11/16/07
4. Procedure 8.2.1	CNS Operations Manual; Chemistry Procedure 8.2.1 ("Chemistry Analysis Schedule")	Revision 52 12/13/07
5. Procedure 8.3	CNS Operations Manual; Chemistry Procedure 8.3 ("Control Parameters and Limits")	Revision 51 11/28/07
6. (not numbered)	Cooper Nuclear Station Strategic Chemistry Plan	Revision 1 3/23/07
7. CNS-RPT-07-LRD05	Operating Experience Review Report, Section 4.1.29 Water Chemistry Control-Closed Cooling Water System	Revision 2 10/07/08
8. CNS-CR-2004-3119	Notification 10309859	6/07/04
9. CNS-SR-2006-6741	REC Dissolved Oxygen Low out of Limit	CA-01 undated

In comparing the 7 program elements in the applicant's program, the staff verified that the program elements contained in AMP B.1.40 are consistent with GALL AMP XI.M21 program elements. The staff confirmed that the boundary conditions of the plant program are enveloped by the boundary conditions described in the GALL AMP except for the area that the applicant

took exception to GALL AMP XI.M21. The staff also verified that the applicant provided an adequate summary description of the program.

In the application, the applicant proposed an exception to GALL program elements Parameters Monitored/Inspected, Detection of Aging Effects, Monitoring and Trending, and Acceptance Criteria, that excludes performance and functional testing from the program. The staff will review the exception and may consider issuing an RAI that requests the applicant provide additional information concerning the exclusion of this testing.

The staff audited the operating experience reports, including a sample of condition reports prepared by the applicant, and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. The staff noted an occurrence reported in CNS-CR-2004-3119 in which the dissolved oxygen level in the Turbine Equipment Cooling (TEC) and Reactor Equipment Cooling (REC) cooling water systems averaged 6 ppm (saturation) for at least one year and probably longer. This compares with a maximum level of 50 ppb specified in the applicants Procedure 8.3 and 200 ppb specified in EPRI Report 1007820 "Closed Cooling Water Chemistry Guideline, Revision 1." This report supersedes EPRI Report TR-107396 and forms the basis for the GALL closed cooling water chemistry requirements. The condition report stated that the cause of the high oxygen level was under investigation, and it noted that oxygen monitoring in this system had been suspended from July of 2003 through July 7, 2004, the date of the report. Possible degradation of the system as a result of this incident was not discussed. Another dissolved oxygen excursion in the REC cooling water system was reported in 2006 (CNS-SR-2006-6741 CA-01), but the magnitude and duration of this excursion were not described. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The staff also conducted an independent search of the applicant's condition report database for operating experience relevant to AMP B.1.40. The search resulted in a review of over 115 results through the use of keywords: "chemistry," "corrosion," "cracking," and "leakage." The staff screened these results, and reviewed them for relevance to the AMP in evaluating the adequacy of the applicant's operating experience review. The staff verified that the operating experience described in the applicant's basis document adequately addresses the plant-specific operating experience for this AMP, with the exception of the two occurrences described in the preceding paragraph, which were not referenced in the basis document.

The applicant's decision to exclude performance and functional testing from this AMP is based upon EPRI Report 1007820, where the applicant cites Section 8.4.4 stating that "performance monitoring is typically part of the engineering program." The applicant infers from this statement that performance monitoring can therefore be excluded from the water chemistry program. However, the applicant does not indicate whether, how, and under what AMP performance monitoring and functional testing of closed water system components such as heat exchangers is accomplished. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

CNS Operations Manual Chemistry Procedure 8.3 provides requirements for water chemistry parameters for the closed water system. In particular, Sections 8.1 and 8.2 specify allowable limits on conductivity, pH, and concentrations of selected chemical species for the TEC, REC,

and diesel generator jacket cooling water systems. These limits define chemistry warning limit (CWL) and selected Action Levels 1 and 2 conditions. In comparing these limits to the corresponding values in EPRI Report 1007820 Tables 5.3 and 5.7, it is noted that they are in compliance in all cases. However, a number of EPRI 1007820 limit values pertaining to Action Level 2 conditions in particular are omitted from the Procedure 8.3 tables. The staff will consider issuing an RAI to address this issue, and the staff's evaluation will be documented in the SER.

The 3 program elements, corrective actions, confirmation process and administrative controls were audited as part of the Scoping and Screening Methodology audit. During the Aging Management Program audit, the staff compared 7 program elements in the applicant's program and verified that these 7 elements for the AMP were consistent with those specified in the GALL AMP XI.M21, not including any exceptions identified by the applicant in the LRA for this AMP, which will be evaluated separately in the SER, and the areas in which the staff felt additional clarification might be warranted as described above.