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10 CFR 50
10 CFR 51
10 CFR 54

2130-06-20400
October 20, 2006

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

Oyster Creek Generating Station
Facility Operating License No. DPR-16
NRC Docket No. 50-219

Subject: AmerGen comments on the NRC Draft Safety Evaluation Report Associated with the Oyster Creek Generating Station Application for License Renewal (TAC No. MC7624)

Reference: NRC Letter "Safety Evaluation Report with Open Items Related to the License Renewal of Oyster Creek Generating Station," dated August 18, 2006

In the referenced letter, the NRC issued its Safety Evaluation Report (SER) with Open Items related to License Renewal of the Oyster Creek Generating Station. In that letter, the NRC requested AmerGen to review the SER for accuracy and provide comments to the Staff.

AmerGen has reviewed the SER and developed comments for the Staff's consideration. Enclosure 1 is a tabulation of the comments, organized by SER section and page number. Enclosure 2 consists of mark-ups of the SER pages affected by the comments, with AmerGen's suggested revisions.

The NRC's letter also requested AmerGen to provide responses to the Open Items identified in Section 1.5 of the SER. AmerGen provided responses to these Open Items in its letter 2130-06-20414, dated October 20, 2006.

If you have any questions, please contact John Hufnagel, Licensing Lead, at 610-765-5829.

Respectfully,

Michael P. Gallagher
Vice President, License Renewal
AmerGen Energy Company, LLC

A114

Enclosures: 1. AmerGen Comments on NRC Draft SER
2. Mark-up of Draft SER Pages

cc: Regional Administrator, USNRC Region I, w/o Enclosures
USNRC Project Manager, NRR - License Renewal, Safety, w/Enclosures
USNRC Project Manager, NRR - License Renewal, Environmental, w/o Enclosures
USNRC Project Manager, NRR - Project Manager, OCGS, w/o Enclosures
USNRC Senior Resident Inspector, OCGS, w/o Enclosures
Bureau of Nuclear Engineering, NJDEP, w/Enclosures
File No. 05040

Enclosure 1

AmerGen Energy Company, LLC
Comments on the NRC Draft License Renewal Safety Evaluation Report
for the Oyster Creek Generating Station

Comment Number	Page Number	Section Number	Proposed Change
1	iii	Abstract	In the second sentence of the second paragraph, change "The NRC issued the OCGS construction permit on December 15, 1964, and the OCGS operating license on July 2, 1991" to "The NRC issued the OCGS construction permit on December 15, 1964, **the OCGS provisional operating license on April 9, 1969** and the OCGS operating license on July 2, 1991. This change would make it clear the plant has been in operation since 1969.
2	xvi	Abbreviations	For EFPY, change "effective full power **year**" to "effective full power **years**"
3	xvi	Abbreviations	For F_{en}, change "environmental **factor**" to "environmental **fatigue factor**"
4	xvii	Abbreviations	For KIP, change "poun**t**" to "poun**d**"
5	xvii	Abbreviations	For LBB, change "brea**t**" to "brea**k**"
6	xvii	Abbreviations	For Met Tower, change "**Meterolical**" to "**Meteorological**"
7	xviii	Abbreviations	For PORC, change "**Power**" to "**Plant**"
8	1-5	1.2.2	Last sentence of section 1.2.2 – change "...staff will separately **published**..." to "...staff will separately **publish**..."
9	1-5	1.3	Third paragraph – change first sentence from "...of 10 CFR requires each **to LRA**..." to "...of 10 CFR requires each **LRA to**..."
10	1-6	1.3	Fifth paragraph of section – change second sentence from "...10 CFR 54.21(a), (b), and (c)" to "...10 CFR 54.21(a) and (c). The basis for this change is that the LRA does not itself provide what is required by 10 CFR 54.21(b). 10 CFR 54.21(b) is met by the LRA amendment that is described in paragraph six of section 1.3.
11	1-6	1.3	Fifth paragraph of section – change third sentence from "LRA Appendix A contains..." to "LRA Appendix A **as supplemented by AmerGen letters 2130-06-20354 and 2130-06-20258** " The basis for this change is that the supplemental letters superseded LRA Appendix A and constitute the final version of what AmerGen presented and the NRC reviewed as the UFSAR supplement.
12	1-12	OI 4.7.2-3	Second paragraph of open item – change first sentence from "In its response dated April **16**, 2006..." to " In its response dated April **7**, 2006..." This corrects the date of the relevant correspondence.
13	1-13	OI 4.7.2-3	Fifth paragraph of open item – change first sentence from "...(Commitment No. **33**)..." to "...(Commitment No. **27**)..." This corrects the reference in that commitment 27 contains all the committed actions related to IWE, including those mentioned in this paragraph of the DSER.

Comment Number	Page Number	Section Number	Proposed Change
14	1-15	1.7	Clarify the description of the second proposed license condition to read as follows: "The second license condition requires future activities identified in the UFSAR supplement to be completed prior to **entering** the period of extended operation**, or as specified in the UFSAR supplement for commitments that will be completed during the period of extended operation.**"
15	2-17	2.1	Generic – SER Section 2 page numbers start with 2-17, should start with 2-1.
16	2-21	2.1.3.1.2	Change "...data and has that the applicant..." to "...data and has **determined** that the applicant..."
17	2-26	2.1.4.2.1	Change "A summary description of the four categories:" to "**The following is a** summary description of the four categories:"
18	2-27	2.1.4.2.1	Change "Air and gas systems were not included within the scope of license renewal because they are not hazards to other plant equipment." to "Air and gas systems were not included within the scope of license renewal **under 10 CFR 54.4(a)(2) scoping criteria** because they are not hazards to other plant equipment." The basis for this change is that some air and gas systems are included in the scope of license renewal for functions other than those associated with 10 CFR 54.4(a)(2).
19	2-27	2.1.4.2.1	Change "Therefore, the applicant concluded that the air/gas systems are not within the scope of license renewal." to "Therefore, the applicant concluded that the air/gas systems are not within the scope of license renewal **under 10 CFR 54.4(a)(2) scoping criteria**." The basis for this change is that some air and gas systems are included in the scope of license renewal for functions other than those associated with 10 CFR 54.4(a)(2).
20	2-27	2.1.4.2.2	Typo - Change "10 CFR 54(a)(2)" to "10 CFR 54**.4**(a)(2)"
21	2-30	2.1.4.2.3	Typo – replace the comma (,) with a period (.).
22	2-33	2.1.4.3.2	Delete references to the October 12, 2005, November 11, 2005 and May 18, 2006 letters. These letters are not applicable to the issues associated with RAI 2.5.1.15-1.
23	2-33	2.1.4.3.2	Typo – change 2.1.5.15-1 to 2.**5.1**.15-1
24	2-34	2.1.4.3.2	Typo – delete close parenthesis
25	2-34	2.1.4.3.2	Typo – delete repeated words
26	2-35	2.1.4.4.1	Change "The CRL lists plant components comprehensively." to "The CRL lists plant **mechanical** components comprehensively." Structural components and electrical commodities are generally not listed in the CRL.
27	2-35	2.1.4.4.1	Change "LRA Table 2.2-1 identifies them by component type only." to "In the scoping and screening results section of the LRA (Sections 2.3, 2.4 and 2.5), components are identified by component type only." The basis for this change is that LRA Table 2.2-1 is a table of systems and structures, and does not identify component types.
28	2-35	2.1.4.4.1	Change "2.5.1" to "2.5.2". LRA Section 2.5.2 is applicable to evaluation of electrical commodity groups.
29	2-35	2.1.4.4.1	Change "an" to "any".

Comment Number	Page Number	Section Number	Proposed Change
30	2-37	2.1.4.5.1	Change "...safety-related functions for regulated events..." to "...safety-related functions **or** regulated events..." Green applies to both safety-related systems and systems credited for regulated events. The basis for this change is that not all systems that are credited for regulated events are safety-related.
31	2-37	2.1.4.5.1	Change "... the CRL compared the LRBDs confirmed..." to "... the CRL **was compared against the LRBDs to confirm**..."
32	2-39	2.1.4.7.1	Typo – Change 2.1.5.4 to 2.1.5.5. Section 2.1.5.4 is not applicable to electrical scoping. Section 2.1.5.5 is the applicable section reference.
33	2-40	2.1.4.7.2	Typo – Change 2.1.5.4 to 2.1.5.5. Section 2.1.5.4 is not applicable to electrical scoping. Section 2.1.5.5 is the applicable section reference.
34	2-40	2.1.4.7.2	Change "PP-01 identifies the systems within the scope of license renewal." to "PP-01 identifies the systems within the scope of **review for** license renewal." The basis for this change is that Position Paper PP-01 identifies all systems that require review for license renewal, but does not identify which systems are in scope.
35	2-40	2.1.5.1.1	Change "LRA Section 2.1.6..." to "**In** LRA Section 2.1.6..."
36	2-40	2.1.5.1.1	Change "...long-lived or passive components...." to "...long-lived **and** passive components..." Components must be both passive and long-lived to be subject to AMR.
37	2-42	2.1.5.2.2	Change "piping and fittings - pressure boundary" to "piping and fittings – leakage and pressure boundary". See LRA Table 2.3.1.3 for basis.
38	2-49	2.3.1.1.1	1st paragraph, 8th line – Should read "..., by **providing** continuous regulation of the core excess reactivity and reactivity distribution and by **providing** sufficient reactivity..."
39	2-53	2.3.1.4.1	1st paragraph, 6th Line – Spell out "**Engineered Safety Feature**" the 1st time you use the acronym (ESF).
40	2-143	2.3.4.6.1	NRC did not use reference to "MSIV bypass leakage". Third bullet should have ...plateout **from MSIV bypass leakage** ...
41	2-150	2.4.1.1	Top of the page. Correct typo from Table 3.5.2.1-18 to 3.5.2.1.18
42	2-165	2.4.10.1	1st paragraph sentence before last sentence. Change the sentence as follows: The new heating boiler house does not house any **safety-related** SSCs.
43	2-165	2.4.10.1	2nd paragraph. Add the word "**old**" to heating boiler house as follows: The failure of nonsafety-related SSCs in the **old** heating boiler house potentially could prevent...function. The **old** heating boiler... The statement only applies to the old heating boiler house.
44	2-181	2.5.1.1	Bottom of page, 1st paragraph on 4160V System, last sentence: Add "being" between "1C and 1D" and "the essential or". Basis: Provide correct meaning.

Comment Number	Page Number	Section Number	Proposed Change
45	2-182	2.5.1.1	Bottom of page, 1st paragraph on Intermediate Range Monitoring System, 2nd sentence: Add "provides the operator with power level indication and " between "monitoring system" and "generates annunciator". Basis: Provides a complete statement for IRM system functions.
46	2-183	2.5.1.1	Top of page, 1st paragraph on Local Power Range Monitoring System and Average Power Range Monitoring System, last sentence: Change "UFSAR Section" to "UFSAR Sections" and add "and 7.5.1.8.7" to the end of this last sentence. Basis: Provides a complete reference to applicable UFSAR sections.
47	2-183	2.5.1.1	Middle of page, 1st paragraph on Post-Accident Monitoring System, last sentence: Change "UFSAR Sections 5.2.2.4.2.2, 7.6.1.4, and 11.5.2.13." to "UFSAR Sections **1.9, 12.3.4.1.5,** 5.2.2.4.2.2, 7.6.1.4, and 11.5.2.13." Basis: Provides a complete reference to applicable UFSAR sections.
48	2-183	2.5.1.1	2nd paragraph on Radio Communication System: Add the following parenthetical at the end of the paragraph: "(See SER Section 3.7 for additional information on the Radio Communications System as it relates to the Meteorological Tower.)" Basis: Provide link to revisions subsequent to LRA submittal.
49	2-184	2.5.1.1	Top of page, 1st paragraph on Reactor Protection System, last sentence: Change "UFSAR Section" to "UFSAR Sections" and add "and 7.3" to the end of this last sentence. Basis: Provides a complete reference to applicable UFSAR sections.
50	2-184	2.5.1.1	Top of page, 1st paragraph on Remote Shutdown System, 2nd line: Change "shutdown whenever necessary" to "shutdown, whenever **it is** necessary". Basis: Typographical.
51	2-184	2.5.1.1	1st sentence, (a) subject in 2nd paragraph on Remote Shutdown System: Add "monitors conditions and controls plant equipment to achieve and maintain safe shutdown and" between "(a)" and "senses process conditions". Basis: Provide complete rationale for safety-related classification of this system.
52	2-184	2.5.1.1	Middle of page, 1st paragraph on Station Blackout System, last sentence: Change "UFSAR Section" to "UFSAR Sections" and add "and 15.9" to the end of this last sentence. Basis: Provides a complete reference to applicable UFSAR sections.

Comment Number	Page Number	Section Number	Proposed Change
53	2-184	2.5.1.2	1st bullet following 2nd paragraph: Rewrite to read: "provides electrical continuity". Basis: Provides a more inclusive function for electrical commodities which conduct electricity.
54	2-184	2.5.1.2	4th bullet following 2nd paragraph: Delete this bullet in its entirety. Basis: This function is for structural commodities.
55	2-186	2.5.1.2	Last paragraph following # (8): Replace "structural component support commodity group in LRA Section 2.4.18." with "structures in which they are located, as discussed in LRA Section 2.4." Basis: Cable trays, conduits, instrument racks, panels and enclosures are not assessed as structural supports as is discussed in section 2.4.18 of the LRA. These commodities are assessed in the evaluations for the buildings and structures in which they are located.
56	2-187	2.5.2	Bottom of page, last two bullets: The last two parenthetical Section #s should be "2.5.2A.5.5" and "2.5.2A.5.6". Basis: Typographical error.
57	2-190	2.5.2	Top of page, 1st sentence: Change "has" and "had" to "have" and "have". Basis: Match verb forms to plural noun, i.e., "responses."
58	2-190	2.5.2	Top of page, 1st paragraph, last sentence: Change "2.5.3-1, 2.5.3-2," to "2.5.2.3-1, 2.5.2.3-2". Basis: Typographical error.
59	3-3	3.0.1.2	The high pressure coolant injection system and residual heat removal system are not applicable to OCGS. Appropriate system references for the engineered safety features group are containment spray system and standby gas treatment system.
60	3-4	3.0.1.2 (9)	Change "The notes are identified by letters and were developed by an NEI work group." to "The notes identified by letters were developed by an NEI work group." Not all notes are identified by letters.
61	3-9	3.0.3	The Protective Coating Monitoring and Maintenance Program should be consistent **with enhancements.**
62	3-10	3.0.3	The One-Time Inspection program should be consistent **with exceptions.**
63	3-12	3.0.3.1	The One-Time Inspection program should be deleted from section 3.0.3.1 since this program has exceptions.
64	3-12	3.0.3.1	The Protective Coating Monitoring and Maintenance Program should be deleted from section 3.0.3.1 since this program has enhancements.

Comment Number	Page Number	Section Number	Proposed Change
65	3-16	3.0.3.1.4	The One-Time Inspection program should be moved from section 3.0.3.1.4 to section 3.0.3.2.x since this program includes exceptions. A detailed markup of this change is not provided since the entire section discussion text is required to be relocated to the above indicated DSER section. The first sentence should also be revised to read, "In LRA Section B.1.24, the applicant described the new One-Time Inspection program as consistent, **with exceptions,** with GALL ...".
66	3-18	3.0.3.1.4	Under Exception 1, delete in two (2) places "or equal to" since the scope of the Oyster Creek One-Time Inspection program for Class 1 piping is limited to less than 4" NPS. Commitment No. 24.
67	3-19	3.0.3.1.4	The write-up discusses the following commitment: "With this new commitment and the examination of 10 percent of the butt-welded small-bore piping, there is reasonable assurance that ...". This commitment should read: "With this new commitment and the examination of 10 percent of the **butt welds in all Class 1** small bore piping, there is reasonable assurance that ...". The original phrasing made the commitment appear to involve piping inspections versus weld inspections. Reference: Commitment No. 24.
68	3-25	3.0.3.1.8	The Protective Coating Monitoring and Maintenance Program should be moved from section 3.0.3.1.8 to section 3.0.3.2.x since this program includes enhancements. A detailed markup of this change is not provided since the entire section discussion text is required to be relocated to the above indicated DSER section. The first sentence should also be revised to read, "In LRA Section B.1.33, the applicant described the existing Protective Coating Monitoring and Maintenance Program as consistent, **with enhancements,** with GALL ...".
69	3-25	3.0.3.1.8	The sentence "Similarly, while some service Level 1 coatings are used to provide corrosion protection, the applicant does not credit them for corrosion protection for the drywell shell above the sandbed region for license renewal purposes" should read, "Similarly, while some **S**ervice Level 1 coatings are used to provide corrosion protection, the applicant does not credit them for corrosion protection for the **internal surface of the** drywell shell for license renewal purposes." Reference: PBD-AMP-B1.33 (3.2 Preventive Actions)
70	3-26	3.0.3.1.8	The sentence "...in the emergency service water (ESW), SW system, and roof drain and overboard discharge system" should read, "...in the emergency service water (ESW), **service water (SW)**, and roof drain and overboard discharge system **(RDODS).**"
71	3-27	3.0.3.1.8	The sentence "The applicant made new commitments related to monitoring of the primary containment coatings in accordance with ..." should read, sentence "The applicant made new commitments related to monitoring of **these** primary containment coatings in accordance with ..."

Comment Number	Page Number	Section Number	Proposed Change
72	3-27	3.0.3.1.8	The write-up is missing three (3) additional enhancements included in the coatings AMP. The following enhancements need to be added to B.1.33: • The program will be enhanced to include additional visual inspections of the epoxy coating that was applied to the exterior surface of the drywell shell in the sand bed region, such that the coated surfaces in all 10 drywell bays will have been inspected at least once prior to entering the period of extended operation. • The program will be enhanced to include the inspection of 100% of the sandbed region epoxy coating every 10 years during the period of extended operation. Inspections will be staggered such that at least three bays will be examined every other refueling outage. • The program will be enhanced to include the inspection of all 20 torus bays at a frequency of every other refueling outage for the current coating system. Should the current coating system be replaced, the inspection frequency and scope will be re-evaluated. Inspection scope will, as a minimum, meet the requirements of ASME Section XI, Subsection IWE. As a result of adding the additional enhancements, the existing DSER enhancement should be changed from "Enhancement" to "Enhancement 1". (For basis see DSER Appendix A Item 33)
73	3-31	3.0.3.1.10	1st word on 1st line of page: Place comma following "failures". Basis: Typographical
74	3-31	3.0.3.1.10	1st line of the 3rd paragraph on page: Delete the word "to" between "...that the applicant" and "clarify its use..." Basis: Typographical
75	3-31	3.0.3.1.10	Bottom of page, add the following as a new paragraph, immediately preceding the Operating Experience section: "In its letter dated June 23, 2006, the applicant committed (Commitment No. 36) to revise the Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program, including Appendix A Section A.1.36 to test cable circuits at an initial frequency of six years, after which the frequency will be evaluated and adjusted, based on test results; period between tests shall not exceed 10 years." Basis: This revision has been provided to reflect aging management program changes occurring post-AMP/AMR audit and reflected in the "final" submittal of commitments for OC license renewal, letter number 2130-06-20354, dated 6/23/06.
76	3-32	3.0.3.1.10	2nd last line of 1st paragraph on page: Delete the "-" immediately preceding "insulated cables prior..." Basis: Typographical

Comment Number	Page Number	Section Number	Proposed Change
77	3-33	3.0.3.1.10	1st paragraph on page, 2nd last sentence: Change "These" to "The 13.8 kV". Basis: Typographical. As written the 34.5 kV circuits are wrongly being included with the FRCT cables as having a 1989 in-service date.
78	3-33	3.0.3.1.10	3rd paragraph at top of page: Rewrite to read: "In its letter dated June 23, 2006, the applicant committed (Commitment No. 36) that cable test/monitoring results will be trended." Basis: This revision is to provide the reference for the commitment change to trend test/monitoring results. Cable test frequency is also addressed in this letter as incorporated by comment #75 above.
79	3-33	3.0.3.1.10	1st line of UFSAR Supplement paragraph: Rewrite "and April 17, 2006," to read: "April 17 and June 23, 2006,". Basis: Provide complete list of letters providing additional information and commitments.
80	3-36	3.0.3.1.12	5th line of 5th paragraph in middle of page: Should read: "consistent with this GALL AMP. The staff's review..." Basis: Typographical
81	3-39	3.0.3.2	The One-Time Inspection program should be added to section 3.0.3.2 since this program has exceptions.
82	3-39	3.0.3.2	The Protective Coating Monitoring and Maintenance Program should be added to section 3.0.3.2 since this program has enhancements.

Comment Number	Page Number	Section Number	Proposed Change
83	3-43	3.0.3.2.1	Draft SER Conclusion statement currently reads as follows: "Also, the staff reviewed the enhancements and confirmed that their implementation prior to the period of extended operation will make the AMP consistent with the GALL Report AMP to which it was compared." The error is that the portion of the enhancement regarding eddy current examination of the isolation condenser tubes and inspection (VT or UT) of the channel head and tube sheets is committed to be performed during the first 10 years of the period of extended operation, not prior to it. Revise sentence to read as follows: "Also, the staff reviewed the enhancements and confirmed that their implementation prior to the period of extended operation, with the exception of eddy current testing of the tubes and inspection (VT or UT) of the channel head and tube sheets which will be performed during the first 10 years of the period of extended operation, will make the AMP consistent with the GALL Report AMP to which it was compared." NOTE: On page 3-42, the draft SER's statement of the enhancement correctly lists the eddy current testing and inspection of channel head and tube sheets as being performed during the first 10 years of the period of extended operation. Only the Conclusion statement on page 3-43 is inconsistent about the timing.
84	3-44		3rd Paragraph, 2nd Sentence – "..... exposed to reactor or treated water." Delete "reactor or" Should read "..... **exposed to treated water**." We do not reference reactor water as an environment in the tables. We have used treated water (which includes reactor water), auxiliary steam, boiler treated steam, steam and sodium pentaborate.
85	3-46		2nd Paragraph, 10th Line – Delete "...CY-AB-120-1000 (Revision 2), Section 4.6B, " and change ".... implementing procedure..." to "...**implementing procedures**, ..."
86	3-47		3rd paragraph, last sentence – Delete this sentence "The applicant also stated that this pH analysis will continue during the period of extended operation." 4th paragraph, 1st sentence – Rewrite as follows "The **S**taff determined that the applicant had been routinely monitoring parameters suggested in the BWRVIP-130 and **had confirmed pH of the torus water** to ensure its quality." Basis: Not monitoring pH is an exception that has been taken and approved in previous license renewal applications. The last sentence in the 3rd paragraph infers that we will monitor pH and therefore we would not need this exception.
87	3-53	3.0.3.2.5	4th paragraph: Delete "In the LRA". The scope of the feedwater modification is fully identified in a PBD reference document, not the LRA
88	3-60	3.0.3.2.7	3rd paragraph, 2nd sentence – "Audit and Review Report Section 3.0.3.2.8." should be "Audit and Review Report Section **3.0.3.2.7**."

Comment Number	Page Number	Section Number	Proposed Change
89	3-60	3.0.3.2.7	Under 4th paragraph, 1st bullet – "..., including new stress-improved welds;" should read "...**and all** new **welds were** stress-improved;" in order to be consistent with LRA Section B.1.07.
90	3-82	3.0.3.2.11	2nd paragraph, 2nd sentence – "...with the same coating..." should read "...with the same **internal** coating..."
91	3-83	3.0.3.2.11	2nd paragraph, 1st sentence – the word "grave" maybe reworded as "**high**". Reference LRA Section B.1.13.
92	3-84	3.0.3.2.12	2nd paragraph, 7th line – "...monitoring indicates degradation..." should read "...monitoring **provides indication of** degradation..." Reference LRA Section B.1.14.
93	3-84	3.0.3.2.12	5th paragraph – Delete "detection of aging effects", "and" and "acceptance criteria". September 2005 GALL does not reference TR-107396 in these 2 elements, therefore we do not need to take exception to these 2 elements. The LRA does not go into the 10-element level of detail.
94	3-85	3.0.3.2.12	1st paragraph, Last sentence – Delete Anthony Selby's name. Reference to specific author can be found in the ERPI documents referenced.
95	3-85	3.0.3.2.12	3rd paragraph, 2nd sentence – Should read "Additionally, industry operating experience demonstrates that **the use of** corrosion inhibitors in CCCWs **that are** monitored and maintained **is** effective in mitigating loss of material and buildup of deposits." Reference LRA Section B.1.14
96	3-85	3.0.3.2.12	3rd paragraph, Last sentence – "Closed-Cycle Cooling" should be "Open-Cycle Cooling". Reference LRA Section B.1.14.
97	3-92	3.0.3.2.15	In the O.E. paragraph, the acronyms HWC and NMCA should be defined as **Hydrogen Water Chemistry** and **Noble Metals Chemical Addition**, respectively.
98	3-95	3.0.3.2.16	TYPO: period should be used in lieu of comma after "Enhancement 4"
99	3-102	3.0.3.2.18	Add to the first paragraph of the page the words "as described" before the words "in the LRA" associated with Commitment 21. The commitment is maintained by the Oyster Creek Passport system, which incorporates the 5-year commitment frequency.
100	3-107	3.0.3.2.19	Delete "*This is a new exception...*" since this statement has not been consistently used in the SER discussions of program exceptions resulting from AMP reconciliation.

Comment Number	Page Number	Section Number	Proposed Change
101	3-110	3.0.3.2.19	Need to add AMP enhancement #6 for the one-time inspection of the EDG day tanks and NRC evaluation paragraph accordingly: In its letter dated April 17, 2006, the applicant committed (Commitment No. 22) to an enhancement in meeting the GALL Report program elements "scope of program," "preventive actions," "parameters monitored or inspected," "detection of aging effects," "monitoring and trending," and "acceptance criteria." Specifically the enhancement stated: To confirm the absence of any significant aging effects, a one-time internal inspection of the Emergency Diesel Generator Day Tanks will be performed. The staff noted that the applicants enhancement ...
102	3-114	3.0.3.2.21	The Staff only stated 1 exception to the AMP. There is a 2nd exception "Oyster Creek does not have any buried tanks in the scope of license renewal". Reference LRA B.1.26.
103	3-115	3.0.3.2.21	Insert the following enhancement: "The inspections will include at least one carbon steel, one aluminum and one cast iron pipe or component. In addition, for each of these materials, the locations selected for inspection will include at least one location where the pipe or component has not been previously replaced or recoated, if any such locations remain." Reference: Letter 2130-06-20354 (A.1.26) & 2130-06-20316 AMR-349.
104	3-115	3.0.3.2.21	6th paragraph – Delete the 3rd sentence. This is a repeat of the 1st sentence and redundant.
105	3-115	3.0.3.2.21	6th paragraph, 10th line, "OCGS has focused inspections...." Should read, "OCGS has **performed** focused inspections...."
106	3-115	3.0.3.2.21	6th paragraph, last sentence – Change "...performed per the..." to "...performed **and are documented in** the..."
107	3-116	3.0.3.2.21	1st paragraph, 4th sentence – Delete this sentence. ISI testing is not performed on all of these systems. Additionally, IST testing is only performed on ESW, SW, RBCCW & Condensate Transfer not Fire Protection.
108	3-116	3.0.3.2.21	1st paragraph, 5th sentence – Delete "these tests" and insert "**testing**" Reference the Comment 107 above.
109	3-116	3.0.3.2.21	3rd paragraph, 2nd to last sentence – "Buried Piping Inspection Program" should be "**Open-Cycle Cooling Water** Program". Reference LRA Section B.1.26.
110	3-117	3.0.3.2.21	3rd paragraph, 2nd to last sentence – Delete A2116126. Reword sentence as follows: "**An** Action Request has been....." to reduce specificity.
111	3-119	3.0.3.2.22	1st full paragraph, 3rd sentence. Typo, change "licence" to "license"
112	3-120	3.0.3.2.22	1st paragraph, 7th sentence: Change "to additional" to "to **perform** additional"

Comment Number	Page Number	Section Number	Proposed Change
113	3-120	3.0.3.2.22	Change "...in part is believed to be..." to "...**is consistent with**..." to provide a more definitive statement. Also, 2nd paragraph, 3rd sentence. Change "when this lack was discovered" to "when this lack **of formal leakage monitoring** was discovered."
114	3-120	3.0.3.2.22	5th paragraph, last sentence. Change "conservatives" to conservative.
115	3-121	3.0.3.2.22	3rd paragraph, last sentence. Correct the name of the coatings program from "Protective Coatings and Monitoring Program" to "**Protective Coating Monitoring and Maintenance Program**"
116	3-123	3.0.3.2.22	5th paragraph. Delete last sentence "This commitment applies prior to the period of extended operation, and every 10 years during the period of extended operation." The wording is misleading and does not reflect the commitment wording in April 4, 2006 letter.
117	3-142	3.0.3.2.23	"IWE" should be "IWF". The third line "...bases for the current 10-year **IWF** inspection interval."
118	3-161	3.0.3.2.26	1st sentence of the only paragraph on UFSAR Supplement in the middle of the page: Delete "and letters dated December 9, 2005 and May 1, 2006,". Basis: The December 9, 2005 and May 1, 2006 letters do not support this program. Also, correct typo: change X.M1 to XI.M1.
119	3-167	3.0.3.2.28	Typo – change "X.M18with" to "XI.M18 with"
120	3-167	3.0.3.2.28	Typo – change "X.M18" and "XL.M18" to "XI.M18"
121	3-170	3.0.3.2.29	Change "...with exceptions and an enhancement." to "...with exceptions." This program is a new program and is not an enhanced program. There are no enhancements applicable to this program. See AmerGen letter 2130-05-20228 dated November 11, 2005.
122	3-171	3.0.3.2.29	Typo – change "X.M21" to "XI.M21"
123	3-171	3.0.3.2.29	Change "...with exceptions and an enhancement." to "...with exceptions." This program is a new program and is not an enhanced program. There are no enhancements applicable to this program. See AmerGen letter 2130-05-20228 dated November 11, 2005.
124	3-172	3.0.3.2.29	Delete the entire Enhancement discussion section. This program is a new program and is not an enhanced program. There are no enhancements applicable to this program. See AmerGen letter 2130-05-20228 dated November 11, 2005.
125	3-173	3.0.3.2.29	Delete the entire Enhancement discussion section. This program is a new program and is not an enhanced program. There are no enhancements applicable to this program. See AmerGen letter 2130-05-20228 dated November 11, 2005.

Comment Number	Page Number	Section Number	Proposed Change
126	3-174	3.0.3.2.29	Delete the discussion of enhancement review from the Conclusion section. This program is a new program and is not an enhanced program. There are no enhancements applicable to this program. See AmerGen letter 2130-05-20228 dated November 11, 2005.
127	3-175	3.0.3.2.30	Typo – change "X.M29" to "XI.M29"
128	3-177	3.0.3.2.31	Typo – change "X.M30" to "XI.M30"
129	3-180	3.0.3.2.31	Delete reference to RG 1.137. This Regulatory Guide is specifically applicable to safety-related Emergency Diesel Generators and is not applicable to the nonsafety-related combustion turbines.
130	3-183	3.0.3.2.32	Typo – change "X.M32with" to "XI.M32 with"
131	3-183	3.0.3.2.32	Typo – change "X.M32" to "XI.M32"
132	3-185	3.0.3.2.32	Change "...observed to be in excellent condition no corrosion." to "...observed to be in excellent condition **with** no corrosion." (2 places)
133	3-186	3.0.3.2.33	Typo – change "X.M33" to "XI.M33" (2 places)
134	3-188	3.0.3.2.34	Typo – change "X.M34" to "XI.M34" (2 places)
135	3-190	3.0.3.2.35	Typo – change "X.M38" to "XI.M38" (2 places)
136	3-197	3.0.3.2.37	Delete sentence. The Buried Piping and Tank Inspection - Met Tower Repeater Engine Fuel Supply Program is a new program that will be applicable to the Forked River combustion turbine site, and has not previously been implemented at OCGS. Sentence is not accurate because Met Tower AMP is new and has no relationship to the Oyster Creek buried piping AMP.
137	3-203	3.0.3.3.2	Second and Fourth Paragraphs contain redundant information. Remove second paragraph and leave the fourth paragraph in this section.
138	3-204	3.0.3.3.2	First paragraph contains "Appendix C" and "Appendix G" which are sections of EPRI 1003056. Add "EPRI 1003056" as a parenthetical after "Appendix C" and "Appendix G."
139	3-204	3.0.3.3.2	Fourth paragraph "(Commitment No. 59)" should be "(Commitment No. 38)".
140	3-208	3.0.3.3.2	Fifth paragraph, UFSAR Supplement section does not contain the most current information. It does not have the enhancement for sampling and measurement of flash point of diesel engine lubricating oil. Add the following just before the last sentence in this paragraph: "In addition, the program will be enhanced to include sampling and measurement for flashpoint of diesel engine lubricating oil to detect contamination of lubricating oil by fuel oil. " This is contained in Letter 2130-06-20354. Also, reword the last sentence of this paragraph to denote the plural: "These enhancements..." instead of "The enhancement..."
141	3-212	3.0.3.3.4	Revise the list of components subject to inspection by the Periodic Inspection of Ventilation Systems Program from "fans" to say "fan housing" as included in LRA Appendix B, section B.2.4. Refer to LRA Table 2.3.3.10, Control Room HVAC, a system which contains component types; fan housing, filter housing and heater housing.

Comment Number	Page Number	Section Number	Proposed Change
142	3-225	3.0.3.3.6	1st line of 1st paragraph after bullets under paragraph # (10): Add a comma between "is new" and "inspections of wooden". Basis: Typographical
143	3-226	3.0.3.3.8	Last sentence of 2nd last paragraph on page: This sentence should be its own paragraph. Basis: Change in subject.
144	3-227	3.0.3.3.8	1st line of 2nd paragraph: Delete redundant "the". Basis: Typographical
145	3-227	3.0.3.3.8	2nd line, Operating Experience paragraph: Insert ", the" between "program is new" and "FRCT has experienced".
146	3-228	3.0.3.3.8	UFSAR Supplement: Add the following two new sentences between the existing 1st and last sentences of this paragraph. "In its letters dated May 9, 2006 and June 2, 2006, the applicant committed (Commitment No. 43) to perform twice per year visual inspections of high voltage insulators. These letters also reflect that cable connections (metallic parts) located at the FRCT power plant are part of the population from which a sample will be selected for testing under the Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program." Basis: Provide references to subsequent revisions of Commitment No. 43.
147	3-228	3.0.3.3.8	1st line Conclusion paragraph: Add ", the staff" following "and RAI response". Basis: Typographical
148	3-234	3.0.4.1	Typo - Change "B.1.29" to "B.1.39"
149	3-239	Tbl 3.1-1, item 3.1.1-15	Revise AMP in LRA column discussion from "Not Applicable" to "Water Chemistry & One-Time Inspection Revise Staff Evaluation column from "Not applicable since no GALL line items related to this component group/aging effect combination were credited in the LRA" to "Consistent with GALL which recommends further evaluation" Basis: SER Section 3.1.2.2.2, pg(s) 3-258 & 3-259
150	3-239	Tbl 3.1-1, item 3.1.1-17	Revise referenced SER section from "4.3" to "4.2" Basis: SER 3.1.2.2.3, pg 3-260; SER 4.2, pg 4-3
151	3-253	3.1.2.2	Missing aging effect Add "cracking due to thermal and mechanical loading" Basis: LRA 3.1.1-21, pg 3.1-19; SER 3.1.2.2.12, pg 3.1-12

Comment Number	Page Number	Section Number	Proposed Change
152	3-257	3.1.2.2.2	Replace the 3rd sentence of the page from "The physical configuration of the isolation condensers and internal surfaces of the channel head require cutting and re-welding of pressure boundary piping." to "The physical configuration of the isolation condensers and **piping at Oyster Creek require cutting and re-welding of pressure boundary piping in order to perform eddy current inspections of the tubes and gain access to the tubesheet and internal surfaces of the channel head.**" Basis: RAI 3.1.1-1, AmerGen April 18, 2006 letter
153	3-258	3.1.2.2.2	Replace "reactor vessel internals (RVI)" with "reactor pressure vessel (RPV) components " in the 6th paragraph of the page. Item RP-25 includes reactor vessel flanges, nozzles, penetrations, safe ends, vessel shells, heads and welds. These items are included with the Reactor Pressure Vessel.
154	3-264	3.1.2.2.4	Replace "SCC" in the 5th paragraph with "IGSCC" Basis: RAI 3.1.1-2, AmerGen April 18, 2006 letter
155	3-270	3.1.2.2.7	Revise referenced LRA section "3.1.2.2.7.1" to "3.1.2.2.7" and "3.1.2.2.7.2" to "3.1.2.2.7". These are SRP section numbers, the LRA uses 3.1.2.2.7.
156	3-270	3.1.2.2.8	Revise twice referenced LRA section "3.1.2.2.8.1" to "3.1.2.2.8". These are SRP section numbers, the LRA uses 3.1.2.2.8.
157	3-273 3-274	3.1.2.2.12 3.1.2.2.18 3.1.2.2.19	SER section 3.1.2.2.12 evaluates LRA section 3.1.2.2.18 dealing with SCC and IASCC in PWR components. This section should be renumbered and relocated to SER section "3.1.2.2.18" consistent with the SRP section 3.1.2.2.18 dealing with SCC and IASCC in PWR components. Additionally the quoted LRA and SRP section(s) should be changed from "3.1.2.2.12" to "3.1.2.2.18". A detailed markup of this change is not provided since the entire section discussion is required to be relocated to the above indicated DSER section.
158	3-273	3.1.2.2.12	A new section 3.1.2.2.12 associated with "Cracking due to Thermal and Mechanical Loading" consistent with the SRP and LRA sections 3.1.2.2.12 should be added.
159	3-274	3.1.2.2.19	Current SER section "3.1.2.2.18" dealing with Quality Assurance should be renumbered as "3.1.2.2.19".
160	3-274	3.1.2.3.1	2nd paragraph, 1st sentence – Replace "this" with "**Loss of Preload**" for clarity. Reference LRA Table 3.1.2.1.1.
161	3-275	3.1.2.3.1	3rd paragraph, 1st sentence – Insert "**, if**" between "that these" and insert "**then**" between "leaking," and "the" Reference LRA A.1.12 & Letter 2130-06-20358.
162	3-275	3.1.2.3.1	3rd paragraph, 2nd sentence – Change "The process will allow…" to "The process **may** allow…" Reference LRA A.1.12 & Letter 2130-06-20358.
163	3-275	3.1.2.3.2	2nd paragraph, 1st sentence – Replace "this" with "**Loss of Preload**" for clarity. Reference LRA Table 3.1.2.1.2.
164	3-276	3.1.2.3.2	4th paragraph, 1st sentence – Insert "**, if**" between "that these" and insert "**then**" between "leaking," and "the" Reference LRA A.1.12 & Letter 2130-06-20358.

Comment Number	Page Number	Section Number	Proposed Change
165	3-276	3.1.2.3.2	4th paragraph, 2nd sentence – Change "The process will allow..." to "The process **may** allow..." Reference LRA A.1.12 & Letter 2130-06-20358.
166	3-277	3.1.2.3.5	Missing "Vessel Shell Flange" & "Recirculation Nozzles" from the list of RPV components identified in LRA Table 3.1.2.1.5 that identifies cracking in CS and credits ASME Section XI & Water Chemistry AMPs. Insert "**Vessel Shell Flange**" & "**Recirculation Nozzles**" to the list of RPV components identified in LRA Table 3.1.2.1.5 that identifies cracking in CS and credits ASME Section XI & Water Chemistry AMPs. Reference LRA Table 3.1.2.1.5.
167	3-278	3.1.2.3.5	Delete "flange" from "bottom head flange"
168	3-279	3.1.2.3.5	Insert "**nozzle safe ends (feedwater & main steam)**" to the list of CS RPV components in which loss of material is not applicable (V.C-1). Missing "Nozzle Safe Ends (Feedwater & Main Steam)" from the list of CS RPV components in which loss of material is not applicable (V.C-1). Reference LRA Table 3.1.2.1.5.
169	3-284	Table 3.2-1	Last row on this page (Item 3.2.1-19): Change "AMP in LRA" column entry FROM "Flow-Accelerated Corrosion (B.1.11)" TO "Not applicable", and change "Staff Evaluation" column entry FROM "Consistent with GALL. (See SER Section 3.2.2.1)" TO "Not applicable since Oyster Creek has no such ESF components within the scope of license renewal." REASON: Oyster Creek has no steel piping, piping components, or piping elements susceptible to flow-accelerated corrosion in the portions of the ESF Systems governed by Group B Quality Standards, as these portions of the ESF Systems are low-temperature systems. Reference LRA Table 3.2.1, Item Number 3.2.1-16. Also see "Roadmap" SRP Table 3.2-1, Item 19.
170	3-288	Table 3.2-1	Fifth row on this page (Item 3.2.1-42): Change "AMP in LRA" column entry FROM "Selective Leaching of Materials (B.1.25)" TO "Not applicable", and change "Staff Evaluation" column entry FROM "Consistent with GALL. (See SER Section 3.2.2.1)" TO "Not applicable since Oyster Creek has no such ESF components within the scope of license renewal." REASON: Oyster Creek has no gray cast iron piping, piping components, or piping elements exposed to closed-cycle cooling water in the ESF Systems. Reference Reconciliation document, Attachment 7, Item EP-52.
171	3-292	3.2.2.1.1	TYPO: SER states, "The identified above" instead of "As identified above". This occurs 16 times on 11 different pages in draft SER: 3-257, 3-263, 3-264, 3-292, 3-294, 3-300, 3-359, 3-360, 3-361 (4 times), 3-362 (3 times), 3-363
172	3-293	3.2.2.2	TYPO: In "Summary of Technical Information in the Application" section, second bullet says, "loss of material due to cladding" instead of "loss of material due to **general corrosion**".

Comment Number	Page Number	Section Number	Proposed Change
173	3-310	Table 3.3-1	Table 3.3-1 does not include Items 3.3.1-7 through 3.3.1-9. Although applicable to PWRs only, the table should identify these items since they are discussed in DSER Section 3.3.2.2.4.
174	3-310	Table 3.3-1	Item 3.3.1-11 in "AMP in LRA" column should also include Structures Monitoring B.1.31). As stated in DSER Section 3.3.2.2.5, the implementation of the Structures Monitoring Program for external inspection of expansion joints and flexible connection elastomers is discussed in LRA Section 3.3.2.2.5.1.
175	3-310	Table 3.3-1	The Staff evaluation discussion for 3.3.1-15 and 3.3.1-16 states that the items are not applicable since OC does not have a reactor coolant pump oil collection system. However, DSER Section 3.3.2.2.7 states that the items are not applicable since the OC containment is inerted. Revise items 3.3.1-15 and 3.3.1-16 to agree with the 3.3.2.2.7 discussion, which is consistent with the OC LRA.
176	3-311	Table 3.3-1	2nd and 3rd paragraphs of 3.3.2.2.7 on page 3-343 identify the applicability of ASME IWF for the verification of water chemistry effectiveness (in lieu of one-time inspection) for certain materials and component types, however, Table 3.3-1 item 3.3.1-17 does not identify this AMP as being applicable. The AMPS for item 3.3.1-17 should include ASME, IWF as verification of the Water Chemistry Program also.
177	3-311	Table 3.3-1	Item 3.3.1-19 in "AMP in LRA" column should also include the Aboveground Outdoor Tanks Program to agree with the discussion in DSER Section 3.3.2.2.8 and LRA Section 3.3.2.2.8.1.
178	3-311	Table 3.3-1	1st and 2nd paragraphs of 3.3.2.2.10 on page 3-348 identify the applicability of ASME IWF for the verification of water chemistry effectiveness (in lieu of one-time inspection) for certain materials and component types, however, Table 3.3-1 item 3.3.1-22 does not identify this AMP as being applicable. The AMPS for item 3.3.1-22 should include ASME, IWF as verification of the Water Chemistry Program also.
179	3-312	Table 3.3-1	1st and 2nd paragraphs of 3.3.2.2.10 on page 3-349 identify the applicability of ASME IWF for the verification of water chemistry effectiveness (in lieu of one-time inspection) for certain materials and component types, however, Table 3.3-1 item 3.3.1-23 does not identify this AMP as being applicable. The AMPS for item 3.3.1-23 should include ASME, IWF as verification of the Water Chemistry Program also.
180	3-312	Table 3.3-1	3rd and 4th paragraphs of 3.3.2.2.10 on page 3-349 identify the applicability of ASME IWF for the verification of water chemistry effectiveness (in lieu of one-time inspection) for certain materials and component types, however, Table 3.3-1 item 3.3.1-24 does not identify this AMP as being applicable. The AMPS for item 3.3.1-24 should include ASME, IWF as verification of the Water Chemistry Program also.

Comment Number	Page Number	Section Number	Proposed Change
181	3-314	Table 3.3-1	Table 3.3-1 item 3.3.1-37 in the "AMP in LRA" block identifies only the BWR RWCU System as the applicable AMP. The BWR RWCU System AMP is only applicable to piping 4" NPS and larger. The Water Chemistry and One-Time Inspection programs are invoked for the identified material/environment/aging effect for piping less than 4" NPS in the Reactor Water Cleanup System and Noble Metals Monitoring System. REFERENCE: LRA Table 3.3.1 Item 3.3.1-31.
182	3-316	Table 3.3-1	Table 3.3-1 item 3.3.1-48 should also include One-Time Inspection program (B.1.24) in the "AMP in LRA" block. Also address this AMP in Staff Evaluation block (similar to 3.3.1-47). REFERENCE: LRA Table 3.3.1 Item 3.3.1-42.
183	3-317	Table 3.3-1	Table 3.3-1 item 3.3.1-50 should also include One-Time Inspection program (B.1.24) in the "AMP in LRA" block. Also address this AMP in Staff Evaluation block (similar to 3.3.1-47). REFERENCE: LRA Table 3.3.1 Item 3.3.1-39.
184	3-317	Table 3.3-1	Table 3.3-1 item 3.3.1-51 should also include One-Time Inspection program (B.1.24) in the "AMP in LRA" block. Also address this AMP in Staff Evaluation block (similar to 3.3.1-47). REFERENCE: LRA Table 3.3.1 Item 3.3.1-38.
185	3-319	Table 3.3-1	Item 3.3.1-59 – In "AMP in LRA" column, REPLACE "Not Applicable" with "Structures Monitoring (B.1.31). In "Staff Evaluation" column, REPLACE "Not applicable since..." statement with "Acceptable since the OCGS structures monitoring program is consistent with GALL external surfaces monitoring program for this component group/aging effect combination. (See SER Section 3.3.2.1.3)" REASON – OC LRA does use this component group and aging effect/mechanism, and manages the aging with the structures monitoring program. REFERENCE: Attachment 2.2 of the Reconciliation document.
186	3-320	Table 3.3-1	Item 3.3.1-62 – In "Staff Evaluation" column, REPLACE "No applicable aging effects" with "Acceptable since the OCGS fire water system program is consistent with GALL fire protection program for this component group/aging effect combination." REASON – OC LRA credits the fire water system program, with a "G" standard note, for managing loss of material in an aluminum piping component in the Fire Protection system. REFERENCE: Item AP-83 in Attachment 7 of the Reconciliation document and Reconciliation Roadmap revision 1 (ML060320211) Table 3.3-1 SRP Table ID 62

Comment Number	Page Number	Section Number	Proposed Change
187	3-321	Table 3.3-1	Item 3.3.1-71 – In "AMP in LRA" column, REPLACE "Not Applicable" with "Periodic Inspection (B.2.5)". In "Staff Evaluation" column, REPLACE "Not applicable since..." statement with "Acceptable since the OCGS periodic inspection program is consistent with GALL inspection of internal surfaces in miscellaneous piping and ducting components program for this component group/aging effect combination. (See SER Section 3.3.2.3)" REASON – OC LRA credits the periodic inspection program, with an "E" standard note, for managing the aging effect of loss of material for a condensation (internal) environment for steel piping and valve bodies in the Emergency Diesel Generator and Auxiliary system. REFERENCE: Attachment 4 of the Reconciliation document Item 9 and Reconciliation Roadmap revision 1 (ML060320211) Table 3.3-1 SRP Table ID 71
188	3-322	Table 3.3-1	Item 3.3.1-76 -- In "AMP in LRA" column, REPLACE "Not Applicable" with "Periodic Inspection (B.2.5), Open-Cycle Cooling Water system (B.1.13), and One-Time Inspection (B.1.24)". In "Staff Evaluation" column, REPLACE "Not applicable since..." statement with "Acceptable since the OCGS periodic inspection, open-cycle cooling water system, and one-time inspection programs are consistent with GALL open-cycle cooling water system program for this component group/aging effect combination. (See SER Sections 3.3.2.1 and 3.3.2.3)" REASON – OC LRA credits these programs for managing the aging effect of loss of material for a raw water environment for steel piping components and valve bodies in Auxiliary Systems. REFERENCE: Attachment 4 of the Reconciliation document Item 11 and Reconciliation Roadmap revision 1 (ML060320211) Table 3.3-1 SRP Table ID 76
189	3-340	3.3.2.2.5	In the 3rd to the last paragraph, revise the sentence, "The Periodic Inspection Program to periodically used to monitor component aging effects ..." to "The Periodic Inspection Program **is** used to monitor component aging effects ..."

Comment Number	Page Number	Section Number	Proposed Change
190	3-350	3.3.2.2.10	The 3rd and 4th paragraphs of 3.3.2.2.10 on page 3-350 discuss the implementation of the water chemistry and one-time inspection programs for managing aging effects for condensation in HVAC systems. These programs do not do that. The correct program is the Periodic Inspection of Ventilation Systems program (B.2.4). Replace these paragraphs with the following: "LRA Section 3.3.2.2.10.2 states that a Periodic Inspection of Ventilation Systems program will be implemented to manage the loss of material in copper heat exchanger coils exposed to an indoor air/condensation external environment in the Control Room HVAC System. The program will inspect the external surfaces of ventilation system components to identify and assess aging effects that may be occurring. The program will include surface inspections of copper alloy components for indications of loss of material. Observed conditions that have the potential for impacting an intended function are evaluated or corrected in accordance with the corrective action process. The staff reviewed..."
191	3-354	3.3.2.2.12	The 5th paragraph of 3.3.2.2.12 on page 3-354 provides the NRC conclusion of its review for fuel oil and aluminum and copper alloy material/environment combinations. However, the paragraph concludes that "these AMPs will manage loss of material due to pitting and crevice corrosion and MIC for steel piping ..." Change "steel" to "**aluminum and copper alloy**"
192	3-396	3.4.2.3	Add "main steam system" to the following sentence: ...inspection of the carbon steel **main steam system** piping external surface... Also, correct typo change "onetime" to "**one-time**"
193	3-397	3.4.2.3	RAI 3.5-8 should be RAI 3.4-8.
194	3-401	Table 3.5.2	Item 3.5.1-6. Change "AMP in LRA" column to "Not Applicable". The component group was not used in OC LRA because it is for a concrete containment and not steel containment.. Change Staff Evaluation column to "Not Applicable; Steel containment (see SER Section 3.5.2.2.1)
195	3-406	Table 3.5.2	Item 3.5.1-31. Revise text in "AMP in LRA" to read :Structures Monitoring Program (B.1.31); Examination of representative samples of below-grade concrete **when excavated for any reason or if observed conditions in accessible areas exposed to the same environment show significant concrete degradation has occurred**, and periodic monitoring of groundwater (non-aggressive environment). This change is consistent with OC commitments and SER 3.5.2.2.2.
196	3-406	Table 3.5.2	Item 3.5.1-33. Change text in "AMP in LRA" column from "...2-year inspection frequency" to "...frequency of every refueling outage" to be consistent with current Oyster Creek commitments.

Comment Number	Page Number	Section Number	Proposed Change
197	3-409	Table 3.5.2	Item 3.5.1-42. Change text in "AMP in LRA" column from "Not applicable; no CLB fatigue analysis " to "TLAA for Group B1.3 supports; CLB fatigue analysis exists. Not applicable to B1.1 and B1.2; no CLB fatigue analysis". Modify text in Staff Evaluation Column accordingly. This is consistent with SER section 3.5.2.2.2, page 3-436, last paragraph.
198	3-411	Table 3.5.2	Item 3.5.1-51. Change text in "AMP in LRA" column to " Not applicable". Change text in "Staff Evaluation" column to "Not applicable; Lubrite graphitic tool steel is not used for Group B2 and B4 supports sliding surfaces". (Clarification, to be consistent with draft SER sections)
199	3-428	3.5.2.2.2	Change first paragraph, last sentence to read: "The applicant will perform a baseline inspection prior to the period of extended operation and evaluate the results of the inspections to determine if there is a need to inspect the structures more frequently than every 4 years." (Clarification consistent with Commitment 31, Item 17)
200	3-428	3.5.2.2.2	Change 2nd paragraph 2nd sentence from "The need for periodic inspection ...extended operation" to "The need for periodic inspection of inaccessible areas of the fresh water pump-house will be determined prior to the period of extended operation based on inspection results of the accessible areas with the same environment." The service water seal well was deleted from the sentence because the service water seal well concrete subject to aggressive environment is accessible and will be inspected prior to the period of extended operation. (Clarification consistent with LRA page 3.5-27, Section 3.5.2.2.2.2.)
201	3-431	3.5.2.2.2	4th paragraph, first sentence. Delete "the biological shield wall" from the list. The biological shield wall concrete is encased in steel plate and is inaccessible for inspection. Refer to LRA page 3.5-70, note 1. Also change "the 2-year inspection frequency" to "**an inspection frequency of every refueling outage**" to be consistent with current Oyster Creek commitments.
202	3-435	3.5.2.2.2	Change "component support" to "component support**s**" in the last paragraph.
203	3-437	3.5.2.2.3	Change "staff fins" to "staff finds" in the conclusion paragraph, 3rd sentence.
204	3-448 3-449	3.5.2.3.7	Delete discussion on "aluminum material embedded in concrete " from this section and move it to section 3.5.2.3.17. Table 3.5.2.3.7 does not contain aluminum material embedded in concrete. This appears to be carrying over typo from RAI-3.5-10. A detailed markup of this change is not provided since the entire section discussion is required to be relocated to the above indicated DSER section. Reword sections 3.5.2.3.7 and 3.5.2.3.17 to reflect the relocated text.
205	3-454	3.6	2nd line of 1st paragraph following 3.6 header: Change "and component groups" to "and **commodity** groups". Basis: Correction of terminology

Comment Number	Page Number	Section Number	Proposed Change
206	3-455	3.6.1	Last line of 1st paragraph following 3.6.1 header: Change "and component groups" to "and **commodity** groups". Basis: Correction of terminology
207	3-456	Table 3.6-1, 1st line item, item # 3.6.1-1	Last column: Add "3.6.2.2" to parenthetical SER reference at end of text. Basis: Completeness of reference.
208	3-473	3.6.2.3.1	Section on Fuse Holders, 1st line of 3rd one-tab indented paragraph: Insert "powered by" between "that these circuits are" and "the reactor protection...". Basis: Typographical
209	3-475	3.6.2.3.1	Section on Uninsulated Ground Conductors, 4th line, last paragraph on page: Should read: "environment or operating conditions. Extremely gradual environmental ..." Basis: Typographical
210	3-477	3.7.1.3	Delete first two bullets and add a new bullet "Table 3.6.2.1.3, "Radio Communications System". See AmerGen letter 2130-05-20239 dated December 9, 2005.
211	3-480	Table 3.7-1	This item is now consistent with GALL. See AmerGen letter 2130-06-20327 dated May 9, 2006.
212	3-480	Table 3.7-1	This item is now consistent with GALL. See AmerGen letter 2130-06-20327 dated May 9, 2006.
213	3-480	Table 3.7-1	Change SER reference Section from 3.7.2.3 to 3.6.2.3.1.
214	3-481	Table 3.7-1	Change SER reference Section from 3.7.2.2.4 to 3.7.2.2.3.
215	3-481	Table 3.7-1	Change SER reference Section from 3.7.2.2.5 to 3.7.2.2.4.
216	3-481	Table 3.7-1	Change SER reference Section from 3.7.2.2.6 to 3.7.2.2.5.
217	3-482	Table 3.7-1	Change SER reference Section from 3.7.2.2.7 to 3.7.2.2.6.
218	3-482	Table 3.7-1	Change SER reference Section from 3.7.2.2.8 to 3.7.2.2.7. (2 places)
219	3-482	Table 3.7-1	Change SER reference Section from 3.7.2.2.9 to 3.7.2.2.8.
220	3-482	Table 3.7-1	Change SER reference Section from 3.7.2.2.10 to 3.7.2.2.9. (2 places)
221	3-483	Table 3.7-1	Change SER reference Section from 3.7.2.2.11 to 3.7.2.2.10.
222	3-483	Table 3.7-1	Change SER reference Section from 3.7.2.2.12 to 3.7.2.2.11. (2 places)

Comment Number	Page Number	Section Number	Proposed Change
223	3-488	Table 3.7-1	Change SER reference Section from 3.7.2.2.9 to 3.7.2.2.8.
224	3-494	3.7.2.2.2	SER Sections 3.6.2.3.1.1, 3.6.2.3.1.3, 3.6.2.3.1.3, and 3.6.2.3.1.4 could not be found. The appropriate SER sections are 3.6.2.3.1, 3.6.2.2.2, 3.6.2.2.3 and 3.6.2.3.1, respectively.
225	3-500	3.7.2.2.8	The appropriate commitment number for Buried Piping Inspection – FRCT Program is Commitment 57.
226	4-1	4.1.1	Para 4.1.1 states in part: In LRA Table 4.1-1, "Time-Limited Aging Analyses Applicable to Oyster Creek," the applicant listed the applicable TLAAs: The subsequent list includes "loss of prestress in concrete tendon." LRA Section 4.1 lists this as a TLAA in a "common general category," and it is addressed in LRA Section 4.5, but this TLAA is not listed in LRA Table 4.1-1 as stated in the SER because Oyster Creek does not have pre-stressed tendons. Delete "loss of prestress in concrete tendon" from the SER 4.1.1 bulleted list.
227	4-21	4.3.1.2	The section evaluates fatigue against the original OCGS acceptance limit of 0.8 without further clarifying that this is the original design limit, since revised upwards to 1.0. The evaluation against the 0.8 original limit remains valid, as the 0.8 original limit is more conservative than the new 1.0 limit. For consistency and clarity, however, reference to the 0.8 limit should be phrased to specify it as the **original** OCGS acceptance.
228	4-24	4.3.3.1.1	Typo: Section refers to American Standards Association (ASA) B31.1 of 1995. Should be 1955. Likewise, throughout this paragraph, ASA B31.1 references should be presented as ASA B31.1 (1955) for clarity (two other occurrences.)
229	4-24	4.3.3.1.1	Typo: need a blank line following for paragraph separation.
230	4-28	4.3.4.1	Typo: feedwater nozzle should be a separate bullet, and there should be commas around "or the shutdown cooling return line tee at OCGS"
231	4-54	4.7.2.2	3rd paragraph: Replace "Table 2" with "UT data". The cited table reference is in a quoted applicant document and not in the SER.
232	4-69	4.7.2.2	4th paragraph: Commitment No. 33 should be Commitment No. 27
233	4-78	4.7.3.2	Two typos, last indented paragraph, beginning: Fourth, the water used to fill... pH<1 1.5 and pH< 1 1.6 should be pH< 11.5 and pH<11.6 respectively.

Comment Number	Page Number	Section Number	Proposed Change
234	A-1	App. A	4th line, end of sentence: Delete "...**prior to the period of extended operation**." The schedule associated with establishing aging management programs is addressed in the final sentence of this program. Since some of the commitments are not due to be completed prior to the period of extended operation, this phrase can be misleading.
235	A-3	App. A	Commitment # 5, "Source" column – Delete "**Letter 2130-06-20291 RAI 3.1.1-4**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
236	A-4	App. A	Commitment # 7, "Source" column – Delete "**NRC Audit AMP-197**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
237	A-4	App. A	Commitment # 9, "Source" column – Delete "**Letter 2130-06-20291 RAI B.1.9-3**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
238	A-5	App. A	Commitment # 9, "Source" column – Delete "**Letter 2130-06-20291 RAI 3.1.2.1-2, Letter 2130-06-20291 RAI B.1.9-2 and Letter 2130-06-20291 RAI B.1.9-8.**" No additional source documents are needed – the source of these commitments (within commitment # 9) has been provided in comment 237.
239	A-6	App. A	Commitment # 9, "Source" column – Delete "**NRC Audit AMP-055**" and "**Letter 2130-06-20291 RAI B.1.9-1**" No additional source documents are needed – the source of these commitments (within commitment # 9) has been provided in comment 237.
240	A-6	App. A	Commitment # 10, "Source" column – Add letter reference below "Section B.1.10" – Add "**Letter 2130-06-20358**" This letter provided the latest version of Commitment #10.
241	A-7	App. A	Commitment # 11, "Item Number" column – Change "Flow Accelerated" to "Flow Accelerated **Corrosion**"
242	A-7	App. A	Commitment # 12, "Source" column – Change "**NRC Audit AMP-361**" to "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
243	A-9	App. A	Commitment # 19 – "Source" column – Delete "**NRC Audit AMP-105 LRCR-219**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
244	A-10	App. A	Commitment # 21 – "Source" column – Delete "**LRCR-231**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
245	A-11	App. A	Commitment # 22 – "Source" column – Delete "**NRC Audit AMP-192 LRCR-256**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.

Comment Number	Page Number	Section Number	Proposed Change
246	A-12	App. A	Commitment # 23, "Commitment" column – Delete the following text that was eliminated from commitment 23, as reflected in AmerGen letter 2130-06-20358 (starts at the end of line 5): **"if approved by the NRC. If BWRVIP-116 is not approved, Exelon will provide a plant-specific surveillance plan for the license renewal period in accordance with 10 CFR 50, Appendices G and H prior to entering the period of extended operation.** **BWRVIP ISP as specified in BWRVIP-116, "BWR Vessel Internals Project Integrated Surveillance Program Implementation for License Renewal" and approved by the *staff will be implemented. If the ISP is not approved* two years prior to the commencement of the extended period of operation, a plant-specific surveillance program for Oyster Creek will be submitted."**
247	A-12	App. A	Commitment # 23, "Source" column – Add "**Letter 2130-06-20358**" to acknowledge that this letter changed commitment # 23.
248	A-12	App. A	Commitment # 23, "Source" column – Delete "**Letter 2130-06-20291 RAI B.1.23-1**" because this was superseded by Letter 2130-06-20358, which was added as a source per comment 247.
249	A-12	App. A	Commitment # 23, "Source" column – Delete "**Letter 2130-06-20291 RAI B.1.23-2**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
250	A-13	App. A	Commitment # 24, item (1), "Source" column – Delete "**NRC Audit AMP-265 2130-06-20328 LRCR-276**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
251	A-13	App. A	Commitment # 24, item (2), "Source" column – Delete "**NRC Region I Inspection Item 94 RAI 3.1.1-1 LRCR-294.**" The source reference inserted via comment 250 on page A-13 changes the source of commitment to AmerGen's update to LRA Appendix A.
252	A-14	App. A	Commitment # 24, item (8), "Source" column – Delete "**NRC Audit AMP-265 LRCR-259.**" The source reference inserted via comment 250 on page A-13 changes the source of commitment to AmerGen's update to LRA Appendix A.
253	A-15	App. A	Commitment # 26, item (1), "Source" column – Delete "**NRC Audit AMR-349 (LRCR-275)**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
254	A-16	App. A	Commitment # 27, "Source" column – Delete "**NRC Audit AMP-141, AMP-209, AMP-118. AMP-072, Letter 2130-06-20284, Letter 2130-06-20328, Letter 2130-06-20353, NRC Region I Inspection Item 95**; insert "**Letter 2130-06-20354 and Letter 2130-06-20358**." This changes the source of commitment to AmerGen's update to LRA Appendix A and the July 7, 2006 follow-up letter.

Comment Number	Page Number	Section Number	Proposed Change
255	A-17	App. A	Commitment # 27, item (2), "Commitment" column – Delete the first four words of the item "**Consistent with current practice**" (and start that sentence with "**A strippable coating will be applied**...") These words were deleted from this commitment description in Letter 2130-06-20358.
256	A-18 A-19	App. A	Commitment # 27, item (3), "Commitment" column – indent the four last bulleted items and the statement that appears immediately prior to item (4).
257	A-21	App. A	Commitment # 27, item (10), "Commitment" column – Change the last phrase from "... "UT inspections in the transition area will be upper drywell (every other refueling outage)" to "UT inspections in the transition area will be **performed on the same frequency as those in the** upper drywell (every other refueling outage)." It appears that several words were inadvertently dropped from the AmerGen commitment as indicated in AmerGen letter 2130-06-20354.
258	A-23	App. A	Commitment # 31, "Source" column – Delete "**RAI 2.5.1.19-1, NRC Audit AMR-302 and Letter 2130-06-20299 RAIs 3.4-4, 3.4-5, 3.4-7, &3.4-8**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
259	A-25	App. A	Commitment # 31, "Source" column – Delete all source documents listed on this page. They have been superseded by the source added in comment 258 above.
260	A-26	App. A	Commitment # 31, "Source" column – Delete all source documents listed next to commitment #31 items (15), (16) and (17) on this page. They have been superseded by the source added in comment 258 above.
261	A-27	App. A	Commitment # 32, "Source" column – Delete "**NRC Audit AMR-236 and AMP-075, AMP-077**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
262	A-28	App. A	Commitment # 33, "Source" column – Delete "**NRC Audit AMP-071 AMP-072** and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
263	A-30	App. A	Commitment #36, "Source" column – delete "**NRC Audit AMP-338 AMP-224 AMR-325 AMR-341 RAI 2.5.1-19 GALL Reconciliation Letter 2.130-06-20293 Region I Inspection Item 81**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
264	A-31	App. A	Commitment #38, "Source" column – delete "**NRC Audit AMP-360 Letter 2130-06-20293** and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
265	A-33	App. A	Commitment #43, "Source" column – delete "**RAI 2.5.1.19-1 Letter 2130-06-20345 RAI 3.6.2 Supplement**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.

Comment Number	Page Number	Section Number	Proposed Change
266	A-34	App. A	Commitment #43, "Source" column – delete "**Letter 2130-06-20327 RAI 3.6.2.2.5.**" This source reference is not needed due to the source reference added in comment 265 above.
267	A-34	App. A	Commitment #44, "Source" column – Insert "**Letter 2130-06-20354**" below "**Section B.3.1**." This changes the source of commitment to AmerGen's update to LRA Appendix A. This will replace the commitment # 44 source references to be removed from page A-35 (comment 268).
268	A-35	App. A	Commitment #44, "Source" column - Delete "**Letter 2130-06-20238**" and "**Letter 2130-06-20328**." These source references were superseded by comment 267 above.
269	A-36	App. A	Commitment #51, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
270	A-37	App. A	Commitment #52, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
271	A-37	App. A	Commitment #53, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
272	A-38	App. A	Commitments # 54, "Commitment" column – on the fourth line, change "Licens**ing** Renewal" to "License Renewal."
273	A-39	App. A	Commitment #54, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
274	A-40	App. A	Commitment #55, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
275	A-40	App. A	Commitment # 56, "Enhancement or Implementation Schedule" column – Delete "**Prior to the Period of Extended Operation**" and insert "**This new program will be implemented in the time period after January 2018 and prior to January 2028.**" AmerGen letters 2130-05-20228 and 2130-06-20354 provided this commitment.
276	A-40	App. A	Commitment #56, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
277	A-41	App. A	Commitment #57, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
278	A-42	App. A	Commitment #58, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
279	A-43	App. A	Commitment #59, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
280	A-43	App. A	Commitment #59, "Source" column - Delete "**NRC Audit AMP-359**" and insert "**Letter 2130-06-20354**." This changes the source of commitment to AmerGen's update to LRA Appendix A.
281	A-44	App. A	Commitment #60, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
282	A-45	App. A	Commitment #61, "Source" column - Delete "**RAI 2.5.1.19-1**" because it is too much detail for the UFSAR.
283	A-46	App. A	Commitment # 63, "Source" column – change "Letter 2130-06-20**2**38" to "Letter 2130-06-20**3**28" (typo)

Comment Number	Page Number	Section Number	Proposed Change
284	A-46	App. A	Commitment # 64, "Source" column – delete "**Letter 2130-06-2-237 RAI 3.6.2.3.3 Letter 2130-06-20345 Region I Inspection Item 39**" and insert "**Letter 2130-06-20354.**" This changes the source of commitment to AmerGen's update to LRA Appendix A.
285	A-47	App. A	Commitment #65, "Source" column - Delete "**Supplement**" to make it consistent with other letter references.
286	B-1	App B	Typo: change "Scetion" to "Section"
287	B-2	App B	Typo: change "appliactions" to "Application"
288	B-3	App B	The referenced ML number is for a different letter dated September 20, 2005 from National Oceanic and Atmospheric Administration, NOAA's Biological Opinion on Impacts of OCGS on Endangered and Threatened Species (ML052770239)
289	B-4	App B	Typo: delete "the"
290	B-9	App B	Delete reference not relevant to OC license renewal.
291	B-10	App B	Delete reference not relevant to OC license renewal.
292	B-12	App B	Delete references not relevant to OC license renewal.
293	B-15	App B	Typo: change "Hufnagle" to "Hufnagel"
294	B-15	App B	Delete reference not relevant to OC license renewal.
295	B-16	App B	Typo: change "Planet" to "Plant"
296	B-19	App B	Delete references not relevant to OC license renewal.
297	B-20	App B	Typo: change "nuclear" to "Nuclear"
298	B-20	App B	Delete reference not relevant to OC license renewal.
299	B-21	App B	Delete references not relevant to OC license renewal.

Enclosure 2

AmerGen Mark-Up of Draft SER Pages Showing Proposed Changes to the NRC Draft License Renewal Safety Evaluation

Oyster Creek Generating Station

Note: The Draft SER markup is 213 pages, including this page. The markup includes only the commented pages identified in Enclosure 1. Individual pages retain the Draft SER page numbering.

ABSTRACT

This safety evaluation report (SER) documents the technical review of the Oyster Creek Generating Station (OCGS) license renewal application (LRA) by the staff of the United States (US) Nuclear Regulatory Commission (NRC) (the staff). By letter dated July 22, 2005, AmerGen Energy Company, LLC submitted the LRA for OCGS in accordance with Title 10, Part 54, of the *Code of Federal Regulations* (10 CFR Part 54). AmerGen Energy Company, LLC requests renewal of the operating license for OCGS (Facility Operating License Number DPR-16), for a period of 20 years beyond the current expiration date of midnight April 9, 2009.

OCGS is located in Lacey Township, Ocean County, New Jersey, approximately two miles south of the community of Forked River, two miles inland from the shore of Barnegat Bay, and nine miles south of Toms River, New Jersey. The NRC issued the OCGS construction permit on December 15, 1964, and the OCGS operating license on July 2, 1991. OCGS is a single unit facility with a single-cycle, forced-circulation boiling water reactor (BWR)-2 and a Mark 1 containment. The nuclear steam supply system was furnished by General Electric and the balance of the plant was originally designed and constructed by Burns & Roe. OCGS licensed power output is 1930 megawatt thermal with a gross electrical output of approximately 619 megawatt electric.

1) the OCGS provisional operating license on April 9, 1969

This SER presents the status of the staff's review of information submitted through July 10, 2006, the cutoff date for consideration in the SER. The staff identified open items that must be resolved before a final determination on the application. SER Section 1.5 summarizes these items. The staff will present its final conclusion on the review of the OCGS LRA in its update to this SER.

DC	direct current
DFED	drywell floor and equipment drains
DG	diesel generator
DWST	demineralized water storage tank
ECCS	emergency core cooling systems
ECP	electrochemical corrosion potential or electrochemical potential
ECT	eddy current testing
EDG	emergency diesel generator
EDGCW	emergency diesel generator cooling water
EFPY	effective full-power ~~year~~ 2) years
EMA	equivalent margin analysis
EMRV	electromatic relief valve
EPRI	Electric Power Research Institute
EPU	extended power uprate
EQ	environmental qualification
ESF	engineered safety feature
ESW	emergency service water
F	Fahrenheit
FAC	flow-accelerated corrosion 3) fatigue
F_{en}	environmental factor
FFW	final feedwater facility
FHAR	Fire Hazards Analysis Report
FP	fire protection
FRCT	Forked River Combustion Turbines
FS	feedwater system
FSSD	fire safe shutdown
FWH	feedwater heater
GALL	Generic Aging Lessons Learned
GDC	general design criteria or general design criterion
GE	General Electric
GEIS	Generic Environmental Impact Statement
GL	generic letter
GPUN	General Public Utilities Nuclear Corporation
GSI	generic safety issue
HELB	high-energy line break
HEPA	high efficiency particulate air
HP	high pressure
HPCI	high pressure coolant injection (system)
HVAC	heating, ventilation, and air conditioning
HVS	hardened vent system
HWC	hydrogen water chemistry
HX	heat exchanger
I&C	instrumentation and controls
IASCC	irradiation assisted stress corrosion cracking

ICS	isolation condenser system
ID	inside diameter or identification
IGSCC	intergranular stress corrosion cracking
ILRT	integrated leak rate test
IN	information notice
INPO	Institute of Nuclear Power Operations
IPA	integrated plant assessment
IPE	individual plant examination
IRM	intermediate range monitoring
ISG	interim staff guidance
ISI	inservice inspection
ISP	integrated surveillance program
ITS	important to safety
KIP	1000 lb; or 1 kilo-~~pount~~ 4) pound
ksi	one KIP per square inch, 1000 psi
kV	kilovolt
LBB	leak-before-~~breat~~ 5) break
LER	licensee event report
LLRT	local leak rate test
LOCA	loss of coolant accident
LOOP	loss of offsite power
LPCI	low pressure coolant injection (system)
LPRM	local power range monitor
LR	license renewal
LRA	license renewal application
MCC	motor control center 6) Meteorological
MEL	master equipment list
Met Tower	~~Meterôlical~~ Tower
MFED	miscellaneous floor and equipment drain
MFL	magnetic flux leakage
MG	motor generator
MGAS	main generator and auxiliary system
MIC	microbiologically influenced corrosion
MSIV	main steam isolation valve
MSS	main steam system
MTAS	main turbine and auxiliary systems
MUD	makeup demineralizer
NDE	nondestructive examination
NEI	Nuclear Energy Institute
NESC	Nuclear Electrical Safety Code
NFPA	National Fire Protection Association
NITS	not important to safety
NMMS	noble metals monitoring system
NPS	nominal pipe size
NRC	U.S. Nuclear Regulatory Commission

NSR	nonsafety-related
NUREG	U.S. Nuclear Regulatory Commission Regulatory Guide
OCCW	open-cycle cooling water
OCGS	Oyster Creek Generating Station
ODSCC	outside-diameter stress-corrosion cracking
OI	open item
P&ID	piping and instrumentation diagram
PASS	post accident sampling system
PBD	program basis document
PCIS	primary containment isolation system
PDI	performance demonstration initiative
PM	preventive maintenance
PORC	~~Power~~ Operations Review Committee
PP	position paper
PT	penetrant testing
P-T	pressure-temperature limit curves
PTFE	polytetrafluoroethylene
PTS	pressurized thermal shock
PUAR	plant-unique analyses report
PWR	pressurized water reactor
PWSCC	primary water stress-corrosion cracking
RAI	request for additional information
RBCCW	reactor building closed cooling water
RBVS	reactor building ventilation system
RCIC	reactor core isolation cooling (system)
RCPB	reactor coolant pressure boundary
RCS	reactor coolant system
RDODS	roof drains and overboard discharge system
RFED	reactor building floor and equipment drains
RFP	reactor feed pump
RG	regulatory guide
RHCS	reactor head cooling system
RHR	residual heat removal (system)
ROPS	reactor overfill protection system
RPS	reactor protection system
RPT	recirculation pump trip
RPV	reactor pressure vessel
RT_{NDT}	reference temperature nil ductility transition
RVI	reactor vessel internals
RWCU	reactor water cleanup system
RWSS	reactor water sample system
SBLC	standby liquid control
SBO	station blackout
SC	structure and component
SCC	stress-corrosion cracking

7) Plant

environmental report must also include analyses of environmental impacts that must be evaluated on a plant-specific basis (i.e., Category 2 issues).

In accordance with the National Environmental Policy Act of 1969 and the requirements of 10 CFR Part 51, the staff reviewed the plant-specific environmental impacts of license renewal, including whether the GEIS had not considered new and significant information. As part of its scoping process, the staff held a public meeting November 1, 2005, in Toms River, New Jersey, to identify environmental issues specific to the plant. The draft, plant-specific Supplement 28 to the GEIS, dated June 2006, documents the results of the environmental review and includes a preliminary recommendation on the license renewal action. The staff held another public meeting on July 12, 2006, in Toms River, New Jersey, to discuss draft GEIS Supplement 28. After considering comments on the draft, the staff will separately published the final, plant-specific GEIS Supplement 28.

8) delete text

1.3 Principal Review Matters

Part 54 of 10 CFR describes the requirements for renewing operating licenses for nuclear power plants. The staff performed its technical review of the LRA in accordance with NRC guidance and the requirements of 10 CFR Part 54. Section 54.29 of 10 CFR sets forth the standards for renewing a license. This SER describes the results of the staff's safety review.

Section 54.19(a) of 10 CFR requires license renewal applicants to submit general information. The applicant provided this general information in LRA Section 1. The staff reviewed LRA Section 1 and found that the applicant had submitted the information required by 10 CFR 54.19(a).

9) LRA to

Section 54.19(b) of 10 CFR requires each ~~to LRA~~ include "conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license." In the LRA, the applicant stated the following regarding this issue:

> The current indemnity agreement (No. B-37) for Oyster Creek states in Article VII that the agreement shall terminate at the time of expiration of the licenses specified in Item 3 of the Attachment to the agreement. Item 3 of the Attachment to the indemnity agreement lists license number, DPR-16. Applicant requests that any necessary conforming changes be made to Article VII and Item 3 of the Attachment, and any other sections of the indemnity agreement as appropriate to ensure that the indemnity agreement continues to apply during both the terms of the current license and the terms of the renewed license. Applicant understands that no changes may be necessary for this purpose if the current license number is retained.

The staff intends to maintain the original license number upon issuance of the renewed license, if approved. Therefore, conforming changes to the indemnity agreement need not be made and the requirements of 10 CFR 54.19(b) have been met.

Section 54.21 of 10 CFR requires each LRA to contain (a) an integrated plant assessment, (b) a description of any CLB changes that occurred during the staff's review of the LRA, (c) an evaluation of TLAAs, and (d) a UFSAR supplement. LRA Sections 3, 4, and Appendix B

10) delete text

11) as supplemented by AmerGen letters 2130-06-20354 and 2130-06-20358

address the license renewal requirements of 10 CFR 54.21(a), ~~(b),~~ and (c). LRA Appendix A contains the license renewal requirements of 10 CFR 54.21(d).

Section 54.21(b) of 10 CFR requires that each year, following submission of the LRA, and at least three months before the scheduled completion of the staff's review, the applicant must submit an amendment to the LRA that identifies any changes to the facility's CLB materially affecting the contents of the LRA, including the UFSAR supplement. The applicant submitted an update to the LRA, by letter dated July 18, 2006, which summarizes the changes to the CLB that have occurred during the staff's review of the LRA. This submission satisfies the requirements of 10 CFR 54.21(b) and is still under staff review.

Section 54.22 of 10 CFR 54.22 requires the LRA to include changes or additions to the technical specifications necessary to manage the effects of aging during the period of extended operation. In LRA Appendix D, the applicant stated that it had not identified any technical specification changes necessary to support issuance of the renewed operating license for OCGS. This statement adequately addresses the requirement specified in 10 CFR 54.22.

The staff evaluated the technical information required by 10 CFR 54.21 and 10 CFR 54.22 in accordance with NRC regulations and the guidance provided by the SRP-LR. SER Sections 2, 3, and 4 document the staff's evaluation of the technical information in the LRA.

As required by 10 CFR 54.25, the ACRS will issue a report to document its evaluation of the staff's review of the LRA and associated SER. SER Section 5 will incorporate the ACRS report, once it is issued. SER Section 6 documents the findings required by 10 CFR 54.29.

The final, plant-specific GEIS Supplement 28 will document the staff's evaluation of the environmental information required by 10 CFR 54.23 and will specify the considerations related to renewing the license for OCGS. The staff will prepare this supplement separately from this SER.

1.4 Interim Staff Guidance

The license renewal program is a living program. The staff, industry, and other interested stakeholders gain experience and develop lessons learned with each renewed license. The lessons learned address the staff's performance goals of maintaining safety, improving effectiveness and efficiency, reducing regulatory burden, and increasing public confidence. Interim staff guidance (ISG) is documented for use by the staff, industry, and other interested stakeholders until it is incorporated into such license renewal guidance documents as the SRP-LR and the GALL Report.

The following table provides the current ISG, issued by the staff, as well as the SER sections in which the staff addresses each ISG issue.

- The stress analysis of Oyster Creek drywell presented in Reference 1 satisfies the local primary stress requirements of NE-3213.10. Conservatism in the allowable primary stress intensity value, the assumed peak pressure during the LOCA condition and the assumption of local corroded thickness in the entire region of the drywell provide additional structural margin.

- The Code primary stress limits are satisfied in the corroded condition and the number of fatigue cycles is small, the surface discontinuities from corrosion do not represent a significant structural integrity concern.

- The applicant indicated that UT measurements of the drywell shell above the sand bed region had shown that the measured general thickness contains significant margin. The applicant stated that the ongoing corrosion in that region is insignificant and that the margin could be applied to offset uncertainties related to surface roughness.

- The applicant stated that UT measurements of the drywell shell in the sand bed region show that the measured general thickness is greater than the 0.736'" thickness assumed in the buckling analysis by significant margins except in two bays, 17 and 19. (Refer to response to RAI 4.7.2-1(d), Table-2). The margin in the general thickness of the two bays is 0.074" and 0.064" respectively. As significant additional corrosion is not expected in the sand bed region, the applicant applied the margin to offset uncertainties related to the surface roughness.

The staff is still evaluating this item; therefore, it has been identified as an OI.

OI 4.7.2-3: (Section 4.7.2 - Drywell Corrosion)

In RAI 4.7.2-3 dated March 10, 2006, the staff noted that leakage from the refueling seal has been identified as one of the reasons for accumulation of water and contamination of the sand-pocket area. The refueling water passes through the gap between the shield concrete and the drywell shell in the long length of inaccessible areas. As there is a potential for corrosion, ASME Code Subsection IWE would require augmented inspection of this area. The staff requested that the applicant provide a summary of inspections (visual and NDE) and mitigating actions to prevent water leaks from the refueling seal components.

12) 7

In its response dated April ~~16~~, 2006, the applicant stated that the refueling seals at OCGS consist of stainless steel bellows. In the mid-to-late 1980s, GPU conducted extensive visual and NDE inspections to determine the source of water intrusion into the seismic gap between the drywell concrete shield wall and the drywell shell and accumulation in the sand bed region. The inspections concluded that the refueling bellows (seals) were not the source of water leakage. The bellows were repeatedly tested by helium (external) and air (internal) with no indication of leakage. Furthermore, any minor leakage from the refueling bellows would be collected in a concrete trough below the bellows. The concrete trough is equipped with a drain line that would direct any leakage to the reactor building equipment drain tank and prevent it from entering the seismic gap. The drain line has been checked before refueling outages to confirm that it is not blocked. The only other seal is the gasket for the reactor cavity steel trough drain line. This

gasket was replaced after the tests showed that it was leaking. However, the gasket leak was ruled out as the primary source of water observed in the sand bed drains because there is no clear leakage path to the seismic gap. Minor gasket leaks would be collected in the concrete trough below the gasket and would be removed by the drain line like leaks from the refueling bellows.

In addition, the applicant noted that additional visual and NDE (dye penetrant) inspections on the reactor cavity stainless steel liner had identified a significant number of cracks, some throughwall. Engineering analysis concluded that the cracks were most probably caused by mechanical impact or thermal fatigue, not intergranular stress corrosion cracking (IGSCC). These cracks were determined to be the source of refueling water that passed through the seismic gap. To prevent leakage through the cracks, GPU installed an adhesive-type stainless steel tape to bridge any observed large cracks and subsequently applied a strippable coating. This repair greatly reduced leakage and was implemented every refueling outage while the reactor cavity was flooded.

The applicant noted that OCGS has a long-time commitment to monitor the sand bed region drains for water leakage. A review of plant documentation provided no objective evidence that the commitment had been implemented since 1998. OCGS Issue Report No. 348545 was issued, in accordance with the corrective action process, to document the lapse in implementing the commitment and to reinforce strict compliance with commitment implementation in the future, including during the period of extended operation.

13) 27

The applicant also committed (Commitment No. ~~33~~) to augmented inspections of the drywell in accordance with ASME Code Section XI, Subsection IWE. These inspections consist of UT examinations of the upper region of the drywell and visual examinations of the protective coating on the exterior of the drywell shell in the sand bed region. UT measurements will supplement the visual inspection of the coating measurements from inside the drywell once before entering the period of extended operation and every 10 years during the period of extended operation.

The staff's review of the applicant's response determined that the epoxy coating applied in the sand-bed region of the shell has a limited life and that water leakage from the air gap has not been prevented. With these observations, the staff requested that the applicant provide a systematic program of examination of the coating for confidence that the preventive measure is adequately implemented at all locations in the sand-pocket areas.

In its response dated June 20, 2006, the applicant stated:

> AmerGen committed that it will monitor the sand bed region drains on a daily basis during refueling outages and take the following actions if water is detected. The actions will be completed prior to exiting the outage.
>
> - The source of water will be investigated and diverted, if possible, from entering the gap between the drywell shell and the drywell shield wall.
>
> - The water will be chemically analyzed to aid in determining the source of leakage.

The staff believes that applicant has not provided sufficient information regarding the extent that coated surfaces will be examined during each inspection. This has been identified as an OI.

1.6 Summary of Confirmatory Items

The staff's review of the LRA, including additional information submitted to the staff through July 10, 2006, identified no confirmatory items (CIs). An issue was considered confirmatory if the staff and the applicant have reached a satisfactory resolution, but such information has not yet been submitted to the staff.

1.7 Summary of Proposed License Conditions

As a result of its review of the LRA, including subsequent information and clarifications from the applicant, the staff, at present, proposes three license conditions.

The first license condition requires the applicant to include the UFSAR supplement required by 10 CFR 54.21(d) in the next UFSAR update, as required by 10 CFR 50.71(e), following the issuance of the renewed license.

14) entering

The second license condition requires future activities identified in the UFSAR supplement to be completed prior to the period of extended operation.

The third license condition requires all surveillance capsules placed in storage to be maintained for future insertion. Any changes to storage requirements must be approved by the staff as required by 10 CFR Part 50, Appendix H.

14), or as specified in the UFSAR supplement for commitments that will be completed during the period of extended operation

SECTION 2

STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW

2.1 Scoping and Screening Methodology

2.1.1 Introduction

Title 10, Section 54.21 of the *Code of Federal Regulations* (10 CFR Part 54.21), "Contents of Application Technical Information," requires each license renewal application (LRA) to contain an integrated plant assessment (IPA) listing those structures and components (SCs) subject to an aging management review (AMR) from all of the systems, structures, and components (SSCs) within the scope of license renewal in accordance with 10 CFR 54.4.

In LRA Section 2.1, "Scoping and Screening Methodology," the applicant described the methodology used to identify the SSCs at the Oyster Creek Generating Station (OCGS) within the scope of license renewal and the SCs subject to an AMR. The staff reviewed the AmerGen Energy Company, LLC (AmerGen or the applicant) scoping and screening methodology to determine whether it meets the scoping requirements of 10 CFR 54.4(a) and the screening requirements of 10 CFR 54.21.

In developing the scoping and screening methodology for the LRA, the applicant considered the requirements of 10 CFR 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," (the Rule), statements of consideration related to the Rule, and the guidance of Nuclear Energy Institute (NEI) 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," Revision 5. Additionally, in developing this methodology, the applicant considered the correspondence between the staff and other applicants and/or the NEI.

2.1.2 Summary of Technical Information in the Application

LRA Sections 2.0 and 3.0 provide the technical information required by 10 CFR 54.21(a). LRA Section 2.1 describes the process to identify SSCs meeting the license renewal scoping criteria under 10 CFR 54.4(a) and the process to identify SCs subject to an AMR, as required by 10 CFR 54.21(a)(1). In addition, the applicant provided the results of the process to identify the SCs subject to an AMR in the following LRA sections:

- Section 2.2, "Plant Level Scoping Results"
- Section 2.3, "Scoping and Screening Results: Mechanical"
- Section 2.4, "Scoping and Screening Results: Structures"
- Section 2.5, "Scoping and Screening Results: Electrical Components"

15) Start Section page number at 2-1

UFSAR, DBDs, controlled plant reference drawings, LRBDs, and Maintenance Rule information. In addition, the applicant developed and implemented a CLB database comprised of primarily licensing correspondence, UFSAR, technical specifications, fire hazards analysis, safety evaluations, and design documentation. This database enabled the applicant to search specific keywords and phrases to find licensing references applicable to license renewal. The applicant formally trained the license renewal staff on the CLB database and described the contents and practical experience in its use. Training lesson plans reviewed by the staff during the audit contained detailed information on important definitions related to the licensing basis, descriptions of the sources of documents which comprised the CLB, and descriptions of the programs and processes that contain the CLB source information. The applicant's detailed PLI-02 Section 6.0 requires use of the CLB source information in developing scoping evaluations. The applicant used the CLB electronic database, in part, for this process requirement.

16) determined

The CRL is the applicant's primary repository for component safety classification information. During the audit, the staff reviewed the applicant's administrative controls for CRL safety classification data and has that the applicant had established adequate measures to control data integrity and reliability. Therefore, the staff concludes that the CRL provided a sufficiently controlled source of component data to support scoping and screening evaluations.

During the staff's review of the applicant's CLB evaluation process, the applicant discussed updates to the CLB and the process for their adequate incorporation into the license renewal process. The applicant provided the staff with PLI-16 and discussed the process defined for such updates. As part of the license renewal effort, the applicant ensured that all engineering change requests approved up to within three months of the LRA submission that could have affected it had been factored in. In addition, PLI-16 guides the evaluation of CLB change documentation that could impact the LRA, describes the process for annual updates to the LRA, and includes a series of checklists to facilitate the evaluation and ensure adequate documentation of the results.

The staff determines that LRA Section 2.1 provides a description of the CLB and related documents used during the scoping and screening process consistent with SRP-LR guidance. In addition, the staff reviewed technical reports supporting identification of SSCs relied upon for compliance with the safety-related criteria, nonsafety-related criteria, and the five regulated events of 10 CFR 54.4(a). PLI-02 and PLI-16 comprehensively lists documents supporting scoping and screening evaluations. The staff finds these design documentation sources useful in ensuring that the initial scope of SSCs identified by the applicant is consistent with the plant's CLB.

2.1.3.1.3 Conclusion

On the basis of review of information in LRA Section 2.1, the detailed scoping and screening implementation procedures, and the results from the scoping and screening audit, the staff concludes that the applicant's scoping and screening methodology had considered CLB information consistently with SRP-LR and NEI 95-10 guidance and is, therefore, acceptable.

2.1.3.2 Quality Controls Applied to LRA Development

2.1.3.2.1 Staff Evaluation

2.1.4.2.1 Summary of Technical Information in the Application

In LRA Section 2.1.5.2, "Nonsafety-related affecting safety-related - 10 CFR 54.4(a)(2)," the applicant described the scoping methodology for 10 CFR 54.4(a)(2) nonsafety-related criteria. The applicant evaluated SSCs under 10 CFR 54.4(a)(2) with four categories. ~~A~~ summary description of the four categories:

17) The following is a

(1) Nonsafety-related SSCs required for functions that support safety-related system intended functions. The nonsafety-related SSCs credited in the CLB that support safety-related system intended functions were included within the scope of license renewal under 10 CFR 54.4(a)(2) and the scoping evaluation for each system was documented. When a system was included within the scope of license renewal pursuant to 10 CFR 54.4(a)(1), the scoping evaluation included the identification of any additional systems required to support the safety-related system intended function(s).

(2) Nonsafety-related systems connected to and providing structural support for safety-related SSCs. Nonsafety-related systems connected to safety-related systems were entirely within the scope of license renewal under 10 CFR 54.4(a)(2) up to and including the first seismic anchor past the safety-related and nonsafety-related interface, up to a flexible hose or joint not capable of load transfer, or up to the end of the piping run. An anchor or three mutually perpendicular restraints as described in the CLB were considered equivalent to a seismic anchor. Grouted walls or slab penetrations or such anchored components as pumps, heat exchangers, or turbines were also considered equivalent to seismic anchors. Underground piping was also considered equivalent.

(3) Nonsafety-related systems with a potential for spatial interaction with safety-related SSCs. Nonsafety-related systems not directly connected to safety-related piping or components or connected downstream from the first seismic or equivalent anchors were within the scope of license renewal pursuant to 10 CFR 54.4(a)(2) if their failure could adversely impact the performance of safety-related SSC intended functions. Failures considered included nonsafety-related piping failures on adjacent SSCs (e.g., pipe whip, jet impingement, spray, flooding, etc.) and loss of nonsafety-related piping supports causing piping to fall on safety-related SSCs (seismic II/I). To determine which nonsafety-related SSCs were within the scope of license renewal, the applicant evaluated two options, mitigative or preventive.

The mitigative option considered the failure of nonsafety-related systems on safety-related SSCs with the effects controlled by some feature(e.g. whip restraints, spray shields, supports, barriers, etc) installed on the safety-related SSCs. With this mitigation the failure of the nonsafety-related system will not prevent the performance of a 10 CFR 54.4(a)(1) safety-related system intended function. With the mitigative option the mitigative feature (whip restraints, spray shields, supports, barriers, etc.) is included within the scope of license renewal pursuant to 10 CFR 54.4(a)(2). The nonsafety-related systems can be excluded from the scope of license renewal provided the mitigative features are adequate to address all potential failure locations that could result from aging.

For the preventive option, vulnerable safety-related systems in proximity to the nonsafety-related systems are identified by plant walkdowns to identify nonsafety-related systems or portions with the potential for spatial interaction (pipe whip, spray, flooding,

etc.) with safety-related equipment, assuming a failure anywhere along the length of the safety-related system. Nonsafety-related SSCs also include heavy load-lifting equipment that could drop on and damage safety-related equipment.

The applicant applied the preventive option for 10 CFR 50.54(a)(2) scoping without consideration of mitigative features. However, certain mitigative features of the CLB were also included within the scope of license renewal. Nonsafety-related systems that contain water, oil, or steam located inside structures with safety-related systems were included within the scope of license renewal for potential spatial interaction under 10 CFR 54.4(a)(2). All supports for nonsafety-related systems with a potential for spatial interaction with safety-related SSCs were included within the scope of license renewal as commodities.

(4) Certain nonsafety-related mitigative plant design features that were part of the CLB. Nonsafety-related SSCs identified as mitigative plant design features in the CLB included turbine building walls (missile protection), walls, dikes, curbs, seals (flood protection), and spray shields.

18) under 10 CFR 54.4(a)(2) scoping criteria

Air and gas systems were not included within the scope of license renewal because they are not hazards to other plant equipment. Plant-specific operating experience verified that they have not adversely affected other plant equipment. Industry operating experience also reveals no events of this nature. Therefore, the applicant concluded that the air/gas systems are not within the scope of license renewal. However, supports for air/gas systems with a potential to fall on safety-related systems were included within the scope of license renewal as commodities.

19) under 10 CFR 54.4(a)(2) scoping criteria

2.1.4.2.2 Staff Evaluation

Pursuant to 10 CFR 54(a)(2), the applicant must consider all nonsafety-related SSCs the failure of which could prevent satisfactory performance of safety-related SSCs relied upon to remain functional during and following a DBE to ensure (1) the integrity of the reactor coolant pressure boundary, (2) the ability to shut down the reactor and maintain it in a safe shutdown condition, or (3) the capability to prevent or mitigate the consequences of accidents that could cause potential offsite exposures comparable to those of 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11.

20) 4

By letters dated December 3, 2001, and March 15, 2002, the NRC issued a staff position to the NEI with expectations for identifying 10 CFR 54.4(a)(2) SSCs. The December 3rd letter provides specific examples of operating experience with pipe failure events (summarized in NRC Information Notice (IN) 2001-09, "Main Feedwater System Degradation in Safety Related ASME Code Class 2 Piping Inside the Containment of a Pressurized Water Reactor") and the approaches the NRC considers acceptable to determine which piping systems should be included within the scope of license renewal for 10 CFR 54.4(a)(2). The March 15th letter further described the staff's expectations for the evaluation of non-piping SSCs to determine which additional nonsafety-related SSCs are within the scope of license renewal. The position states that applicants should not consider hypothetical failures but rather should base their evaluation on the plant's CLB, engineering judgement and analyses, and relevant operating experience. The letter further describes operating experience as all documented plant-specific and industry experience that can be used to determine the plausibility of a failure. Documentation would include NRC generic communications and event reports, plant-specific condition reports, such industry reports as safety operational event reports, and engineering evaluations.

concludes that the applicant has adequately described its process for establishing the use of grouted wall penetrations as equivalent to seismic anchors. The staff's concern described in RAI 2.1.5.2-1 is resolved.

LRA Section 2.1.5.2 describes the applicant's screening and scoping methodology for nonsafety-related systems connected to safety-related systems. This section of the LRA states that piping that exits a structure and is routed underground is credited as equivalent to a seismic anchor. This same methodology is described in PP-03 Section 4.5.1.3. During the audit, the applicant clarified that, although described in the LRA and PP-03, this methodology was not used.

In RAI 2.1.5.2-2 dated November 9, 2005, the staff requested that the applicant verify that underground piping was not credited as equivalent to a seismic anchor.

In its response dated December 9, 2005, the applicant stated that underground piping was not credited as an equivalent anchor for license renewal. The staff reviewed the applicant's response and concludes that it has adequately described the process for establishing equivalence to seismic anchors. The staff's concern described in RAI 2.1.5.2-2 is resolved.

(3) Nonsafety-related SSCs not directly connected to safety-related SSCs. PLI-02 Section 6.11 and PP-03 Section 4.6 implement this process. PLI-02 Section 6.11 requires documentation in the license renewal database scoping form of evaluations of any potential adverse interactions between nonsafety-related and safety-related SSCs not physically connected. PLI-03 Section 4.6 states that, although non-liquid systems are not within the scope of license renewal, supports for non-liquid systems in areas of potential seismic interaction with safety-related systems are included. All high-energy lines that contain water, oil, or steam were within the scope of license renewal. All moderate- and low-energy lines that contain water, oil, or steam during plant operation were included within the scope of license renewal. Supports for seismic Class II piping, cranes, monorails, and hoists were also included within the scope of license renewal.

(4) Certain nonsafety-related mitigative plant design features in the CLB. PP-03 Section 4.4 stated that nonsafety-related missile barriers (walls), flood barriers (walls, slabs, curbs, drains, and seals), and spray shields addressed in the CLB are within the scope of license renewal under 10 CFR 54.4(a)(2). Structures with mitigative plant design features were listed in PP-01.

2.1.4.2.3 Conclusion

On the basis of its review and the RAI responses, the staff determines that the applicant's methodology for identifying systems and structures meets 10 CFR 54.4(a)(2) scoping criteria and is, therefore, acceptable. This determination is based on a review of sample systems, discussions with the applicant, and review of the applicant's scoping process.

21)

PP-07 Section 4 states that first-level, primary support systems necessary for equipment credited in the FHAR or safe shutdown analysis to function for compliance with 10 CFR 54.48 are included within the scope of license renewal. PP-07 Table 1 lists the standby gas engine (propane) generator as within the scope of license renewal. However, LRA Section 2.5.1.15 does not list the backup gas (propane) engine generator as within the scope of license renewal. The applicant stated during the audit that LRA Section 2.5.1.15 is correct and that the backup gas (propane) generator was removed from the scope of license renewal because it is not the radio communication system's primary power source.

In RAI 2.5.1.15-1 dated November 9, 2005, the staff requested that the applicant:

(1) Verify that the CLB, plant-specific experience, industry experience (as appropriate), and safety analyses or plant evaluations do not require the backup gas (propane) generator to perform a function for compliance with NRC regulations under 10 CFR 54.4(a)(3).

(2) Verify that second-, third-, or fourth-level support systems were included within the scope of license renewal if the CLB, plant-specific experience, industry experience (as appropriate), and safety analyses or plant evaluations require such support systems to perform functions for compliance with NRC regulations under 10 CFR 54.4(a)(3).

22) delete text

In its responses dated ~~October 12, November 11, and~~ December 9, 2005, and ~~May 18 and~~ June 7, 2006, the applicant stated that it had determined that the repeater located at the Meteorological Tower (Met Tower) is credited for communication capabilities for some 10 CFR Part 50, Appendix R, scenarios. Therefore, the repeater and associated support equipment, including the backup gas (propane) engine generator located at the Met Tower, are now within the scope of license renewal and subject to an AMR. The applicant also stated that the second-, third-, and fourth-level support systems were included within the scope of license renewal if the CLB, plant-specific experience, industry experience, and safety analyses or plant evaluations require these systems to perform functions for compliance with 10 CFR 54.4(a)(3). The staff reviewed the applicant's response and concludes that it is adequate. The staff's concerns described in RAI ~~2.1.5.15-1~~ are resolved.

23) 2.5.1.15-1

Based on the review of the LRA, PP-07, and ISGs the staff finds that the fire protection implementing documents for license renewal meet 10 CFR 54.4(a)(3) requirements.

Environmental Qualification. For the EQ regulated event, the staff evaluated LRA Section 2.1.3.4 and PP-06. The UFSAR Section 3.11.1.1.1, "Criteria for Selection of Equipment," identifies the scope of electrical equipment and components that must be environmentally qualified for use in harsh environments. The electrical components in the EQ Master List were entered into the CRL, which CRL includes an EQ data field for identifying EQ components. In PP-06 Table 1, "Systems Subject to 10 CFR 50.49 EQ Requirements," the applicant identified mechanical, electrical, and instrumentation and control (I&C) systems with EQ equipment within the scope of license renewal. PP-06 Table 1 was compared to the EQ Master List to verify that the EQ Master List was consistent with the CRL. In PP-06 Table 2, "Structures Associated with EQ Environmental Boundaries," the applicant identified structures that provide physical boundaries for postulated harsh environments with EQ electrical equipment included within the scope of license renewal: the containment, reactor building, turbine building, standby gas treatment exhaust tunnel, containment electrical penetrations, and EQ barriers in the 4160V switchgear.

The staff finds that the LRA and PP-06 adequately identified the scope of EQ electrical systems, electrical penetrations, cable routing and terminations, and structures within the scope of license renewal.

Anticipated Transient Without Scram. For the ATWS regulated event, the staff evaluated LRA Section 2.1.3.4 and PP-05. PP-05, Attachment 1, identifies systems within the scope of license renewal. PP-05, Attachment 2, identifies the primary containment, reactor building, turbine building, and the component supports commodity group as within the scope of license renewal. The staff finds that the LRA and PP-05 adequately identify ATWS SSCs within the scope of license renewal.

Station Blackout. For the SBO regulated event, the staff evaluated LRA Sections 2.1.3.4 and 2.1.4 and several mechanical, structural, and electrical systems in LRA Sections 2.3, 2.4, and 2.5. The staff compared the LRA information to that of PP–04, Table I, "Systems and Structures Credited to Cope with an SBO Event," Table II, "Systems Credited for Safe Shutdown During a Station Blackout," Table III, "Systems Required to Recover from a Station Blackout Event," and Table IV, "Structures Required For Station Blackout Event," where the applicant identified the SBO electrical and mechanical systems and components and support structures that house SBO equipment within the scope of license renewal needed under 10 CFR 54.4(a)(3) to meet the SBO regulated event.

In PP-04, the applicant stated that it had added the alternate AC (AAC) power supply system to the existing plant configuration to comply with the SBO rule. The AAC source is provided by one of two non-Class IE combustion turbines located at the Forked River site adjacent to OCGS. The AAC source supplies power to OCGS via a connection to the non-1E 4160V "1B" switchgear. In PP-04, Table II, the AAC combustion turbines and their sub-systems, the turbine lube oil system, the fuel system, the direct current (DC) power system, and the SBO transformer are parts of the AAC Power Supply System within the scope of license renewal for the SBO regulated event under 10 CFR 54.4(a)(3). In PP-04, Table IV, the applicant identified the Forked River Combustion Turbine (FRCT) buildings as support structures protecting relay cables, I&C cables, combustion turbines, and other equipment.

24) delete

In LRA Table 2.5.1.19, the ACC combustion turbines are identified as one combustion turbine power plant unit within the scope of license renewal and subject to an AMR. As described in SER Section 2.5.5.2~~)~~, in its response to RAI 2.5.1.19-1, the applicant stated that it had revised the combustion turbine power plant unit scoping and screening methodology. Mechanical, electrical, and structural component types were itemized in detail consistent with scoping and screening methodology for other ~~the other~~ license renewal systems and structures.

25) delete

The staff finds that the LRA, as revised in the response to RAI 2.5.1.19-1, and the methodology as described in PP-04 has adequately identified SSCs within the scope of license renewal for the SBO regulated event.

2.1.4.3.3 Conclusion

Based on the sample review, RAI responses, discussions with the applicant, and review of the applicant's scoping process, the staff determines that the applicant's methodology for identifying systems and structures meets 10 CFR 54.4(a)(3) scoping criteria and is, therefore, acceptable.

2.1.4.4 Plant-Level Scoping of Systems and Structures

27) In the scoping and screening results section of the LRA (Sections 2.3, 2.4 and 2.5), components are identified

2.1.4.4.1 Summary of Technical Information in the Application

System and Structure Level Scoping. In LRA Section 2.1, the applicant described the scoping methodology for safety-related and nonsafety-related systems and structures and equipment relied upon for functions for 10 CFR 54.4(a)(3) regulated events. The scoping methodology is consistent with guidance by the NRC in the SRP-LR and by the industry in NEI 95-10. In LRA Section 2.2, using the methodology described in LRA Section 2.1, the applicant evaluated systems and structures to determine whether they were within the scope of license renewal. The results of plant scoping are provided in LRA Table 2.2-1.

26) mechanical

Component Level Scoping. The applicant identified the systems and structures within the scope of license renewal and determined the components within each mechanical system and structure. The structural and mechanical components supporting intended functions were considered within the scope of license renewal and screened to determine whether AMRs were required. All electrical components of in-scope mechanical and electrical systems were included as commodity groups. The applicant considered three component classifications during this stage of the scoping methodology: mechanical, structural, and electrical. The CRL lists plant components comprehensively. The database identifies components by type and unique number, ~~LRA Table 2.2-1 identifies them~~ by component type only.

28) .2

Commodity Groups Scoping. All electrical components of in-scope of mechanical and electrical systems were included as commodity groups. Many active electrical commodity groups were screened out and not subject to an AMR. In LRA Section 2.5.~~1~~, the applicant described the commodity groups used to evaluate all in-scope electrical components subject to an AMR.

Structural components were grouped as component types based on design function, materials of construction, and environments. LRA Section 2.4 states that such component types as component supports and piping and component insulation were placed in commodity groups.

Insulation. LRA Section 2.4.19 states that insulation installed on hot piping or components of structures within the scope of license renewal (with the exception of miscellaneous yard structures) were included within the scope of license renewal as a commodity group. All insulation was considered nonsafety-related. Therefore, the piping and component insulation commodity group is within the scope of license renewal under 10 CFR 54.4(a)(2) because insulation performs a function that supports a 10 CFR 54.4(a)(1) system. Piping and component insulation in the miscellaneous yard structure is not within the scope of license renewal because its failure does not impact ~~an~~ safety-related intended function.

29) any

Consumables. LRA Section 2.1.6.4, the applicant discussed consumables, using the guidance in SRP-LR Table 2.1-3 to categorize and evaluate consumables. Consumables were divided into the following four categories for the purpose of license renewal: (a) packing, gaskets, component seals, and o-rings, (b) structural sealants, (c) oil, grease, and component filters, and (d) system filters, fire extinguishers, fire hoses, and air packs.

Group (a) subcomponents are not relied on to form a pressure-retaining function and, therefore, are not subject to an AMR. Group (b) structural sealants for structures within the scope of license renewal require an AMR. Group (c) subcomponents are periodically replaced in accordance with plant procedures and therefore are not subject to an AMR. Group (d) consumables are subject to replacement based on National Fire Protection Association standards in accordance with plant procedures and, therefore, are not subject to an AMR.

2.1.4.4.3 Conclusion

Based on review of the LRA, CRL, scoping and screening implementation procedures, and a sampling of system scoping results during the audit, the staff concludes that the applicant's scoping methodology for plant SSCs, commodity groups, insulation, and consumables is acceptable. In particular, the staff determines that the applicant's methodology reasonably identifies systems, structures, component types, and commodity groups within the scope of license renewal and their intended functions.

2.1.4.5 Mechanical Component Scoping

2.1.4.5.1 Summary of Technical Information in the Application

In LRA Sections 2.1.5.5 and 2.3.1, the applicant discussed the scoping methodology for mechanical systems and components. For mechanical systems, mechanical components supporting system intended functions are included within the scope of license renewal. Mechanical system diagrams are marked to create LRBDs showing in-scope components that support safety-related functions ~~for~~ regulated events highlighted in green; nonsafety-related components connected to safety-related components and providing structural support at the connections or components the failure of which could prevent satisfactory accomplishment of a safety-related function due to spatial interaction with safety-related SSCs are highlighted in red. A computer sort from the CRL ~~compared the LRBDs confirmed~~ the scope of components in the system. For additional information, the applicant performed plant walkdowns when required.

30) or

31) was compared against the LRBDs to confirm

2.1.4.5.2 Staff Evaluation

The staff evaluated LRA Sections 2.1.5.5 and 2.3.1 and the guidance in PLI-02 and PLI-04 to complete the review of the mechanical scoping process. PLI-04 utilizes information in PP-01 through PP-07 to complete the mechanical scoping process.

PLI-2 provides instructions for filling out system data fields in the license renewal database. The license renewal database was used to develop license renewal system and structure scoping forms for subsequent review, approval, and document retention. The CLB documents were utilized when determining whether a system or component was within the scope of 10 CFR 54.4(a). The CLB includes the UFSAR, the facility description safety analysis report, separate ATWS, EQ, fire protection, and SBO documents, technical specifications, SERs, the Integrated Plant Safety Assessment Report, and NRC orders. Other documents included the CRL, flow diagrams, licensed operator training plans, and the Maintenance Rule database. In the event of differences between CLB documents and other documents, the CLB documents took precedence.

The license renewal database scoping input forms included the following information: license renewal system name, system grouping, DBD if applicable, UFSAR sections, drawings, other reference documents, and system intended functions. The applicant then evaluated the 10 CFR 54.4(a) scoping criteria against the identified system intended functions to determine which criteria applied. The applicant also identified support system intended functions which provide the functional and physical support required to accomplish safety-related intended functions. Using PLI-04, the applicant then created LRBDs for mechanical systems.

one or more 10 CFR 54.4(a) criteria. Various other PPs (PP-02 through PP-07) were developed to support the evaluation of each structure in accordance with the scoping criteria. For each structure, the applicant further studied the drawings and plant databases to identify specific structural components and features. The structural component intended functions were identified based on the guidance of Regulatory Guide 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses," NEI 95-10, and the SRP-LR. Procedures also described the source design documentation used for the evaluation of structures including the various technical PPs developed by the applicant to support the LRA. For structures, the evaluation boundaries were determined from a complete description of each structure according to intended functions performed and its components per PLI-04. The license renewal database was used to compile the structural evaluation results. The database contains a list of structures, structural component types, evaluation results for each of the 10 CFR 54.4(a) criteria for each structure, a description of structural intended functions and source reference information for the functions, and a reference to pertinent plant layout drawing(s) for each structure. Plant structures within the scope of license renewal were captured on a plant layout drawing. The boundaries of the structures were identified from the physical representation of the structure on the layout drawing.

The staff conducted detailed discussions with the applicant's license renewal team and reviewed documentation pertinent to the scoping process. The staff assessed whether the scoping methodology and procedures outlined in the LRA had been appropriately implemented and whether the scoping results were consistent with CLB requirements. The staff also reviewed structural scoping evaluation results for the reactor building for proper implementation of the scoping process for structural components and compared a sample of structural components identified in the reactor building structural drawings to the structural list in the license renewal database for consistency. In these audit activities, the staff identified no discrepancies between the methodology documented and the implementation results.

2.1.4.6.3 *Conclusion*

Based on review of information in the LRA, the applicant's detailed scoping implementation procedures, and a sampling of structural scoping results, the staff concludes that the applicant's methodology for identification of structural component types within the scope of license renewal meets 10 CFR 54.4(a) requirements and is, therefore, acceptable.

2.1.4.7 Electrical Component Scoping

2.1.4.7.1 Summary of Technical Information in the Application

32) 2.1.5.5

LRA Sections 2.1.1 and ~~2.1.5.4~~ describe the scoping process for electrical systems and components. All electrical systems were evaluated in accordance with 10 CFR 54.4(a) scoping criteria. A system was included within the scope of license renewal if it performed one or more intended functions. The entire system was included within the scope of license renewal if any portion of the system met 10 CFR 54.4(a) scoping criteria. A single electrical boundary drawing was prepared to show schematically portions of the plant electrical distribution system included within the scope of license renewal. The CRL was used to identify electrical components. All electrical components of electrical and mechanical systems within the scope of license renewal were included within the scope of license renewal as commodity groups.

2.1.4.7.2 Staff Evaluation

The staff evaluated LRA Sections 2.1.1 and ~~2.1.5.4~~ and implementing procedures PP-01, PP-04, PP-05, PP-06, PP-07, PP-08, and PLI-02. The staff also evaluated the single electrical boundary drawing specifically developed for license renewal showing portions of the plant electrical distribution system included within the scope of license renewal. The staff reviewed the electrical systems and electrical components in mechanical systems identified in the ICS scoping form. The staff discussed the electrical scoping methodology with the applicant's LRA team.

The CRL and UFSAR ~~were used~~ primarily to identify electrical systems and electrical components in mechanical systems within the scope of license renewal. PP-01 identifies the systems within the scope of license renewal. PP-04, PP-05, PP-06, and PP-07 specifically identify the electrical and mechanical systems credited for meeting SBO, ATWS, EQ, and fire protection regulatory requirements. The electrical commodity groups are identified in PP-08. PLI-2 provides instructions for filling out system data fields in the license renewal database.

2.1.4.7.3 Conclusion

Based on review of information in the LRA, the applicant's detailed scoping implementation procedures, and a sampling of electrical scoping results, the staff concludes that the applicant's methodology for identification of electrical components within the scope of license renewal meets 10 CFR 54.4(a) requirements, and is, therefore, acceptable.

2.1.4.8 Conclusion for Scoping Methodology

Based on a review of the LRA and the scoping implementation procedures, the staff determines that the applicant's scoping methodology is consistent with SRP-LR guidance and identified safety-related SSCs the failure of which could affect safety-related functions and which are necessary for compliance with the NRC's regulations for fire protection, EQ, ATWS, and SBO. Therefore, the staff concludes that the applicant's methodology meets 10 CFR 54.4(a) requirements.

2.1.5 Screening Methodology

2.1.5.1 General Screening Methodology

After identifying systems and structures within the scope of license renewal, the applicant implemented a process for identifying SCs subject to an AMR, in accordance 10 CFR 54.21.

2.1.5.1.1 Summary of Technical Information in the Application

LRA Section 2.1.6, the applicant discussed the method of identifying components of in-scope systems and structures subject to an AMR. The identification method consisted of the following steps:

(1) Identification of long-lived ~~or~~ passive components for each in-scope mechanical system, structure, and electrical commodity group.

(2) Identification of the license renewal intended function(s) for all mechanical and structural component types and electrical commodity groups.

applicant studied LRBDs to identify passive and long-lived components, then entered them into the license renewal database. The applicant also examined components in the CRL to confirm that all system components had been considered. Where the LRBDs did not provide sufficient detail, as for large vendor-supplied components (e.g., compressors, emergency diesel generators), the applicant examined associated component drawings or vendor manuals. The applicant also performed plant walkdowns to confirm which components required an AMR. Finally, the applicant benchmarked passive and long-lived components for a system against previous LRAs with similar systems.

2.1.5.2.2 Staff Evaluation

The staff evaluated the mechanical screening methodology in LRA Section 2.1.6.1, PLI-03, and PP-08. Using PLI-03 for mechanical systems, the applicant downloaded a listing of components from the CRL to assist in identifying system passive, long-lived component types.

An important function in the screening form is the "Intended Function" column. The list of potential intended functions is identified in PP-08 and included in the pull-down menu for the intended functions database field. For components like restricting orifices or heat exchangers, the appropriate intended function depends on the specific application within the system or structure. For example, the in-scope heat exchanger has a pressure boundary intended function, but the tubes have a heat transfer function if required to support a system intended function under 10 CFR 54.4(a). All in-scope passive, long-lived mechanical components have at least one intended function.

Based on the mechanical screening methodology in LRA Section 2.1.6.1, PLI-03, and PP-08, the staff finds the mechanical screening process acceptable.

Screening Methodology for the Isolation Condenser System. In LRA Table 2.3.1.3, the applicant identified the following isolation condenser system component types and intended functions subject to an AMR:

- bird screen - filter
- closure bolting - mechanical closure
- gauge snubbers - pressure boundary
- heat exchangers (isolation condensers) - heat transfer and pressure boundary
- piping and fittings - pressure boundary
- thermowell - pressure boundary
- valve body - leakage and pressure boundary

The staff questioned the applicant to determine whether instrument lines had been included within the scope of license renewal and subject to an AMR. The applicant stated that instrument lines that penetrate the ICS and serve pressure boundary functions were covered under piping and fittings. The ICS and structure screening form lists ICS steam supply instrument lines. The staff also questioned the applicant about expansion joints on the isolation condenser outlet to atmosphere from the isolation condenser heat exchangers. The applicant stated that expansion joints are pipe fittings included within the scope of license renewal and subject to an AMR.

The applicant used PP-08 and PLI-03 to identify the components subject to an AMR.

2.1.5.2.3 Conclusion

- service water system
- spent fuel pool cooling system
- turbine building closed cooling water system
- water treatment and distribution system
- condensate transfer system
- feedwater system
- main steam system

2.3.1 Reactor Vessel, Internals, and Reactor Coolant System

In LRA Section 2.3.1, the applicant identified the SCs of the reactor vessel, internals, and RCS subject to an AMR for license renewal.

The applicant described the supporting SCs of the reactor vessel, internals, and RCS in the following sections of the LRA:

- 2.3.1.1 control rods
- 2.3.1.2 fuel assemblies
- 2.3.1.3 isolation condenser system
- 2.3.1.4 nuclear boiler instrumentation
- 2.3.1.5 reactor head cooling system
- 2.3.1.6 reactor internals
- 2.3.1.7 reactor pressure vessel
- 2.3.1.8 reactor recirculation system

The staff's review findings on LRA Sections 2.3.1.1 – 2.3.1.8 are presented in SER Sections 2.3.1.1 – 2.3.1.8, respectively.

2.3.1.1 Control Rods

2.3.1.1.1 Summary of Technical Information in the Application

In LRA Section 2.3.1.1, the applicant described the control rods. The control rods are replaceable, mechanical components consisting of cruciform-shaped stainless steel assemblies containing neutron-absorbing material, designed for flux shaping and for reactivity control during reactor startup, power level changes, and shutdown. The reactor contains 137 control rods the purpose of which is to absorb neutrons in the reactor core, thereby providing the means to adjust core power shape, compensate for reactivity changes caused by fuel and burnable poison depletion, and fully shut down the nuclear reaction. They accomplish this purpose, in conjunction with their positioning system (evaluated with the control rod drive system), by continuous regulation of the core excess reactivity and reactivity distribution and by sufficient reactivity compensation to render the reactor adequately subcritical from its most reactive condition. Control rod absorption of neutrons chemically depletes the absorber material and control rod lifetime is monitored. Control rods reaching prescribed thresholds are scheduled for replacement during refueling outages.

38) providing

The control rods contain safety-related components relied upon to remain functional during and following DBEs.

No intended functions within the scope of license renewal are applicable for the controls rods.

license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.1.4 Nuclear Boiler Instrumentation

39) Engineered Safety Feature (ESF)

2.3.1.4.1 Summary of Technical Information in the Application

In LRA Section 2.3.1.4, the applicant described the nuclear boiler instrumentation. The nuclear boiler instrumentation system is designed to provide the means to measure parameters of level, pressure, temperature, flow, core differential pressure, and core spray pipe integrity. The purpose of the system is to provide signals to the reactor protection system and emergency core cooling system (ECCS) logic for initiation of such protective system functions as reactor scram, ECCS and ~~ESF~~ system initiation, primary containment isolation, recirculation pump trip, and alternate rod insertion. The feedwater control function is provided input from this system. Nuclear boiler instrumentation also provides the operator with indications of reactor level, pressure, temperature, and flow during normal and transient conditions to support procedural activities during normal and post-accident operation. It accomplishes these purposes by utilizing specific instruments to monitor level, pressure (including differential pressure), flow, and temperature. Reactor vessel level is measured by comparing the differential pressure between the variable level of water in the reactor vessel and the pressure from a reference water column of a known height. Reactor pressure is measured by pressure instruments utilizing the same piping used to measure the pressure in the water level instrument reference legs. Temperature is measured through thermocouples placed in specific locations on the reactor vessel shell, heads, flange, and skirt to indicate vessel metal temperature.

The nuclear boiler instrumentation contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the nuclear boiler instrumentation potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the nuclear boiler instrumentation performs functions for fire protection, ATWS, SBO, and EQ.

The intended functions within the scope of license renewal include:

- maintains mechanical and structural integrity to prevent spatial interactions that could cause failure of safety-related SSCs (includes the required structural support when the nonsafety-related leakage boundary piping is also attached to safety-related piping)
- provides mechanical closure
- provides pressure-retaining boundary; fission product barrier; containment isolation; or containment, holdup, and plateout (main steam system)

In LRA Table 2.3.1.4, the applicant identified the following nuclear boiler instrumentation component types within the scope of license renewal and subject to an AMR:

- closure bolting
- condensing chamber
- gauge snubber
- piping and fittings
- valve body

scope of license renewal any components with intended functions under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as within the scope of license renewal to verify that it had not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.3.4.5.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff determined whether any components subject to an AMR had not been identified by the applicant. No omissions were identified. The staff's review concludes that there is reasonable assurance that the applicant has adequately identified the MGAS components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.3.4.6 Main Steam System

2.3.4.6.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.6, the applicant described the main steam system, a normally pressurized system designed to deliver steam generated from the RPV system to the main turbine and auxiliary system. The purpose of the main steam system is to provide a primary containment and RCPB function; it serves as the pressure relief system and steam distribution system. It accomplishes the primary containment and RCPB function with piping and valves to limit radiation release rates from the primary containment below the 10 CFR 100 guidelines. It accomplishes the pressure relief function for the RCPB by way of automatic and manual actuation of relief valves. It also provides manual and automatic emergency depressurization by relief valves supporting the core spray system. Distribution of steam to the main turbine and auxiliary system is accomplished by piping distribution branches in the turbine building.

The main steam system contains safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the main steam system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the main steam system performs functions that support fire protection and EQ.

The intended functions within the scope of license renewal include:

- maintains mechanical and structural integrity to prevent spatial interactions that could cause failure of safety-related SSCs (includes the required structural support when the nonsafety-related leakage boundary piping is also attached to safety-related piping)
- provides mechanical closure
- provides pressure-retaining boundary; fission product barrier; containment isolation; or containment, holdup, and plateout (main steam system)
- provides flow restriction

40) from MSIV bypass leakage

In LRA Table 2.3.4.6, the applicant identified the following main steam system component types within the scope of license renewal and subject to an AMR:

- closure bolting

evaluated with the "component supports" commodity group in LRA Section 2.4.18. Their AMR is presented in LRA Table ~~3.5.2.1-18;~~ 41) 3.5.2.1.18

The staff's review of LRA Table 3.5.2.1-18 indicates that the seismic lateral supports are not explicitly included. However, from the first sentence of the response, the staff considers the supports included under the component type "supports for ASME Class MC components." Their aging will be managed by the ASME Section XI, Subsection IWF Program. From the response, the staff finds that the seismic lateral supports are included within the scope of license renewal. The staff's concern described in RAI 2.4.2-1 is resolved.

In RAI 2.4.1-2 dated March 20, 2006, the staff stated that LRA Tables 2.4.1 and 2.4.2 do not include refueling cavity seal components within the scope of license renewal though the plant has experienced significant corrosion (as described in item number 3.5.2.2-4 of LRA Section 3.5.2.2) of the drywell from leakage from the seal. The staff requested that the applicant include the seal within the scope of license renewal or justify not including it.

In its response dated April 18, 2006, the applicant explained that LRA Section 2.4.2 describes the refueling cavity seals and refers to them as refueling bellows, which are classified as nonsafety-related and perform their design function only when the plant is shut down for refueling. Moreover, the applicant noted that refueling bellows are not credited in the CLB for DBEs or accidents, that their failure would not impact a safety function, and that scoping had determined that they perform no 10 CFR 54.4 (a) intended function; thus, they are not included in LRA Table 2.4.2.

The applicant also stated that the cavity seals are addressed in RAI 4.7.2-3. In its response to RAI 4.7.2-3 dated April 7, 2006, the applicant provided the following information:

> The refueling seals at Oyster Creek consist of stainless steel bellows. In the mid to late 1980's, GPU conducted extensive visual and NDE inspections to determine the source of water intrusion into the seismic gap between the drywell concrete shield wall and the drywell shell, and its accumulation in the sand bed region. The inspections concluded that the refueling bellows (seals) were not the source of water leakage. The bellows were repeatedly tested using helium (external) and air (internal) without any indication of leakage. Furthermore, any minor leakage from the refueling bellows would be collected in a concrete trough below the bellows. The concrete trough is equipped with a drain line that would direct any leakage to the reactor building equipment drain tank and prevent it from entering the seismic gap (see Figures 1 and 2). The drain line has been checked before refueling outages to confirm it is not blocked.
>
> The only other seal is the gasket for the reactor cavity seal trough drain line. This gasket was replaced after the tests showed that it was leaking (see Figure 2). However the gasket leak was ruled out as the primary source of water observed in the sand bed drains because there is no clear leakage path to the seismic gap. Minor gasket leakage would be collected in the concrete trough below the gasket and would be removed by the drain line similar to leaks from the refueling bellows.
>
> Additional visual and NDE (dye penetrant) inspections on the reactor cavity stainless steel liner identified a significant number of cracks, some of which were through wall cracks. Engineering analysis concluded that the cracks were most

42) safety-related

a reinforced concrete base slab on grade. The old heating boiler house is adjacent and provides access to the ventilation stack through a double door airlock. It also houses two safety-related electrical load centers, electrical panels and enclosures, a transformer, and electrical conduits required for the operation of the SGTS fans. The new heating boiler house does not house any SSCs. The two heating boiler houses are classified as nonsafety-related, seismic Class II.

The failure of nonsafety-related SSCs in the heating boiler house potentially could prevent the satisfactory accomplishment of a safety-related function. The heating boiler house also performs functions that support fire protection.

43) old

The intended functions within the scope of license renewal include:

- provides enclosure, shelter, or protection for in-scope equipment (including shielding)
- provides structural support or structural integrity to preclude nonsafety-related component interactions that could prevent satisfactory accomplishment of a safety-related function

In LRA Table 2.4.10, the applicant identified the following heating boiler house component types within the scope of license renewal and subject to an AMR:

- conduits
- door
- equipment foundation
- metal deck
- metal siding
- panels and enclosures
- reinforced concrete foundation
- removable panel (in siding)
- seals
- structural bolts
- structural steel: beams, columns, girts, bracing, connection plates and angles

2.4.10.2 Staff Evaluation

The staff reviewed LRA Section 2.4.10 using the evaluation methodology of SER Section 2.4. The staff conducted its review in accordance with the guidance of SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR to verify that the applicant had not omitted from the scope of license renewal any components with intended functions under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as within the scope of license renewal to verify that it had not omitted any passive and long-lived components subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.10.3 Conclusion

The staff reviewed the LRA and related structural components to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff determined whether any components subject to an AMR had not been identified by the applicant. No omissions were identified. The staff's review concludes that there is reasonable assurance that the applicant has adequately identified the

This system is within the scope of license renewal because it (a) resists nonsafety-related SSC failures that could prevent satisfactory accomplishment of a safety-related function (this system provides electrical power to a control room ventilation fan) and (b) is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection and SBO regulations.

120V AC Vital Power System. The 120V AC vital power system is a Class 1E safety-related electrical distribution system that supplies 120V AC power to various loads essential for operation, protection, and safe shutdown of the plant. The system design incorporates redundant power sources and automatic bus transfer switches so that critical loads remain energized at all times. Additional detail of the system is in UFSAR Section 8.3.1.1.4.

This system is within the scope of license renewal because it (a) provides motive power to safety-related components and (b) is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection, EQ, and SBO regulations.

125V Station DC System. Three complete 125V DC distribution systems make up the station DC power system at OCGS. Two of these, designated as DC Distribution Systems A and B, are the originally installed systems. The third system, designated as DC Distribution System C, was designed and installed as a modification.

The function of the station DC system is to provide a continuous source of 125V DC power. Safety loads are supplied from DC Distribution Systems B and C with DC Distribution System B supplying Division B safety-related loads and DC Distribution System C supplying Division A safety-related loads. DC Distribution System A supplies nonsafety loads. Additional detail of the system is in UFSAR Section 8.3.2.1.

This system is within the scope of license renewal because it (a) provides motive power to safety-related components and (b) is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection, EQ, and SBO regulations.

24/48V Instrumentation Power DC System. The 24/48V DC power electrical distribution system is designed to supply power to the reactor nuclear instrumentation and radiation monitoring systems. Additional detail of the system is in UFSAR Section 8.3.2.2.

This system is within the scope of license renewal because provides motive power to safety-related components.

4160V System. The 4160V electrical distribution system is designed to provide continuous electrical power necessary for plant operation, startup, and shutdown. The 4160V switchgear is comprised of four separate bus sections or lineups of switchgear. The four bus sections are identified as Bus Sections 1A, 1B, 1C, and 1D with Bus Sections 1C and 1D the essential or emergency switchgear lineups.

44) being

The 4160V AC system also can be powered from the FRCT, which is the OCGS alternate AC (AAC) power source during an SBO event. The AAC source utilizes a connection independent from the normal connection to the regional transmission grid. The routing is through a dedicated underground ductbank to the load break switches and SBO transformer located on site and then through a cable trench to the switchgear breaker connection to the 4160V AC Bus 1B. Additional detail of the system is in UFSAR Section 8.3.1.1.1.

This system is within the scope of license renewal because it (a) provides motive power to safety-related components and (b) is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection and SBO regulations.

480/208/120V Utility (JCP&L) Non-Vital Power System. The 480/208/120V utility (JCP&L) nonvital power electrical distribution system is designed to provide nonessential electrical power necessary for balance of plant equipment located throughout the site. Additional detail of the system is in UFSAR Section 8.2.1.2.

This system is within the scope of license renewal because it is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection regulations.

480V AC System. The 480V AC electrical distribution system is designed to provide continuous electrical power necessary for plant operation, startup, and shutdown. Additional detail of the system is in UFSAR Section 8.3.1.1.2.

This system is within the scope of license renewal because it (a) provides motive power to safety-related components and (b) is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection, EQ, and SBO regulations.

Alternate Rod Injection System. The alternate rod injection electrical system provides a method diverse from the reactor protection system (RPS) for depressurizing the instrument (control) air system scram air header in the unlikely event the RPS does not cause a reactor scram in response to an operational transient. Additional detail of the system is in UFSAR Section 3.9.4.4.

This system is within the scope of license renewal because it is relied upon in safety analyses or plant evaluations to perform a function for compliance with ATWS regulations.

Grounding and Lightning Protection System. The plant grounding and lightning protection electrical system is designed to provide a low-impedance path to ground for fault currents and lightning strokes.

This system is within the scope of license renewal because it is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection regulations.

Intermediate Range Monitoring System. The intermediate range monitoring electrical instrumentation and logic system is designed to monitor the neutron flux and power in the reactor core and to provide automatic core protection. The intermediate range monitoring system generates annunciator alarms, rod blocks, and scram signals for nuclear instrumentation degraded operation and downscale or upscale conditions. Additional detail of the system is in UFSAR Section 7.5.1.8.4.

45) provides the operator with power level indication and

This system is within the scope of license renewal because it senses process conditions and generates signals for a reactor trip or an ESF actuation.

Lighting System. The lighting system is comprised of the normal lighting and convenience system (outdoor area lighting, general plant lighting, office building lighting), emergency lighting, and security lighting. Additional detail of the system is in UFSAR Section 9.5.3.

This system is within the scope of license renewal because it is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection and SBO regulations.

Local Power Range Monitoring System and Average Power Range Monitoring System. The local power range and average power range monitoring electrical instrumentation and logic systems are designed to monitor the neutron flux and power in the reactor core and to provide automatic core protection. Additional detail of the system is in UFSAR ~~Section~~ 7.5.1.8.6.

46) Sections 46) and 7.5.1.8.7

This system is within the scope of license renewal because it senses process conditions and generates signals for a reactor trip or an ESF actuation.

Offsite Power System. The offsite power electrical distribution system is designed to connect OCGS to the offsite electrical transmission system. The purpose of the offsite power system is to connect to the output of the generator and to provide redundant sources of power to the plant when the main generator is offline. It accomplishes this purpose with a 230 kV substation and a connected 34.5 kV substation in a switchyard adjacent to the plant. Additional detail of the system is in UFSAR Section 8.2.

This system is within the scope of license renewal because it is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection and SBO regulations.

Post-Accident Monitoring System. The purpose of the post-accident electrical monitoring system is to display and record plant parameters of drywell radiation and pressure levels, torus level, and temperature and safety/relief valve flow detection during and following a LOCA. The system is comprised of containment high-range radiation monitors, safety valve and relief valve accident monitoring instrumentation, suppression pool temperature and water level monitors, and containment pressure indicators. Additional detail of the system is in UFSAR Sections 5.2.2.4.2.2, 7.6.1.4, and 11.5.2.13.

47) 1.9, 12.3.4.1.5,

This system is within the scope of license renewal because it (a) senses process conditions and generates signals for a reactor trip or an ESF actuation and (b) is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection and EQ regulations.

Radio Communications System. The radio communications electrical system is designed to provide two-way voice communication between personnel operating safe shutdown equipment during a fire emergency and SBO. The radio communications system is comprised of primary and installed spare base station transmitter-repeaters in the upper cable spreading room, portable radio units with batteries and chargers in the control room, and antennae with associated cabling at selected locations in the reactor building and turbine building. Electrical power for the primary base station transmitter and repeater is supplied from the 120V AC vital power system.

This system is within the scope of license renewal because it is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection and SBO regulations.

Reactor Overfill Protection System. The reactor overfill protection electrical instrumentation and logic system minimizes the potential for overfilling the reactor to the elevation of the main steam lines. Additional detail of the system is in UFSAR Section 7.7.1.6.

This system is within the scope of license renewal because failure of its components could adversely affect the safety-related RPS.

48) (See SER Section 3.7 for additional information on the Radio Communications System as it relates to the Meteorological Tower.)

49) Sections 7.2 and 7.3

Reactor Protection System. The RPS is an electrical logic system designed to furnish signals to trip the reactor and to initiate certain ESF systems. Additional detail of the system is in UFSAR ~~Section 7.2.~~

50) shutdown, whenever it is necessary

51) monitors conditions and controls plant equipment to achieve and maintain safe shutdown and

This system is within the scope of license renewal because it (a) senses process conditions and generates signals for a reactor trip or an ESF actuation and (b) is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection regulations.

Remote Shutdown System. The remote shutdown system enables operators to achieve and maintain hot and cold ~~shutdown whenever necessary~~ to evacuate the control room. The remote shutdown system is comprised of a remote shutdown panel and several local shutdown panels outside the control room. Additional detail of the system is in UFSAR Sections 9.5.1 and 3.1.15.

This system is within the scope of license renewal because it (a) senses process conditions and generates signals for a reactor trip or an ESF actuation and (b) is relied upon in safety analyses or plant evaluations to perform a function for compliance with fire protection, EQ, and SBO regulations.

52) Sections 8.3.4 and 15.9.

Station Blackout System. The SBO electrical supply system provides AAC power for the regulated event of loss of all AC power. The source of electrical power to the SBO system is the FRCT station, an electrical power plant owned, operated, and maintained by FirstEnergy and designed for peak loading to the grid. Additional detail of the system is in UFSAR ~~Section 8.3.4.~~

This system is within the scope of license renewal because it is relied upon in safety analyses or plant evaluations to perform a function for compliance with SBO regulations.

2.5.1.2 Electrical Commodity Groups

In LRA Section 2.5.2.5, the applicant described the electrical commodity groups subject to an AMR. The screening process for electrical components used plant documentation to identify the electrical component types within the electrical, mechanical, and civil or structural systems based on plant design documentation, drawings, the CRL, and interface with the parallel mechanical and civil screening efforts. These component types were grouped into a smaller set of electrical commodity groups identified from a review of NEI 95-10 Appendix B, the GALL Report, and information from previous LRAs.

The intended functions within the scope of license renewal include:

53) continuity

- provides electrical ~~connections to specified sections of an electrical circuit~~
- provides insulation and support for an electric conductor
- provides pressure-retaining boundary; fission product barrier; containment isolation
- ~~provides structural support or structural integrity to preclude nonsafety-related component interactions that could prevent satisfactory accomplishment of a safety-related function~~

54) delete text

In LRA Table 2.5.2, the applicant identified the following electrical commodity group component types within the scope of license renewal and subject to an AMR:

- cable connections (metallic parts)
- electrical penetrations

(4) Transmission Conductors and Connections - Transmission conductors that provide a portion of the circuits supplying power from the switchyard to plant buses during recovery from an SBO or fire protection event meet the 10 CFR 54.21(a)(1)(ii) screening criterion and are subject to an aging management review.

(5) Fuse Holders - Both the metallic and nonmetallic portions of fuse holders not included in the Environmental Qualification Program meet the 10 CFR 54.21(a)(1)(ii) screening criterion and are subject to an AMR.

(6) Wooden Utility Poles - Wooden utility poles did not fit within an existing electrical commodity group; therefore, a separate commodity group was created. Utility poles provide structural support for transmission conductors, high-voltage insulators, and other active electrical components supplying power from the switchyard to plant buses during recovery from an SBO or fire protection event. The wooden utility poles meet the 10 CFR 54.21(a)(1)(ii) screening criterion and are subject to an AMR.

(7) Cable Connections (Metallic Parts) - The cable connections commodity group includes the metallic portions of cable connections not included in the Environmental Qualification Program. The metallic connections evaluated include splices, threaded connectors, compression type termination lugs, and terminal blocks.

(8) Uninsulated Ground Conductors - The uninsulated ground conductors commodity group is comprised of grounding cable and connectors.

The components which support or interface with electrical components (e.g., cable trays, conduits, instrument racks, panels, and enclosures) are assessed as part of the ~~structural component support commodity group in LRA Section 2.4.18.~~ 55) structures in which they are located, as discussed in LRA Section 2.4.

2.5.2 Staff Evaluation

The staff reviewed LRA Section 2.5 and the UFSAR using the evaluation methodology of SER Section 2.5. The staff conducted its review in accordance with the guidance of SRP-LR Section 2.5.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant had not omitted from the scope of license renewal any components with intended functions under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components subject to an AMR in accordance with 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.5 identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

In RAI 2.5.1.19-1 dated September 28 2005, the staff stated that the combustion turbine power plant was determined to be within the scope of license renewal. The staff requested that the applicant evaluate the long-lived passive components of the combustion turbine power plant and any AMPs and AMRs related to those components in the same format and depth as used in the diesel generator section of the LRA.

In its response dated October 12, 2005, the applicant stated:

> AmerGen has taken a more detailed approach to scoping, screening, aging management reviews and aging management programs, for long-lived passive components, than was previously presented in the Oyster Creek License Renewal Application submittal for the Oyster Creek Station Blackout System, Combustion Turbine Power Plant.

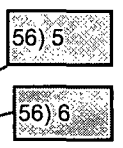
In addition, the applicant revised Commitment Nos. 31 and 36. Furthermore, Commitment No. 43, "Periodic Monitoring of Combustion Turbine - Electrical," was completely modified as follows:

> A new plant specific program, 'Periodic Monitoring of Combustion Turbine Power Plant - Electrical' is credited. The program will be used in conjunction with the existing 'Structures Monitoring Program' and the new 'Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.59 Environmental Qualification Requirements Program', to manage the aging effects for the electrical commodities that support Forked River Combustion Turbine (FRCT) operation. The Program consists of visual inspections of accessible electrical cables and connections exposed in enclosures, pits, manholes and pipe trench; visual inspection for water collection in manholes, pits, and trenches, located on the FRCT site, for inaccessible medium voltage cables; and visual inspection of accessible phase bus and connections and phase bus insulators/supports. The new program will be performed on a 2-year interval for manhole, pit and trench inspections, on a 5-year interval for phase bus inspections, and on a 10-year interval for cable and connection inspections.

In Appendix B of this letter, the applicant described the scoping system in more detail, correlating to LRA Section 2.5.1.19, "Station Blackout," for scoping and screening results. Sixteen subsystem descriptions (e.g., fuel oil system, combustion turbine inlet and exhaust system, cooling water system), combustion turbine structure and electrical commodity descriptions, and associated system boundary details have been added to the scoping information. The applicant stated that the expanded information is consistent with such other LRA system information as the EDGs.

The applicant identified and described the following SBO system electrical commodity groups subject to AMR in Section 2.5.2A.5 of its letter:

- cable connections (metallic parts) (Section 2.5.2A.5.1)
- high-voltage insulators (Section 2.5.2A.5.2)
- insulated cables and connections (Section 2.5.2A.5.3)
- phase bus (Section 2.5.2A.5.4)
- transmission conductors and connections (Section 2.5.2A.5.4)
- uninsulated ground conductors (Section 2.5.2A.5.5)



The staff reviewed the applicant's response following the guidance of SRP-LR, Section 2.5. The staff agreed that the electrical commodities groups in the SBO recovery path consisting of passive long-lived components subject to AMR are in accordance with 10 CFR 54.21(a)(1).

In RAI 2.5.2-1 dated March 20, 2006, the staff noted that LRA Section 2.5.2.5 describes electrical commodity groups subject to an AMR. The staff requested that the applicant confirm that, in addition to power circuits in the electrical systems, the control circuits also had been considered in

57) have

57) have

The staff agrees that the applicant responses dated October 12, 2005, and April 18, 2006, ~~has~~ adequately addressed the staff concerns and ~~had~~ not omitted any passive, long-lived components subject to an AMR in accordance with 10 CFR 54.21(a)(1). The staff's concerns described in RAIs 2.5.1.19-1, 2.5.2-1, ~~2.5.3-1, 2.5.3-2,~~ 2.5.2.5-1, and 2.5.2.5-2 are resolved.

58) 2.5.2.3-1, 2.5.2.3-2,

2.5.3 Conclusion

The staff reviewed the LRA, the UFSAR, and RAI responses to determine whether any SSCs within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff determined whether any components subject to an AMR had not been identified by the applicant. No omissions were identified. The staff's review concluded that there is reasonable assurance that the applicant has adequately identified the electrical commodity group components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

2.6 Conclusion for Scoping and Screening

The staff reviewed the information in LRA Section 2, "Scoping and Screening Methodology for Identifying Structures and Components Subject to Aging Management Review, and Implementation Results." The staff determined that the applicant's scoping and screening methodology is consistent with 10 CFR 54.21(a)(1) requirements and the staff's position on the treatment of safety-related and nonsafety-related SSCs within the scope of license renewal and that the SCs requiring an AMR is consistent with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

On the basis of its review, the staff concludes that the applicant has adequately identified systems and components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

The staff's review concludes that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB, and any changes made to the CLB, in order to comply with 10 CFR 54.29(a), with the Atomic Energy Act of 1954, as amended, and with NRC regulations.

In its Table 1s the applicant summarized the portions of the application that it considered to be consistent with the GALL Report. In its Table 2s the applicant identified the linkage between the scoping and screening results in LRA Section 2 and the AMRs in LRA Section 3.

3.0.1.1 Overview of Table 1

Each Table 3.x.1 (Table 1) provides a summary comparison of how the facility aligns with the corresponding tables in the GALL Report. The tables are essentially the same as Tables 1 through 6 in the GALL Report, except that the "ID" column has been deleted, the "Type" column has been replaced by an "Item Number" column, and the "Related Generic Item" and "Unique Item" columns have been replaced by a "Discussion" column. The "Item Number" column provides the staff reviewer with a means to cross-reference Table 2s with Table 1s. The "Discussion" column is used by the applicant to provide clarifying information. The following are examples of information that might be in this column:

- further evaluation recommended - information or reference to where that information is located
- the name of a plant-specific program used
- exceptions to GALL Report assumptions
- a discussion of how the line is consistent with the corresponding line item in the GALL Report when it may not be intuitively obvious
- a discussion of how the item is different from the corresponding line item in the GALL Report (e.g., when there is exception taken to a GALL AMP)

The format of each Table 1 allows the staff to align a specific row in the table with the corresponding GALL Report table row so that the consistency can be easily checked. It should be noted that, since the LRA was prepared based on the draft January 2005 version of the GALL Report, there is not always a one-to-one correspondence between the LRA Table 1 line items and the line items in the September 2005 Revision 1 of the GALL Report, which was used as the basis for this safety evaluation.

59) containment spray system, and standby gas treatment system.

3.0.1.2 Overview of Table 2

Each Table 3.x.2.1.y (Table 2) provides the detailed results of the AMRs for those components identified in LRA Section 2 as subject to an AMR. The LRA contains a Table 2 for each of the systems or structures within a specific system grouping (e.g., reactor coolant systems, engineered safety features, auxiliary systems, etc.). For example, the engineered safety features group contains tables specific to the core spray system, ~~high pressure coolant injection system, and residual heat removal system~~. Each Table 2 consists of the following nine columns:

(1) Component Type – The first column identifies the component types from LRA Section 2 that are subject to an AMR. The component types are listed in alphabetical order.

(2) Intended Function – The second column identifies the license renewal intended functions for the listed component types. Definitions of intended functions are contained within LRA Table 2.1-1.

(3) Material – The third column lists the particular construction materials for the component type.

(4) Environment – The fourth column lists the environment to which the component types are exposed. Internal and external service environments are indicated and a list of these environments is provided in LRA Tables 3.0-1 and 3.0-2, respectively.

(5) Aging Effect Requiring Management – The fifth column lists aging effects requiring management (AERMs). As part of the AMR process, the applicant determined any AERMs for each combination of material and environment.

(6) Aging Management Programs – The sixth column lists the AMPs that the applicant uses to manage the identified aging effects.

(7) NUREG-1801 Vol. 2 Item – The seventh column lists the GALL Report item(s) that the applicant identified as similar to the AMR results in the LRA. The applicant compared each combination of component type, material, environment, AERM, and AMP in LRA Table 2 with the items in the GALL Report. If there were no corresponding items in the GALL Report, the applicant left the column blank. In this way, the applicant identified in the LRA tables AMR results that correspond to the items in the GALL Report tables.

(8) Table 1 Item – The eighth column lists the corresponding summary item number from LRA Table 1. If the applicant identified in each LRA Table 2 AMR results consistent with the GALL Report, then the associated Table 1 line item summary number should be listed in LRA Table 2. If there is no corresponding item in the GALL Report, column eight is left blank. In this manner, the information from the two tables can be correlated.

(9) Notes – The ninth column lists the corresponding notes that the applicant used to identify how the information in each Table 2 aligns with the information in the GALL Report. The notes ~~are~~ identified by letters ~~and~~ were developed by an NEI work group. These notes will be used in future LRAs. Any plant-specific notes are identified by a number and provide additional information concerning the consistency of the line item with the GALL Report.

3.0.2 Staff's Review Process

60) delete text

The staff conducted the following three types of evaluations of the AMRs and associated AMPs:

(1) For items that the applicant stated were consistent with the GALL Report, the staff conducted either an audit or a technical review to determine consistency with the GALL Report.

(2) For items that the applicant stated were consistent with the GALL Report with exception(s) and/or enhancement(s), the staff conducted either an audit or a technical review of the item to determine consistency with the GALL Report. In addition, the staff conducted either an audit or a technical review of the applicant's technical justifications for the exceptions and of the adequacy of the enhancements.

The SRP-LR states that an applicant may take one or more exceptions to specific GALL AMPs program elements. However, any deviation or exception to the GALL AMP should be described and justified. Therefore, the staff considers exceptions as portions of the GALL AMP that the applicant does not intend to implement.

In some cases, an applicant may choose an existing plant program that does not meet all the program elements defined in the GALL AMP. However, the applicant may make a commitment to augment the existing program to satisfy the GALL AMP prior to the period of extended operation. Therefore, the staff considers these revisions or additions to be enhancements. Enhancements include, but are not limited to, those activities needed to

OCGS AMP (LRA Section)	GALL Comparison	GALL AMP(s)	LRA Systems or Structures That Credit the AMP	Staff's SER Section
10 CFR Part 50, Appendix J (B.1.29)	Consistent	XI.S4	auxiliary systems; containment, structures, component supports, and piping and component insulation	3.0.3.1.6
Masonry Wall Program (B.1.30)	Consistent	XI.S5	containment, structures, component supports, and piping and component insulation	3.0.3.1.7
Structures Monitoring Program (B.1.31)	Consistent with enhancements	XI.S6	reactor vessel, internals, and reactor coolant systems; ESFs; auxiliary systems; steam and power conversion system; containment, structures, component supports, and piping and component insulation FRCT Mechanical Systems FRCT Electrical Systems FRCT Structural Systems Met Tower Structural Systems Radio Com. System	3.0.3.2.24
RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.1.32)	Consistent with enhancements	XI.S7	containment, structures, component supports, and piping and component insulation	3.0.3.2.25
Protective Coating Monitoring and Maintenance Program (B.1.33)	Consistent 61) with enhancements	XI.S8	containment, structures, component supports, and piping and component insulation	3.0.3.1.8
Electircal Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrument Circuits (B.1.35)	Consistent with enhancements	XI.E2	electrical components	3.0.3.2.26
Periodic Testing of Containment Spray Nozzles (B.2.1)	Plant-specific	NA	ESFs	3.0.3.3.1
Lubricating Oil Monitoring Activities (B.2.2)	Plant-specific	NA	reactor vessel, internals, and reactor coolant systems; auxiliary systems; steam and power conversion system	3.0.3.3.2

OCGS AMP (LRA Section)	GALL Comparison	GALL AMP(s)	LRA Systems or Structures That Credit the AMP	Staff's SER Section
Generator Stator Water Chemistry Activities (B.2.3)	Plant-specific	NA	steam and power conversion system	3.0.3.3.3
Periodic Inspection of Ventilation Systems (B.2.4)	Plant-specific	NA	ESFs; auxiliary systems	3.0.3.3.4
Periodic Monitoring of Combustion Turbine Power Plant (B.2.7)	Plant-specific	NA	This AMP was deleted.	3.0.3.3.7
Metal Fatigue of Reactor Coolant Pressure Boundary (B.3.1)	Consistent with enhancement	X.M1	reactor vessel, internals, and reactor coolant systems	3.0.3.2.27
Environmental Qualification (EQ) Program (B.3.2)	Consistent	X.E1	electrical components	3.0.3.1.11
New AMPs				
Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.1.10)	Consistent	XI.M13	reactor vessel, internals, and reactor coolant systems	3.0.3.1.1
Aboveground Outdoor Tanks (B.1.21)	Consistent with exception	XI.M29	auxiliary systems; steam and power conversion system	3.0.3.2.18
One-Time Inspection (B.1.24)	Consistent 62) with exceptions	XI.M32	reactor vessel, internals, and reactor coolant systems; ESFs; auxiliary systems; steam and power conversion system; containment, structures, component supports, and piping and component insulation	3.0.3.1.4
Selective Leaching of Materials (B.1.25)	Consistent	XI.M33	ESFs; auxiliary systems; steam and power conversion system	3.0.3.1.5
Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B.1.34)	Consistent	XI.E1	electrical components	3.0.3.1.9

OCGS AMP (LRA Section)	GALL Comparison	GALL AMP(s)	LRA Systems or Structures That Credit the AMP	Staff's SER Section
(B.1.38)				
Lubricating Oil Analysis - FRCT (B.1.39)	Consistent with exceptions	XI.M39	FRCT Mechanical Systems	3.0.3.2.36
Periodic Monitoring of Combustion Turbine Power Plant Electrical (B.1.37)	N/A	OCGS plant-specific program	FRCT Electrical Systems	3.0.3.3.8
Periodic Inspection Program - FRCT (B.2.5A)	N/A	OCGS plant-specific program	FRCT Mechanical Systems	3.0.3.3.9
Buried Piping Inspection-Met Tower (B.1.26B)	Consistent with exceptions	XI.M34	Met Tower Mechanical Systems	3.0.3.2.37

3.0.3.1 AMPs That Are Consistent with the GALL Report

In LRA Appendix B, the applicant identified the following AMPs as consistent with the GALL Report:

- Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) (B.1.10)
- Flow-Accelerated Corrosion (B.1.11)
- Compressed Air Monitoring (B.1.17)
- ~~One-Time Inspection (B.1.24)~~ 63) delete text
- Selective Leaching of Materials (B.1.25)
- 10 CFR Part 50, Appendix J (B.1.29)
- Masonry Wall Program (B.1.30)
- ~~Protective Coating Monitoring and Maintenance Program (B.1.33)~~ 64) delete text
- Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B.1.34)
- Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B.1.36)
- Environmental Qualification (EQ) Program (B.3.2)
- Electrical Cable Connections - Metallic Parts - Not Subject to 10 CFR 50.49 Environmental Qualification Requirements (B.1.40)

3.0.3.1.1 Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS)

consistent with the OCGS response to Generic Letter (GL) 88-14, "Instrument Air Supply Problems," and utilize guidance and standards provided by the Institute of Nuclear Power Operations (INPO) Significant Operating Experience Report (SOER) 88-01, EPRI TR-108147, and American Society of Mechanical Engineers (ASME) OM-S/G-1998, Part 17. Testing and monitoring activities are implemented through station procedures.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's evaluation of this AMP are documented in the Audit and Review Report Section 3.0.3.1.3. The staff found the Compressed Air Monitoring Program consistent with GALL AMP XI.M24, including the associated operating experience attribute.

Operating Experience. In LRA Section B.1.17, the applicant stated that the reliability of the instrument air system has improved since the implementation of GL 88-14 activities and industry guidance. The Compressed Air Monitoring Program has implemented new industry air quality standard, ISA-S7.0.01-1996, consistent with the GALL Report, and replacement dryers have increased air quality as indicated by air quality test results and dewpoint monitoring.

UFSAR Supplement. In LRA Section A.1.17, the applicant provided the UFSAR supplement for the Compressed Air Monitoring Program. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Compressed Air Monitoring Program, the staff determined that all the program elements are consistent with the GALL Report. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.1.4 One-Time Inspection

65) This program discussion section should be moved to SER section 3.0.3.2.

Summary of Technical Information in the Application. In LRA Section B.1.24, the applicant described the new One-Time Inspection Program as consistent with GALL AMP XI.M32, "One-Time Inspection."

65) with exceptions,

The applicant stated that the One-Time Inspection Program provides reasonable assurance that an aging effect does not occur or occurs so slowly as not to affect the component or structure intended function during the period of extended operation and therefore requires no additional aging management. The program will be credited for cases where either (a) an aging effect is not expected to occur but there is insufficient data to rule it out completely, (b) an aging effect is expected to progress very slowly in the specified environment, but the local environment may be more adverse than generally expected; or (c) the characteristics of the aging effect include a long incubation period. This program will be used for the following:

- To confirm that crack initiation and growth due to stress corrosion cracking (SCC), intergranular stress corrosion cracking (IGSCC), or thermal and mechanical loading does not occur in Class 1 piping less than 4-inch nominal pipe size (NPS) exposed to reactor coolant.

Program. Implementation of one-time inspections will be through the normal maintenance planning process.

The staff reviewed the inspection sample basis document, an OCGS report titled "Inspection Sample Basis, Oyster Creek License Renewal Project" dated August 16, 2005, and determined that it provides an adequate rationale for selecting one-time inspection samples to manage the aging effects for which it is credited.

The staff also reviewed the following exceptions to the GALL Report program elements identified by the applicant.

Exception 1. In its reconciliation document, the applicant identified an exception to the GALL Report program elements "scope of program," "preventive actions," "parameters monitored or inspected," "detection of aging effects," "monitoring and trending," and "acceptance criteria." Specifically, the exception stated that:

> NUREG-1801 states in XI.M32 that one-time inspection of Class 1 piping less than or equal to NPS 4 is addressed in Chapter XI.M35, One Time Inspection of ASME Code Class 1 Small Bore-Piping. NUREG-1801 aging management program XI.M35, One Time Inspection of ASME Code Class 1 Small Bore-Piping will not be used at Oyster Creek. The new Oyster Creek One-Time Inspection aging management program will include the one-time inspection of Class 1 piping less than ~~or equal to~~ NPS 4.

66) delete text

In its letter dated March 30, 2006, the applicant committed (Commitment No. 24) to revise the One-Time Inspection Program in the LRA to include the exception identified in the reconciliation document, which states that the new One-Time Inspection Program will include the one-time inspection of Class 1 piping less than ~~or equal to~~ NPS 4, and that GALL AMP XI.M35, "One-Time Inspection of ASME Code Class 1 Small Bore Piping," will not be used.

The staff compared the program elements for the One-Time Inspection Program to those for GALL AMP XI.M35 to determine whether they were consistent for the inspection of piping less than 4-inch NPS. Specifically, because the selection of the one-time inspection sample for the One-Time Inspection Program is described in the OCGS inspection sample basis document, an OCGS report titled "Inspection Sample Basis, Oyster Creek License Renewal Project" dated August 16, 2005, the staff reviewed this document to determine how the small bore piping inspection sample will be determined. GALL AMP XI.M35 recommends for ASME Code Class 1 small bore piping a one-time inspection with volumetric examination on selected weld locations to detect cracking. The sample size should be based on susceptibility, accessibility for inspection, dose considerations, operating experience, and limiting locations of the total population of ASME Code Class 1 smallbore piping locations.

The staff noted that the inspection sample basis document stated that sample size for Class 1 piping less than 4-inch NPS will include 10 percent of the total butt welds, and inspection locations will be based on physical accessibility, exposure levels, non-destructive examination (NDE) techniques, and will be determined by the site. The applicant was asked to clarify the process for selecting pipe inspection samples to ensure that different piping sizes, including socket-welded piping, are included in the sample selection for Class 1 piping less than 4-inch NPS.

In its response to the staff's questions on this issue, the applicant committed to the following:

> The one-time inspection program will also include destructive or non-destructive examination of one socket welded connection using techniques proven by past industry experience to be effective for the identification of cracking in small bore socket welds. This examination will be an examination of opportunity (e.g., socket weld failure or socket weld replacement). Should an inspection of opportunity not occur prior to entering the period of extended operation, a susceptible small bore socket weld will be examined either destructively or non-destructively prior to entering the period of extended operation. The current plan is to examine a susceptible small bore Class 1 elbow off of an isolation condenser system drain line. Results of the inspection will be evaluated in accordance with the Oyster Creek 10 CFR Part 50, Appendix B Corrective Action process.

In its letter dated May 1, 2006, the applicant committed (Commitment No. 24) to such inspections of small-bore piping as part of the One-Time Inspection Program.

The staff determined that the applicant had committed to do a non-destructive or destructive examination of one socket weld prior to the period of extended operation in response to the staff's concern in this area. As this is a sampling process, the staff determined that one socket weld will represent the population for Class 1 piping less than 4-inch NPS. With this new commitment and the examination of 10 percent of the ~~butt-welded~~ small bore piping, there is reasonable assurance that the aging of small bore piping will be adequately managed during the period of extended operation.

67) butt welds in all Class 1

Exception 2. In its reconciliation document the applicant identified an exception to the GALL Report program elements "scope of program," "parameters monitored or inspected," "detection of aging effects," "monitoring and trending," and "acceptance criteria." Specifically, the exception stated that:

> NUREG-1801 references, in XI.M32 and XI.M35, the 2001 ASME Section XI B&PV Code, including the 2002 and 2003 Addenda for Subsections IWB, IWC, and IWD. The current Oyster Creek ISI Program Plan for the fourth ten-year inspection interval effective from October 15, 2002 through October 14, 2012, approved per 10CFR50.55a, is based on the 1995 ASME Section XI B&PV Code, including 1996 addenda. The next 120-month inspection interval for Oyster Creek will incorporate the requirements specified in the version of the ASME Code incorporated into 10 CFR 50.55a twelve months before the start of the inspection interval.

In its letter dated March 30, 2006, the applicant stated that the One-Time Inspection Program will be revised to include this exception.

The staff evaluated this exception as part of its review of AMP B.1.1, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD," and found it acceptable as consistent with the requirements of 10 CFR 50.55a. The staff's evaluation is discussed in SER Section 3.0.3.2.1.

68) Move this program discussion section to SER Section 3.0.3.2

3.0.3.1.8 Protective Coating Monitoring and Maintenance Program

68) , with enhancements,

Summary of Technical Information in the Application. In LRA Section B.1.33, the applicant described the existing Protective Coating Monitoring and Maintenance Program as consistent with GALL AMP XI.S8, "Protective Coating Monitoring and Maintenance Program."

The Protective Coating Monitoring and Maintenance Program provides for aging management of Service Level I coatings inside the primary containment and Service Level II coatings for the external drywell shell in the sandbed region. Service Level I coatings are used in areas where coating failure could affect the operation of post-accident fluid systems adversely and thereby impair safe shutdown. OCGS was not originally committed to Regulatory Guide (RG) 1.54 for Service Level I coatings because the plant was licensed prior to the issuance of this RG in 1974. Currently, OCGS is committed to a modified version of this RG as described in the response to GL 98-04 and as detailed in the Exelon Quality Assurance Topical Report (QATR) NO-AA-10. Service Level II coatings provide corrosion protection and decontamination ability in areas outside of the primary containment subject to radiation exposure and radionuclide contamination. The Protective Coating Monitoring and Maintenance Program provides for visual inspections, assessment, and repairs for any condition that adversely affects the ability of Service Level I coatings or sandbed region Service Level II coatings to function as intended.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's evaluation of this AMP are documented in the Audit and Review Report Section 3.0.3.1.8.

69) S

69) internal surfaces of the

During the audit the staff requested that the applicant clarify which coatings are credited for corrosion protection of metal surfaces. In its response, the applicant clarified that Service Level 2 coatings are used only for corrosion protection in the external drywell shell sand bed region. Similarly, while some service Level 1 coatings are used to provide corrosion protection, the applicant does not credit them for corrosion protection for the drywell shell ~~above the sand bed region~~ for license renewal purposes. An analysis has been performed which demonstrates that the upper portion of the drywell vessel will meet ASME Code requirements for the remaining life of the plant based on corrosion rates. The corrosion of the drywell shell above the sand bed region is considered a time-limited aging analysis (TLAA) and is further described in LRA Section 4.7.2. However, Service Level 1 coatings are credited for corrosion protection for the vent header and torus.

69) delete text

The applicant further stated that for loss of coolant accident debris generation and transport, the drywell coating is qualified for such an environment. The mass of coating released following a loss of coolant accident jet impingement was conservatively estimated at 47 pounds. No additional coating flaking was assumed due to the harsh environment because the coating is qualified. Coating within the vent system and torus is expected to contribute 0 pounds of debris to the suction strainer load following a loss of coolant accident. However, the analysis conservatively assumed 10 pounds of debris attributed to the vent system and torus coating.

The staff also requested that the applicant clarify whether any Service Level III coatings are credited for corrosion protection for license renewal. In its response, the applicant stated that Exelon Corporate Procedure ER-AA-330-008 in paragraph 2.7.3 defines Service Level III coatings as coatings used on any exposed surface area located outside containment whose failure could affect normal plant operation or orderly and safe plant shutdown adversely. Service Level III coatings are also used in areas outside the reactor containment where failure could affect the

safety function of a safety-related structure, system, or component adversely. Specification SP-9000-06-004 in paragraph 3.2.1.c specifies the use of Service Level III coatings on structures/components subjected to a corrosive environment (e.g., liquid immersion, saltwater contact, underground burial, outdoor exposure, etc.). For license renewal Service Level III coatings are credited only for corrosion protection for the external surfaces of piping and fittings exposed to a soil (external) environment in the emergency service water (ESW) system, SW system, and roof drain and overboard discharge system. These coatings are managed under the Buried Piping Inspection Program. Other than the Service Levels I and II coatings discussed in PBD-AMP-B.1.33, and the Service Level III coatings described in response to this question no other protective coatings are credited for corrosion protection for license renewal.

The staff also noted that the discussion in LRA Table 3.5.1, item 3.5.1-15, appears to identify a scope larger than that identified in the AMP description. The staff requested that the applicant clarify the scope of this program. In its response, the applicant stated that the structures or components and environments "rolled-up" into LRA Table 3.5.1 item 3.5.1-15 (reference LRA Table 3.5.2.1.1 for primary containment) include the following:

- access hatch covers - containment atmosphere (internal)
- downcomers - containment atmosphere
- drywell penetration sleeves - containment atmosphere (internal)
- drywell shell - containment atmosphere (internal) and indoor air (external)
- personnel airlock/equipment hatch - containment atmosphere (internal)
- suppression chamber penetrations - containment atmosphere (internal)
- suppression chamber ring girders - containment atmosphere (external)
- suppression chamber shell - containment atmosphere (internal)
- vent line, and vent header - containment atmosphere (internal) and indoor air (external)
- downcomers - immersed
- suppression chamber ring girders - immersed
- suppression chamber penetrations - immersed
- suppression chamber shell - immersed

The applicant stated that for Service Level I coatings the Protective Coating Monitoring and Maintenance Program is not used to manage loss of material for access hatch covers, drywell penetration sleeves, and personnel airlock/equipment hatches exposed to a containment atmosphere (internal) environment. Accordingly, LRA Table 3.5.2.1.1 for the primary containment will be revised to delete the Protective Coating Monitoring and Maintenance Program from these component types exposed to a containment atmosphere environment. For Service Level II coatings, the Protective Coating Monitoring and Maintenance Program is not used to manage corrosion for the vent line and vent header exposed to an indoor air (external) environment. Accordingly, LRA Table 3.5.2.1.1 and Table 3.5.1, item 3.5.1-15, will be revised to delete the Protective Coating Monitoring and Maintenance Program from this component type exposed to an indoor air environment.

In its letter dated April 17, 2006, the applicant stated that LRA Tables 3.5.2.1.1 and 3.5.1 will be revised to delete the Protective Coating Monitoring and Maintenance Program from line items to manage loss of material for access hatch covers, drywell penetration sleeves, and personnel airlock/equipment hatches exposed to a containment atmosphere (internal) environment and line items to manage corrosion for the vent line and vent header exposed to an indoor air (external) environment.

The staff finds the applicant's clarifications acceptable because they defined the scope of coatings credited for corrosion protection and also defined the coatings specifically monitored and maintained by the Protective Coating Monitoring and Maintenance Program for license renewal.

During its review of plant-specific operating experience related to containment degradation, the staff asked a number of questions about the implementation of the Protective Coating Monitoring and Maintenance Program for the exterior surface of the sand bed region and for the submersed interior surface of the torus. The staff's inquiries and assessments of the applicant's responses are documented in the evaluation of the applicant's ASME Section XI, Subsection IWE Program summarized in SER Section 3.0.3.2.22. The applicant made new commitments related to monitoring of ~~the~~ primary containment coatings in accordance with ASME Section XI, Subsection IWE (Commitment No. 33).

71) these

Subsequent to the audit, in response to RAI 4.7.2-1, by letter dated June 20, 2006, the applicant provided additional information regarding the coatings credited for corrosion mitigation for primary containment and activities associated with drywell shell corrosion. The staff's evaluation of the applicant's information and commitments is documented in SER Section 4.7.2.

Although the LRA did not identify any enhancements for the Protective Coating Monitoring and Maintenance Program, the applicant's program basis document, (PBD)-AMP-B.1.33, "OCGS Program Basis Document: Protective Coating Monitoring and Maintenance Program," Revision 0, identified the following enhancement to meet the GALL Report program elements:

72) 1

Enhancement: The applicant identified an enhancement to its program elements "parameters monitored or inspected," "detection of aging effects," and "acceptance criteria." Specifically, the enhancement stated that:

> The inspection of Service Level I and Service Level II protective coatings that are credited for mitigating corrosion on interior surfaces of the Torus shell and vent system, and, on exterior surfaces of the Drywell shell in the area of the sand bed region, will be consistent with ASME Section XI, Subsection IWE requirements.

The staff requested that the applicant clarify what changes were necessary to make the Protective Coating Monitoring and Maintenance Program consistent with ASME Code Section XI, Subsection IWE requirements. In its response, the applicant stated that the requirements for coating inspections are included in OCGS specifications SP-1302-52-120, "Specification for Inspection and Localized Repair of the Torus and Vent System Coating," and IS-328227-004, "Functional Requirements for Drywell Containment Vessel Thickness Examination." These specifications do not invoke all of the requirements of ASME Code Section XI, Subsection IWE. The following requirements will be included in these inspection specifications:

(1) Torus and vent system internal coating inspections will be per Examination Category E-A and will require VT-3 visual examinations per IWE-3510.2. The inspected area shall be examined (as a minimum) for evidence of flaking, blistering, peeling, discoloration, and other signs of distress. Disposition of suspect areas shall be by engineering evaluation or correction by repair or replacement in accordance with IWE-3122. Supplemental examinations in accordance with IWE-3200 shall be performed when specified as a result of engineering evaluation.

72) Add three additional enhancements as described in the Proposed Changes column of comment form.

73)

failures all 47 cable circuits are conservatively assumed to have potential exposure to significant moisture conditions. This program will inspect manholes, conduits, and sumps of the 47 cable circuits for water collection so draining or other corrective actions can be taken. In addition, these medium-voltage cable circuits will be tested for deterioration of the insulation system due to wetting by a proven test like power factor, partial discharge, or polarization index as described in EPRI TR-103834-P1-2, or other state-of-the-art testing at the time. Cable testing will be performed at least once every10 years testing frequency will be adjusted in accordance with the results obtained. The first tests will be completed prior to the period of extended operation.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's evaluation of this AMP are documented in the Audit and Review Report Section 3.0.3.1.10. The staff determined that, with Commitment No. 36, the Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is consistent with GALL AMP XI.E3, including the associated operating experience attribute.

74) delete text

The staff requested that the applicant ~~to~~ clarify its use of polarization index testing. In its response, the applicant stated that current methodologies at OCGS implement a polarization index test as part of step voltage and Megger testing, and the applicant does not currently use, nor does it plan to use in the future, polarization index testing as the sole condition monitoring test in its Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program.

In its letter dated April 17, 2006, the applicant stated that the Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program will be revised to clarify that polarization index testing is not used as the sole condition monitoring test for medium-voltage cable circuits.

The staff's review of LRA Section B.1.36 identified an area in which additional information was necessary to complete the review of the applicant's program elements. The applicant responded to the staff's request for additional information (RAI) as discussed below.

As stated in SER Section 2.5, in RAI 2.5.1.19-1 dated September 28, 2005, the staff expressed the need for additional information to continue its review of long-lived passive components of the Forked River combustion turbines (FRCTs). By letters dated October 12, 2005, and November 11, 2005, the applicant responded. The Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program scope has been revised to include 13.8 kV inaccessible medium-voltage cables associated with the FRCTs. The staff noted that OCGS has included 2.3 kV, 4.1 kV, and 13.8 kV system circuits in the scope of the Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program. In addition, as a result of the applicant's reconciliation of the September 2005 revision of the GALL Report with the January 2005 draft revision, 34.5 kV system cables will be added to this program.

In its letter dated March 30, 2006, the applicant committed (Commitment No. 36) to revise the Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program in the LRA to include 34.5 kV system cables in the program.

Operating Experience. In LRA Section B.1.36, the applicant explained that OCGS has experienced eleven in-service medium voltage circuit failures to date, five from water intrusion,

75) In its letter dated June 23, 2006, the applicant committed (Commitment No. 36) to revise the Inaccessible Medium Voltage Cables not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program, including Appendix A Section A.1.36 to test cable circuits at an initial frequency of six years, after which the frequency will be evaluated and adjusted, based on test results; period between tests shall not exceed 10 years.

76) delete dash

four from manufacturing defects, and two from a single lightning strike. The majority of those failures occurred in EPR-insulated "UniShield" cables manufactured by Anaconda before 1985. In 1991, OCGS implemented a medium voltage cable testing program covering all 47 of its medium voltage circuits in an attempt to identify cable degradation so that appropriate corrective action could be taken prior to failure. The results of that inspection program have successfully identified degradation in cross-linked polyethylene (XLPE) insulated cables prior to failure. The results failed to identify degradation in EPR-insulated cables.

The applicant stated that testing under the current cable testing program has successfully identified degradation in XLPE-insulated cables (e.g., General Electric (GE) Vulkene) so that replacements could be made prior to in-service failures. Eleven XLPE-insulated cable circuit replacements have been made based on test results since the testing program was implemented in 1991. No in-service failures of XLPE-insulated cable have occurred since the testing program was implemented in 1991.

The applicant also stated that the current cable testing program has not been successful at identifying degradation in EPR-insulated UniShield type cables (for example, Anaconda UniShield) so that replacements could be made prior to in-service failures. Five in-service failures of UniShield cable circuits exposed to moisture have occurred since the testing program was implemented in 1991. Four of the five failed cables were manufactured before UniShield manufacturing process improvements to address manufacturing defects were implemented in mid-1984. OCGS has experienced no failures in UniShield cables manufactured since that date.

The fifth and most recent in-service cable failure occurred in 2003. Corrective actions were completed to (1) test failed cables to confirm the failure mechanisms, (2) confirm the accuracy of configuration information for 4160V circuits, (3) evaluate all remaining UniShield cables and replace or schedule for replacement of any manufactured before 1985 which might be exposed to significant moisture, and (4) eliminate the future use of UniShield cables.

The applicant tested 18 of its medium voltage cable circuits in 2004 in a trial use of a new, state-of-the-art testing method based on partial discharge. As a result, one XLPE-insulated cable was replaced. Additional medium voltage cables were tested in 2005. The current inspection program will remain in effect until replaced by the Inaccessible Medium Voltage Cables Not Subject To 10 CFR 50.49 Environmental Qualification Requirements Program before entering the period of extended operation.

The Inaccessible Medium Voltage Cables Not Subject To 10 CFR 50.49 Environmental Qualification Requirements Program is new; therefore, no programmatic operating experience is available. The staff reviewed the operating experience provided in the LRA and interviewed the applicant's technical personnel to confirm that the plant-specific operating experience revealed no degradation not bounded by industry experience.

The staff noted that the new Inaccessible Medium Voltage Cables Not Subject To 10 CFR 50.49 Environmental Qualification Requirements Program now includes the underground circuits in the 2.4 kV, 4.16 kV, 13.8 kV, and 34.5 kV systems. This program will test in-scope medium-voltage cables at OCGS for an indication of the condition of the conductor insulation. The specific type of test performed will be an industry-endorsed, proven test for detecting deterioration of the insulation system resulting from wetting like power factor, partial discharge, or polarization index as described in EPRI TR-103834-P1-2, or other state-of-the-art testing at the time. Additionally, inspections for water collection in the manholes, conduits, and sumps containing medium-voltage

77) The 13.8 kV

cables within the scope of this program will be performed as preventive measures. The applicant stated that underground 13.8 kV circuits at the FRCT power plant as well as 34.5 kV circuits that provide offsite feeds to OCGS are included in the AMP. ~~These~~ circuits date back to the 1989 installation of alternate alternating current (AC) capabilities for station blackout (SBO) at OCGS. There have been no failures reported on these cables.

The staff asked the applicant whether it has any plans to trend the cable test data during the period of extended operation. The applicant stated that ongoing test results from the current OCGS medium-voltage cable testing program are being trended. Trending of test results will continue through the period of extended operation.

78) June 23, 2006

In its letter dated ~~April 17, 2006,~~ the applicant committed (Commitment No.36) ~~to revise the LRA to state~~ that cable test/monitoring ~~frequency will be at least once every 10 years, that it will be adjusted based on test/monitoring results, and that the test~~ results will be trended.

78) delete text

The staff also noted that the recent industry concern with direct current (DC) high-potential testing and its impact on the life of cables is not a concern at OCGS because the majority of the medium-voltage cables at OCGS are tested by partial discharge or power factor testing methodologies. The applicant stated that it is not implementing hi-pot testing at OCGS as part of its medium-voltage cable testing program except for five circuits feeding the 2.4 kV recirculation pump motors. These cables are DC step-voltage tested to only a maximum of 4 kV. The industry has concerns about hi-pot testing at very high DC voltages.

The staff believes that the corrective action process will capture internal and external plant operating issues to ensure that aging effects are adequately managed.

On the basis of its review of the above industry and plant-specific operating experience as well as discussions with the applicant's technical personnel, the staff concludes that the applicant's Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

79) April 17 and June 23, 2006,

UFSAR Supplement. In LRA Section A.1.36 and letters dated March 30, ~~and April 17, 2006,~~ the applicant provided the UFSAR supplement for the Inaccessible Medium Voltage Cables Not Subject To 10 CFR 50.49 Environmental Qualification Requirements Program. The staff determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Inaccessible Medium Voltage Cables Not Subject To 10 CFR 50.49 Environmental Qualification Requirements Program, the staff determined that those program elements for which the applicant claimed consistency with the GALL Report are consistent. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

This program as described can be thought of as a sampling program. The following factors are considered for sampling: application (high, medium, and low voltage), circuit loading, and location (high temperature, high humidity, vibration, etc.) with respect to connection stressors. If an unacceptable condition or situation is identified in the selected sample, a determination is made whether the same condition or situation is applicable to other connections not tested.

A sample of non-EQ electrical cable connections metallic parts will be tested prior to the period of extended operation with an inspection frequency of at least once every 10 years.

Staff Evaluation. The staff review of LRA Section 3.6.2.3.3 identified an area in which additional information was necessary to complete the review of the applicant's program elements. The applicant responded to the staff's RAI as discussed below.

In RAI 3.6.2.3.3 dated April 20, 2006, the staff requested that the applicant provide an AMP with the 10 elements to manage the aging effects of electrical components, metallic parts, or for justification for not requiring an AMP. In its response dated May 9, 2006, the applicant committed (Commitment No. 64) to develop and implement the Electrical Cable Connections - Metallic Parts - Not Subject to 10 CFR 50.49 Environmental Qualification Requirement Program to manage aging effects of electrical connections.

80) The

To determine whether the applicant's AMP is adequate to manage the effect of aging so that intended function(s) will be maintained consistent with the CLB for the period of extended operation the staff evaluated seven elements. The staff reviewed those portions of the applicant's program for which the applicant claimed consistency with GALL AMP XI.E6 and found them consistent with this GALL AMP. ~~the~~ staff's review concluded that the applicant's program provided reasonable assurance that electrical components, metallic parts, will be adequately managed. The staff finds that the applicant's program conforms to the recommended GALL AMP XI.E6.

The staff reviewed the Electrical Cable Connections - Metallic Parts - Not Subject to 10 CFR 50.49 Environmental Qualification Requirement Program against the AMP elements in the GALL Report, SRP-LR Section A.1.2.3, and Table A.1-1 and focused on how the program manages aging effects through the effective incorporation of 10 program elements (i.e., "scope of program," "preventive actions," "parameters monitored or inspected," "detection of aging effects," "monitoring and trending," "acceptance criteria," "corrective actions," "confirmation process," "administrative controls," and "operating experience").

The applicant indicated that "corrective actions," "confirmation process," and "administrative controls" program elements are parts of the site-controlled QA program. The staff's evaluation of the QA program is addressed in SER Section 3.0.4. The remaining seven elements are discussed as follows.

(1) Scope of Program - In its letter, the applicant stated that the metallic parts of electrical cable connections not subject to 10 CFR 50.49 associated with cables within the scope of license renewal are part of this program regardless of their association with active or passive components

The staff confirmed that this program element satisfies the criterion defined in the GALL Report and SRP-LR Section A.1.2.3.1 and concludes that this program attribute is acceptable.

The staff also reviewed the UFSAR supplement for this AMP and concludes that, with the inclusion of Commitment No. 64, it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2 AMPs That Are Consistent with the GALL Report with Exceptions or Enhancements

In LRA Appendix B, the applicant identified that the following AMPs are, or will be, consistent with the GALL Report, with exceptions or enhancements:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.1.1)
- Water Chemistry (B.1.2)
- Reactor Head Closure Studs (B.1.3)
- BWR Vessel ID Attachment Welds (B.1.4)
- BWR Feedwater Nozzle (B.1.5)
- BWR Control Rod Drive Return Line Nozzle (B.1.6)
- BWR Stress Corrosion Cracking (B.1.7)
- BWR Penetrations (B.1.8)
- BWR Vessel Internals (B.1.9)
- Bolting Integrity (B.1.12)
- Open-Cycle Cooling Water System (B.1.13)
- Closed-Cycle Cooling Water System (B.1.14)
- Boraflex Rack Management Program (B.1.15)
- Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B.1.16)
- BWR Reactor Water Cleanup System (B.1.18)
- Fire Protection (B.1.19)
- Fire Water System (B.1.20)
- Aboveground Outdoor Tanks (B.1.21)
- Fuel Oil Chemistry (B.1.22)
- Reactor Vessel Surveillance (B.1.23)
- Buried Piping Inspection (B.1.26)
- ASME Section XI, Subsection IWE (B.1.27)
- ASME Section XI, Subsection IWF (B.1.28)
- Structures Monitoring Program (B.1.31)
- RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.1.32)
- Electircal Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrument Circuits (B.1.35)

81) One-Time Inspection (B.1.24)

82) Protective Coating Monitoring and Maintenance Program (B.1.33)

following outage when the elbow was replaced. During a Class 1 pressure test of core spray piping following a refueling outage leakage was observed at a field weld and repaired via the corrective action process. An expanded examination of similar type welds found no additional indications, supporting the conclusion that the observed defect was not a generic issue.

The staff reviewed the operating experience provided in the LRA and in the AMP basis document, interviewed the applicant's technical personnel, and confirmed that the plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review of the above industry and plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's ASME Section XI Inservice Inspection, Subsection IWB, IWC and IWD Program will adequately manage the aging effects for which this AMP is credited in the LRA.

UFSAR Supplement. In LRA Section A.1.1, the applicant provided the UFSAR supplement for the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program, the staff determined that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exceptions and their justifications and determined that the AMP, with the exceptions, is adequate to manage the aging effects for which it is credited. Also, the staff reviewed the enhancements and confirmed that their implementation prior to the period of extended operation will make the AMP consistent with the GALL Report AMP to which it was compared. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.2 Water Chemistry

83), with the exception of eddy current testing of the tubes and inspection (VT or UT) of the channel head and tube sheets which will be performed during the first 10 years of the period of extended operation,

Summary of Technical Information in the Application. In LRA Section B.1.2, the applicant described the existing Water Chemistry Program as consistent, with exceptions, with GALL AMP XI.M2, "Water Chemistry."

The Water Chemistry Program's activities consist of measures that are used to manage aging of piping, piping components, piping elements, and heat exchangers exposed to reactor water, condensate and feedwater, control rod drive (CRD) water, demineralized water storage tank water (DWST), condensate storage tank water, torus water, and spent fuel pool water, all classified as treated water for aging management. The program activities monitor and control water chemistry by station procedures and processes based on Boiling Water Reactor Vessel Internals Project (BWRVIP)-130, "BWR Vessel and Internals Project BWR Water Chemistry Guidelines," 2004 Revision, for the prevention or mitigation of loss of material, reduction of heat transfer, and cracking aging effects. The Water Chemistry Program is also credited for mitigating loss of material and cracking for components exposed to sodium pentaborate and boiler-treated water environments. As specified by the GALL Report, the Water Chemistry Program may not be effective in low-flow or stagnant areas. The One-Time Inspection Program includes provisions

specified by the GALL Report for verification of chemistry control and confirmation of the absence of loss of material and cracking in stagnant areas in piping systems and components.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Section 3.0.3.2.2. The staff reviewed the exceptions and their justifications to determine whether the AMP remained adequate to manage the aging effects for which it was credited.

The staff reviewed those portions of the Water Chemistry Program for which the applicant claimed consistency with GALL AMP XI.M2 and found them consistent. Furthermore, the staff concluded that the applicant's Water Chemistry Program provides reasonable assurance of mitigation of degradation caused by corrosion and SCC in components exposed to ~~reactor or~~ treated water. The staff found that the applicant's Water Chemistry Program conforms to the recommended GALL AMP XI.M2 with exceptions described below.

84) delete text

Exception 1. In the LRA, the applicant stated an exception to the GALL Report program elements "scope of program" and "parameters monitored or inspected." Specifically, the exception stated:

> NUREG-1801 indicates that water chemistry control is in accordance with BWRVIP-29 for water chemistry in BWRs. BWRVIP-29 references the 1996 revision of EPRI TR-103515, "BWR Water Chemistry Guidelines." The Oyster Creek water chemistry program is based on BWRVIP-130, which is the 2004 Revision of "BWR Water Chemistry Guidelines." EPRI periodically updates the water chemistry guidelines, as new information becomes available.

The staff recognized that the SER for the Dresden/Quad Cities LRA (NUREG-1769) has accepted BWRVIP-79, which is Revision 2 of the EPRI document EPRI-TR-103515, published in 2000. Therefore, the staff reviewed the differences between the 2000 revision (BWRVIP-79) and 2004 revision (BWRVIP-130). The review demonstrated that the use of the 2004 revision of the EPRI BWR water chemistry guidelines is an acceptable method of controlling water chemistry consistent with the GALL Report recommendations. On this basis, the staff finds this exception acceptable.

Exception 2. In the LRA, the applicant stated an exception to the GALL Report program elements "scope of program" and "parameters monitored or inspected." Specifically, the exception stated:

> In transitioning from TR-103515-R2 to BWRVIP-130, Oyster Creek has reviewed BWRVIP-130 and has determined that the most significant difference from Revision 2 is that a recent policy of the U.S. nuclear industry commits each nuclear utility to adopting the responsibilities and processes on the management of materials aging issues described in "NEI 03-08: Guideline for the Management of Materials Issues." Section 1 of the BWR Water Chemistry Guidelines specifies which portions of the document are "Mandatory," "Needed," or "Good Practices," using the classification described in NEI 03-08. A new section (section 7) has been added and contains recommended goals for water chemistry optimization. These are "good practice" recommendations for targets that plants may use in optimizing water chemistry that balances the conflicting requirements of materials, fuel and radiation control. Significant time and expense may be required to meet these targets; thus efforts to achieve these goals should be considered in the context of

The staff recognized that the ECP quantifies the oxidizing power of a solution in contact with a specific metal surface. ECPs of reactor internals component materials are very sensitive to the concentration of oxygen, hydrogen, and hydrogen peroxide (which determine the ECP) and therefore differ at locations within the BWR reactor system. BWRVIP-79 Section 5.3 discusses locations suitable for measuring the ECP (Figure 5.5) and Section 5.4 provides alternate ECP estimation techniques. Therefore, during the audit the staff requested that the applicant clarify how the threshold ECP level is maintained within the reactor system without monitoring the hydrogen peroxide level.

In its response, the applicant stated that the ECP is directly monitored with ECP probes in the B recirculation loop via the reactor water cleanup (RWCU) system (location E in Figure 5.5 of BWRVIP-79). In addition, the dissolved oxygen is monitored in the reactor water as a secondary parameter to ensure that mitigation is maintained in the recirculation loops. To assure that an adequate excess of hydrogen relative to oxygen is present to reduce the ECP below -230 mV (SHE) at target locations during power operation, the measured reactor water hydrogen-to-oxygen molar ratio (an alternative to ECP per Appendix E of BWRVIP-130) is maintained at greater than 3 during hydrogen injection. Thus, OCGS has chosen a strategy that uses ECP or the measured molar ratio of hydrogen to oxygen as the primary indicator of IGSCC mitigation with proof of sufficient catalyst loading. According to OCGS implementing ~~procedure GY-AB-120-1000 (Revision 2), Section 4.6B~~, verification of mitigation can also be based on radiolysis modeling using an EPRI model as an alternative to ECP measurement.

85) procedures

The staff determined that the Water Chemistry Program includes activities that are adequate to ensure that the reactor water contains an adequate excess of hydrogen relative to oxygen to reduce the ECP below -230 mv (SHE) at target locations. On this basis, the staff finds this exception acceptable.

Exception 4. In the LRA, the applicant stated an exception to the GALL Report program elements "scope of program" and "parameters monitored or inspected." Specifically, the exception stated:

> NUREG-1801 indicates that dissolved oxygen is monitored. Consistent with the guidance provided in BWRVIP-130, condensate storage tank, demineralized water storage tank water, spent fuel pool water and torus water are not sampled for dissolved oxygen. The Oyster Creek chemistry procedures require monitoring of conductivity, chlorides, sulfates and total organic carbon (TOC) in accordance with limits set by BWRVIP-130 as an alternate method for ensuring component integrity.

During the interview, the applicant stated that the water in the CST, DWST, spent fuel pool, and torus are exposed to atmospheric conditions (i.e., air-saturated) and hence measuring dissolved oxygen in the water at these locations would not provide the actual oxygen content nor help determine the quality of the water. The applicant was asked to explain what alternate parameters are monitored for the water in these tanks exposed to the atmosphere and therefore containing water saturated with oxygen. In its response, the applicant stated that dissolved oxygen is monitored routinely for the feedwater, condensate, and CRD water systems as recommended in BWRVIP-130 and is thus consistent with the GALL Report. However, the tanks or reservoirs of these systems are monitored for conductivity, chlorides, sulfates, and TOC in accordance with limits set by BWRVIP-130, Appendix B, as an alternate method for ensuring component integrity.

The staff determined that the Water Chemistry Program monitors the water within both the subject systems and their tanks or reservoirs as recommended in BWRVIP-130. On this basis, the staff finds this exception acceptable.

Exception 5. In the LRA, the applicant stated an exception to the GALL Report program elements "scope of program" and "parameters monitored or inspected." Specifically, the exception stated:

> NUREG-1801 indicates that water quality (pH and conductivity) is maintained in accordance with established guidance. However, per BWRVIP-130, "BWR Water Chemistry Guidelines," Section 8.2.1.11, pH measurement accuracy in most BWR streams is generally suspect because of the dependence of the instrument reading on ionic strength of the sample solution. In addition, the monitoring of pH is not discussed in BWRVIP-130, Appendix B for condensate storage tank, demineralized water storage tank, or torus water. pH is not monitored for torus water, however pH is monitored in the CST & DWST. Alternate methods are applied to monitor the water chemistry of the torus in lieu of direct pH measurements. The Oyster Creek chemistry procedures require monitoring of conductivity, chlorides and sulfates in accordance with limits set by BWRVIP-130.

In reviewing this exception, the staff noted that OCGS monitors conductivity, chlorides, sulfates, and TOC in the torus per BWRVIP-130, Table B-3, which does not include pH as one of the parameters. The applicant was asked to explain the alternate method used to monitor pH in the torus water. In its response, the applicant stated that a periodic pH analysis has found torus water pH near neutral (i.e., 6.6 - 7.4) based on measurements during the last 5 years (July 2001 - 6.7; March 2002 -7.0; July 2003 - 6.9; April 2005 - 7.4; and June 2005 - 6.6). ~~The applicant also stated that this pH analysis will continue during the period of extended operation.~~

86) delete text

86) S

The staff determined that the applicant had been routinely monitoring parameters suggested in the BWRVIP-130 ~~and, in addition, performing pH analysis of the torus water periodically~~ to ensure its quality. On this basis, the staff finds this exception acceptable.

86) and had confirmed pH of the torus water

Exception 6. In the LRA, the applicant stated an exception to the GALL Report program elements "scope of program" and "detection of aging effects." Specifically, the exception stated:

> Aging of Standby Liquid Control (SBLC) system components not in the reactor coolant pressure boundary section of SBLC system relies on monitoring and control of SBLC makeup water chemistry. The makeup water is monitored in lieu of the storage tank, because the sodium pentaborate that is maintained in the storage tank would mask most of the chemistry parameters monitored. The effectiveness of the water chemistry program will be verified by a one-time inspection of the SBLC system as discussed in the One-Time Inspection (B.1.24) aging management program.

As part of the audit the staff interviewed the applicant's technical personnel to discuss issues related to this exception. During the interview the applicant stated that aging of the SBLC system components relies on monitoring and control of SBLC makeup water chemistry. The makeup water is monitored in lieu of the storage tank because the sodium pentaborate maintained in the storage tank would mask most of the chemistry parameters monitored. The applicant claimed that the effectiveness of the Water Chemistry Program will be verified by a one-time inspection of the SBLC system as discussed in the One-time Inspection Program. The applicant was asked to

3.0.3.2.5 BWR Feedwater Nozzle

Summary of Technical Information in the Application. In LRA Section B.1.5, the applicant described the existing BWR Feedwater Nozzle Program as consistent, with an exception and an enhancement, with GALL AMP XI.M5, "BWR Feedwater Nozzle."

The BWR Feedwater Nozzle Program provides for monitoring of feedwater nozzles for cracking through station procedures based on the 1995 Edition through 1996 Addendum of ASME Section XI, Subsection IWB, Table IWB 2500-1. The program specifies periodic UT inspections of critical regions of the feedwater nozzle. Inspections are at intervals not exceeding 10 years.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Section 3.0.3.2.5. The staff reviewed the exception and enhancement and their justifications to determine whether the AMP, with the exception and enhancement, remained adequate to manage the aging effects for which it is credited.

87) The

~~In the LRA, the~~ applicant stated that the original feedwater spargers were replaced in 1977 to address industry-wide feedwater nozzle cracking issues in response to NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking." Each replacement feedwater sparger incorporated a piston ring seal at the single nozzle thermal sleeve to safe end connection and included a flow baffle to better protect the low alloy steel nozzles. Also, the removed stainless steel cladding was removed at the feedwater nozzle areas and all cracks found there were repaired. The feedwater flow control system was also changed to improve system performance and reduce temperature fluctuations at the nozzle bend areas during low power operation. The RWCU system was not rerouted. In accordance with NUREG-0619, the applicant performed liquid penetrant examination (PT) of the originally cladded surfaces to ensure that no cracks remained in the nozzle area.

During the audit, the staff requested that the applicant discuss the results of the PT examinations performed in 1977. In its response, the applicant stated that the PT examination of the nozzle area during the 1977 inspections detected 54 unacceptable flaws distributed among all four nozzles. Following clad removal of the nozzle inside surface, the inspections were repeated and revealed 12 smaller indications in three of the nozzles: 45-degree nozzle - 5 indications (0.5-1.5 inches long), 135-degree nozzle - no indications, 225-degree nozzle - 4 indications (0.3 to 3 inches long), and 315-degree nozzle - 3 indications (0.25 to 1 inch long). These indications were ground out with pencil grinders and surface-polished. Subsequent examinations have identified no new indications.

In its response, the applicant also stated that OCGS continued to inspect the feedwater sparger visually during every subsequent refueling outage and found no sign of degradation. During the 1988-89 refueling outage (12R), the applicant performed UTs from outside of all nozzle safe ends, bores, and inside blend radius in accordance with NUREG-0619, Section 4.3.2.3 (i.e., UT inspection and subsequent PT of recordable indications) and detected no reportable indications.

After submitting these results to the staff in 1992 (Appendix VIII UT qualification), the applicant submitted a relief request to eliminate routine PT examination of the feedwater and CRD return line nozzles to which it had committed earlier in response to NUREG-0619 and utilize the phased-array UT technique (most advanced method of UT at the time) as the primary method to detect, characterize, and monitor flaws in these nozzles. On October 4, 1994, the staff approved

3.0.3.2.7 BWR Stress Corrosion Cracking

Summary of Technical Information in the Application. In LRA Section B.1.7, the applicant described the existing BWR Stress Corrosion Cracking Program as consistent, with an exception, with GALL AMP XI.M7, "BWR Stress Corrosion Cracking."

The BWR Stress Corrosion Cracking Program mitigates IGSCC in stainless steel reactor coolant pressure boundary piping components and piping 4 inches and greater NPS exposed to reactor coolant above 200 °F. Preventive measures include monitoring and controlling of water impurities by water chemistry activities and providing replacement stainless steel components in the solution annealed condition with a maximum carbon content of 0.035 weight percent and a minimum ferrite level of 7.5 weight percent. Inspection and flaw evaluation are in accordance with the ISI program plan for the station. The program is implemented through station procedures based on NUREG-0313, "Technical Report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping Revision 2," GL 88-01, "NRC Position on Intergranular Stress Corrosion Cracking (IGSCC) in BWR Austenitic Stainless Steel Piping," and its Supplement 1, BWRVIP-75, "Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules," BWRVIP-130, "BWR Vessel and Internals Project BWR Water Chemistry Guidelines," and ASME Section XI.

88) 3.0.3.2.7

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Section ~~3.0.3.2.8~~. The staff reviewed the exception and its justifications to determine whether the AMP, with the exception, remained adequate to manage the aging effects for which it is credited.

The applicant was asked to provide details of all weld repairs and material replacement of components to implement the NUREG-0313 and GL 88-01 recommendations. In its response, the applicant stated that the following piping was replaced with IGSCC-resistant material (low carbon stainless steel):

89) and all new welds were

- all isolation condenser large bore piping outside the drywell (from the drywell penetrations to the isolation condensers), ~~including new~~ stress-improved ~~welds;~~

89) delete text

- all piping within the four isolation condenser drywell penetrations and the two RWCU system drywell penetrations, which contain welds that cannot be inspected;
- the isolation condenser piping at the isolation condensers at 95 feet elevation;
- the head cooling spray nozzle assembly; and
- the 4-inch tee and flange of the reactor vent line. Additionally, all welds accessible for inspection inside the drywell (except RWCU system) were stress-improved.

The applicant also stated that, of the 380 welds in the scope of GL 88-01, which includes 85 in the RWCU system outside the second containment isolation valves, 40 had IGSCC indications. Following numerous piping replacements, 11 welds remained in service with indications of IGSCC. Nine welds were repaired with full structural overlays (four in core spray, four in recirculation and one in shutdown cooling systems). The remaining two welds were in service without repair in the recirculation system, however, they were both stress-improved before inspections found IGSCC. The NRC-approved PDI inspections in 2002 and 2004 using the new UT technique found no indications of IGSCC in either of the recirculation system welds.

> The open-cycle cooling water aging management program will be enhanced to include volumetric inspections, for piping that has been replaced, at a minimum of 4 aboveground locations every 4 years based on the observed and anticipated performance of the new pipe.

90) internal

In reviewing this enhancement, the staff noted that volumetric inspections of above-ground ESW and SW piping original to the plant design are at a minimum of 10 locations every 2 years based on the maximum anticipated corrosion rates determined from past inspections and analyses. The enhancement will add a minimum of 4 UT inspections every 4 years on above-ground piping replaced with the same coatings and materials as new buried ESW and SW piping. As above-ground and buried piping are subject to the same internal environments and failure mechanisms, the volumetric inspections of above-ground piping bound the buried portions of piping. During the audit, the applicant confirmed that the inspection locations for new piping are in addition to the minimum of 10 locations for the original above-ground ESW and SW piping. The applicant also stated that the frequency of the testing and inspections is based on previous findings and, if testing and inspections need to be more frequent or the scope needs to be increased, the program allows for such adjustments.

The staff determined that the enhancement will provide an adequate method of inspecting piping that has been replaced and is consistent with the recommendations in the GALL Report. The inspection samples and frequencies are adequate because, based on previous findings, the applicant's program allows for adjustment of the sample and frequency as needed. On this basis, the staff finds the enhancement acceptable because when implemented the program will be consistent with GALL AMP XI.M20 and will provide additional assurance that the effects of aging will be adequately managed.

Enhancement 2. In the LRA, the applicant stated an enhancement in meeting the GALL Report program elements "scope of program," "parameters monitored or inspected," "detection of aging effects," and "monitoring and trending." Specifically, the enhancement stated:

> The open-cycle cooling water aging management program will be enhanced to include specificity on inspection of heat exchangers for loss of material due to general, pitting, crevice, galvanic and microbiologically influenced corrosion in the RBCCW, TBCCW and Containment Spray preventative maintenance tasks.

In reviewing this enhancement the staff noted that the reactor building closed cooling water (RBCCW) and containment spray heat exchangers are included in the scope of license renewal for the intended function of pressure boundary and heat transfer. The turbine building closed cooling water (TBCCW) heat exchangers are included for a leakage boundary function only. The current GL 89-13 program includes only the ESW system and containment spray heat exchangers. Attributes of the GL 89-13 guidance will be implemented for the SW system, RBCCW system, and TBCCW system heat exchangers as parts of the Open-Cycle Cooling Water System Program. Upon implementation of this enhancement, the program will be consistent with the recommendations in AMP XI.M20 in the GALL Report.

On this basis, the staff finds this enhancement acceptable because when implemented the Open-Cycle Cooling Water System Program will be consistent with GALL AMP XI.M20 and will provide additional assurance that the effects of aging will be adequately managed.

Operating Experience. In LRA Section B.1.13, the applicant explained that OCGS had reviewed both industry and plant-specific operating experience with the Open-Cycle Cooling Water System Program. Inspections implementing the guidance of GL 89-13 have identified deterioration, degradation, and loss of material from inside the pipe.

91) high

OCGS evaluations have identified the buried piping with high risk of developing leaks and ~~grave~~ consequences should leaks occur. Piping replacements are scheduled based on the risk priority, and the monitoring and inspection program assures that the piping maintains adequate wall thickness with margin prior to replacement.

The methodology for determining corrosion rates and projected service life was revised in 2002 based on analysis of station operating experience and previous inspection results. Additionally, in 2004, 50 percent of the buried ESW and 10 percent of the buried SW piping were replaced with new pipe and an improved coating system. A plan is in place to replace the other 50 percent of the buried ESW piping prior to 2007.

After reviewing several ESW pipe leaks and wall thinning events, the applicant identified a common failure mechanism (local wall thinning due to salt-water corrosion). The results were entered into the corrective action process and an operability evaluation was performed in 2003. The operability evaluation included the effect of the failure mechanism on the SSC safety function thresholds and methods for detection of leaks for each of the safety functions. Additionally, the corrective action process problem resolution response developed an inspection plan, "Topical Report 140 - ESW and Service Water System Plan." Some of the plan's goals are to prioritize modifications and inspections based on risk and consequence of a leak, to modify piping segments that pose high risks and cannot reasonably be inspected, to modify piping to allow system flexibility for future repairs, and to inspect piping to ensure disposition/repair prior to failure. The plan captures existing analysis, past action, and future action for ESW and SW pipe.

The staff reviewed the operating experience provided in the LRA and interviewed the applicant's technical personnel to confirm that the plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review of the above industry and plant-specific operating experience, and discussions with the applicant's technical personnel, the staff concludes that the applicant's Open-Cycle Cooling Water System Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

UFSAR Supplement. In LRA Section A.1.13, the applicant provided the UFSAR supplement for the Open-Cycle Cooling Water System Program. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Open-Cycle Cooling Water System Program, the staff determined that those program elements for which the applicant claimed consistency with the GALL Report are consistent. Also, the staff reviewed the enhancements and confirmed that their implementation prior to the period of extended operation will make the AMP consistent with the GALL Report AMP to which it was compared. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR

supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.12 Closed-Cycle Cooling Water System

Summary of Technical Information in the Application. In LRA Section B.1.14, the applicant described the existing Closed-Cycle Cooling Water System (CCCWS) Program as consistent, with an exception, with GALL AMP XI.M21, "Closed-Cycle Cooling Water System"

The Closed-Cycle Cooling Water System Program manages aging of piping, piping components, piping elements, and heat exchangers included in the scope of license renewal for loss of material and reduction of heat transfer and exposed to a closed cooling water environment. The program provides for preventive, performance monitoring, and condition monitoring activities implemented through station procedures. Preventive activities include measures to maintain water purity and the addition of inhibitors to minimize corrosion based on EPRI 1007820, "Closed Cooling Water Chemistry Guidelines." Performance monitoring ~~indicates~~ degradation in CCCWSs with plant operating conditions indicating degradation in normally operating systems. In addition, station maintenance inspections and NDE monitor the condition of heat exchangers exposed to closed-cycle cooling water environments.

92) provides indication of

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Section 3.0.3.2.12. The staff reviewed the exception and its justifications to determine whether the AMP, with the exception, remained adequate to manage the aging effects for which it is credited.

The staff reviewed those portions of the Closed-Cycle Cooling Water System Program for which the applicant claimed consistency with GALL AMP XI.M21 and found them consistent with the GALL Report AMP. Furthermore, the staff concluded that the applicant's Closed-Cycle Cooling Water System Program provides reasonable assurance that aging effects attributable to closed-cycle cooling water systems will be adequately managed during the period of extended operation. The staff found that the applicant's program conforms to the recommended GALL AMP XI.M21 with an exception described below.

93)

Exception. In the LRA, the applicant stated an exception to the GALL Report program elements "preventive actions," "parameters monitored or inspected," ~~"detection of aging effects,"~~ "monitoring and trending," ~~and "acceptance criteria."~~ Specifically, the exception stated:

93) delete text

93) and

> NUREG 1801 refers to EPRI TR-107396 Closed Cooling Water Chemistry Guidelines 1997 Revision. Oyster Creek implements the guidance provided in EPRI 1007820 "Closed Cooling Water Chemistry Guideline, Revision 1" which is the 2004 Revision to TR-107396. EPRI periodically updates industry water chemistry guidelines, as new information becomes available. Oyster Creek has reviewed EPRI 1007820 and has determined that the most significant difference is that the new revision provides more prescriptive guidance and has a more conservative monitoring approach. EPRI 1007820 meets the same requirements of EPRI TR-107396 for maintaining conditions to minimize corrosion and microbiological growth in closed cooling water systems for effectively mitigating many aging effects.

During the audit, the applicant described its review and evaluation of the differences between EPRI TR-107396, "Closed Cooling Water Chemistry Guidelines," the 1997 revision of the guidelines referred to in the GALL Report, and EPRI TR-1007820, "Closed Cooling Water Chemistry Guideline, Revision 1," which is the 2004 revision implemented by OCGS. In addition, the applicant stated that the most significant difference is that EPRI TR-1007820 provides more prescriptive guidance and has a more conservative monitoring approach. The applicant further stated that EPRI TR-1007820 meets the same recommendations of EPRI TR-107396 for maintaining conditions to minimize corrosion and microbiological growth in closed cooling water systems for effectively mitigating many aging effects. In addition, the applicant stated that it had contacted the author of EPRI TR-107396 and EPRI TR-1007820, ~~Anthony Selby,~~ to confirm that the new guidance provided in TR-1007820 was not contrary to that in TR-107396.

94) delete text

The staff reviewed EPRI TR-1007820, "Closed Cooling Water Chemistry Guideline, Revision 1," and EPRI TR-107396, Revision 0, and confirmed the applicant's assessment that the new revision provides more prescriptive guidance, has a more conservative monitoring approach, and meets the same recommendations for maintaining conditions to minimize corrosion and microbiological growth in closed cooling water systems for effectively mitigating many aging effects. On this basis, the staff finds this exception acceptable.

95) that are

95) is

95) the use of

Operating Experience. In LRA Section B.1.14, the applicant explained that the OCGS has not experienced a loss of intended function failure of components due to corrosion product buildup or through-wall loss of material for components within the scope of license renewal subject to CCCWS activities. Additionally, industry operating experience demonstrates that corrosion inhibitors in CCCWSs monitored and maintained ~~are~~ effective in mitigating loss of material and buildup of deposits. Buildup of deposits have degraded heat transfer in heat exchangers on the tube side of the heat exchangers. The tube side of the heat exchangers is exposed to raw water-salt water and managed by the ~~Closed~~-Cycle Cooling Water System Program.

96) Open

In 2002 OCGS increased its desired molybdate range ~~in all of~~ the CCCWSs from 50-125 ppm to 200-1000 ppm, enabling OCGS to align with industry best practices.

In 2004, the pH in the TBCCW system decreased outside the Action Level 1 range for pH. A caustic add returned pH back in spec within the acceptable time period for correcting an Action Level 1 CCW limit.

In addition to mitigating loss of material and buildup of deposits by maintaining water chemistry, OCGS monitors the RBCCW, TBCCW and emergency diesel generator (EDG) cooling water (EDGCW) for microbiological growth (total bacteria colonies) in accordance with EPRI 1007820, "Closed Cooling Water Chemistry Guidelines." To date there have been no adverse trends in microbiological growth in CCCWSs.

By improving the CCCW monitoring parameters, promptly returning out of range parameters within acceptable limits, and monitoring for microbiological growth OCGS has been effective in managing loss of material and reduction of heat transfer for components in a closed cooling water environment. Additionally, the Closed-Cycle Cooling Water System Program is adjusted continually to account for industry and station experience and research. With additional operating experience lessons learned will be used to adjust this program as needed.

The staff reviewed the applicant's exception as part of the Water Chemistry Program and determined that it is acceptable. The evaluation of this exception is discussed in SER Section 3.0.3.2.2.

Operating Experience. In LRA Section B.1.18, the applicant explained that no indications of IGSCC have been found in the RWCU, which is not stress-improved. The following mitigative actions also have been implemented to reduce the susceptibility to IGSCC in the RWCU system: improved water chemistry guidelines (BWR Water Chemistry Guidelines 2004 Revision (BWRVIP-130)), ~~HWC, and NMCA.~~ 97) Hydrogen Water Chemistry (HWC), and Noble Metals Chemical Addition (NMCA).

The staff requested clarification on when the HWC and NMCA mitigative actions had been initiated. In its response, the applicant stated that the HWC had been implemented during cycle 12 (1990) and NMCA implemented in refueling outage 1R19 (2002).

The staff reviewed the operating experience provided in the LRA and PBDs, interviewed the applicant's technical personnel, and confirmed that the plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review of the above industry and plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's BWR Reactor Water Cleanup System Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

UFSAR Supplement. In LRA Section A.1.18, the applicant provided the UFSAR supplement for the BWR Reactor Water Cleanup System Program. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's BWR Reactor Water Cleanup System Program, the staff determined that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exception and its justifications and determined that the AMP, with the exception, is adequate to manage the aging effects for which it is credited. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.16 Fire Protection

Summary of Technical Information in the Application. In LRA Section B.1.19, the applicant described the existing Fire Protection Program as consistent, with an exception and enhancements, with GALL AMP XI.M26, "Fire Protection."

The Fire Protection Program provides for aging management of various fire protection-related components within the scope of license renewal. The program visually inspects fire barrier penetration seals for such signs of degradation as change in material properties, cracking, and loss of material, through periodic inspection, surveillance, and maintenance activities. The program visually inspects fire barrier walls, ceilings, and floors in structures within the scope of

inclusion of visual inspections will provide additional assurance of adequate management of aging degradation of the fuel supply lines this enhancement is acceptable.

The staff finds this enhancement acceptable because when implemented the Fire Protection Program will be consistent with GALL AMP XI.M26 and will provide additional assurance that the effects of aging will be adequately managed.

Enhancement 3. In the LRA, the applicant stated an enhancement in meeting the GALL Report program elements "parameters monitored or inspected," "detection of aging effects," "monitoring and trending," and "acceptance criteria." Specifically, the enhancement stated:

> The fire protection aging management program will be enhanced to provide additional inspection guidance for degradation of fire barrier walls, ceilings, and floors such as spalling and loss of material caused by freeze-thaw, chemical attack, and reaction with aggregates. Enhancements will be implemented prior to the period of extended operation.

In reviewing this enhancement, the staff noted that, as part of the applicant's Fire Protection Program, the aging effects on the intended function of fire barrier walls, ceilings, and floors that perform a fire barrier function are managed by specific inspection parameters in accordance with industry codes, standards, and guidelines that detect and correct aging degradation prior to loss of intended functions. This enhancement will add inspections of fire barrier walls, ceilings, and floors for signs of degradation including but not limited to cracking, spalling, and loss of material caused by freeze-thaw, aggressive chemical attack, reaction with aggregates, and corrosion of embedded steel as recommended in the GALL Report. As these enhanced inspections will provide additional assurance of adequate management of aging degradation of fire barrier walls, ceilings, and floors this enhancement is acceptable.

The staff finds this enhancement acceptable because when implemented the Fire Protection Program will be consistent with GALL AMP XI.M26 and will provide additional assurance that the effects of aging will be adequately managed.

98) change comma to period

Enhancement 4~~; In the~~ PBD for this AMP, the applicant stated an additional enhancement in meeting the GALL Report program elements "parameters monitored or inspected," "detection of aging effects," "monitoring and trending," and "acceptance criteria" not identified in the LRA. Specifically, the enhancement stated:

> The fire protection aging management program will be enhanced to require that surface integrity and clearances of fire doors in the scope of license renewal be routinely inspected every two years. The program currently requires these doors be intact and verified functional, with fire doors identified as secondary containment receiving routine clearance checks. Other fire doors in the scope of license renewal currently receive clearance checks if they have been damaged or undergone maintenance such that the clearances may have been physically altered. The enhancement of requiring routine surface integrity and clearance checks for all fire doors in the scope of license renewal will provide assurance that degradation of fire doors prior to loss of intended function will be detected.

In its letter dated April 17, 2006, the applicant committed (Commitment No. 19) to revise LRA Section B.1.19 to add the following enhancement to the Fire Protection Program for periodic

The specified frequency by the Oyster Creek program is every 5 years in place of system walkdowns each outage. 99) as described

In its letter dated April 17, 2006, the applicant committed (Commitment No. 21) to revise the Aboveground Outdoor Tanks Program in the LRA to include the exception identified in the PBD, which states that the specified frequency by the program is every 5 years in place of system walkdowns each outage.

The applicant stated in the PBD that the frequency of 5 years specified for monitoring of exterior surfaces of tanks is consistent with the frequency specified for exterior surfaces of supporting structures. The 5-year frequency consistent with industry guidelines has proven effective in detecting loss of material due to corrosion and change in material properties of structural elastomers on exterior surfaces of structures. Consequently this frequency will also be effective for detecting loss of material and change in material properties on exterior tank surfaces before an intended function is impacted.

The staff questioned the schedule for conducting the walkdowns and asked whether the schedule is consistent with the GALL Report recommendation. The applicant stated that it uses structured inspections every 5 years rather than system walkdowns every outage and that this use is an exception to the GALL Report recommendation. The applicant stated that the inspection frequency is consistent with the practical life of the coatings and the industry application of the structures monitoring programs under the Maintenance Rule. The staff finds this exception to GALL Report acceptable because it meets the requirements of the Maintenance Rule and is consistent with ASME Section XI Code.

The staff's review of operating experience for the Aboveground Outdoor Tanks Program finds this exception acceptable based on industry experience and plant operating experience.

Operating Experience. In LRA Section B.1.21, the applicant explained that the Aboveground Outdoor Tanks Program is being implemented at OCGS; therefore, no program experience exists. It will replace selective inspections and will complement those activities in place for tank management of petroleum and other hazardous above-ground and buried tanks. The program is based on industry guidance and the GALL Report program for above-ground carbon steel tanks. The condensate storage tank (CST) has been repaired to replace a corroded tank bottom. Periodic UT inspections will be performed on aluminum and carbon steel tank bottoms.

The staff believes that the corrective action process will capture internal and external plant operating issues to ensure that aging effects are adequately managed.

On the basis of its review of the above plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's Aboveground Outdoor Tanks Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

UFSAR Supplement. In LRA Section A.1.21 and letter dated April 17, 2006, the applicant provided the UFSAR supplement for the Aboveground Outdoor Tanks Program. The staff determined that the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

NUREG-1430 through NUREG-1433. Oyster Creek has not adopted the Standard Technical Specifications as described in these NUREGs, however, the Oyster Creek fuel oil specifications and procedures invoke similar requirements for fuel oil purity and fuel oil testing, as described by the Standard Technical Specifications. These include testing requirements for new fuel oil (API gravity, kinematic viscosity, water and sediment) prior to adding the new fuel to the storage tank to ensure that the oil has not been contaminated with substances that will have an immediate detrimental impact on diesel engine combustion, and testing of new fuel after adding it to the storage tank to confirm that the remaining fuel oil properties are within specification requirements. Oyster Creek fuel oil activities also provide for the trending of particulate contamination in new and stored fuel oil. Water and Sediment are drained periodically (quarterly) from the Emergency Diesel Generator Fuel Storage Tank. This periodicity exceeds the Standard Technical Specifications requirements of "once every [31] days", however, it is aligned with the requirements of Regulatory Guide 1.137, which states that a quarterly basis is sufficient unless accumulated condensation is suspected (in which case a monthly basis is appropriate). ~~*This is a new exception based on the reconciliation of this aging management program from the draft January 2005 GALL to the approved September 2005 GALL.*~~

In its letter dated March 30, 2006, the applicant stated that the Fuel Oil Chemistry Program will be revised to include the exception identified in the reconciliation document stating that OCGS has not adopted the Standard Technical Specifications; however, the fuel oil specifications and procedures invoke similar requirements for fuel oil purity and fuel oil testing.

The applicant was asked for additional information on the specific fuel oil specifications and how they differ from the requirements in the standard technical specifications. The applicant was also asked to justify the frequency for draining water and sediment from the EDG fuel storage tank in light of operating experience at OCGS in which increasing water and sediment concentrations were observed in the stored fuel oil.

In its response, the applicant stated that water and sediment are drained from the EDG fuel storage tank quarterly. This frequency exceeds the standard technical specifications requirements of 31 days; however, it is aligned with RG 1.137, which states that a quarterly basis is sufficient unless accumulated condensation is suspected, in which case a monthly basis is appropriate. As to the frequency for draining water and sediment from the EDG fuel oil storage tank, the applicant stated that the increasing trend in water and sediment was attributed to long-term accumulation. Prior to this event, OCGS did not have in place recurring tasks to drain water and sediment periodically from the bottom of fuel oil storage tanks. Current practices include quarterly tasks to drain accumulated water and sediment from the bottom of the EDG fuel oil storage tank. This practice has been effective in preventing recurrence of high levels of water and sediment in the tank.

The applicant further stated in its response that the standard technical specifications reference RG 1.137 as supplemented by ANSI N195 for recommended fuel oil practices. The fuel oil properties governed by these requirements are the water and sediment content, the kinematic viscosity, specific or API gravity, and impurity level. These fuel oil properties are obtained with the Fuel Oil Chemistry Program, which is implemented by procurement specification SP-1302-38-010 and sampling and analysis procedure CY-OC-120-1107. These procedures are based on RG 1.137, Revision 1, ANSI N195-1976, and ASTM D975-81. These implementing documents

The staff noted that the applicant's enhancement will add periodic draining, cleaning, and inspection of the fire pond diesel fuel tanks and the main fuel oil tank. This activity is already performed for the EDG fuel storage tank. Inspection activities will include the use of ultrasonic techniques for determining tank bottom thicknesses when there is any evidence of corrosion or pitting. This activity is consistent with the recommendations in the GALL Report and will ensure that aging of the fire pond diesel fuel tanks and the main fuel oil tank is properly managed. The staff finds this enhancement acceptable because when implemented the Fuel Oil Chemistry Program will be consistent with GALL AMP XI.M30 and will provide additional assurance that the effects of aging will be adequately managed.

101) Add Enhancement 6 here. See comment form.

Operating Experience. In LRA Section B.1.22, the applicant explained that the Fuel Oil Chemistry Program has proven to be effective in identifying and correcting abnormal conditions promptly. In 2003, OCGS experienced high concentrations of water and sediment in main fuel oil tank samples. On previous occasions, high concentrations of water and sediment also had been detected in the EDG fuel storage tank and fire pond diesel fuel tanks. There were no fuel oil system failures attributed to a loss of material condition or biofouling as a result of these findings. Although fuel oil chemistry activities detected the high levels of contaminants in the fuel promptly and corrective actions were initiated before blockage of fuel oil system supply lines or corrosion of fuel oil tanks and fuel supply lines occurred, fuel oil chemistry activities were enhanced to include the addition of biocides and stabilizers to fuel oil and to incorporate improved test methods for the early detection of water and sediment.

The staff reviewed the operating experience provided in the LRA and interviewed the applicant's technical personnel to confirm that plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review of the above industry and plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's Fuel Oil Chemistry Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

UFSAR Supplement. In LRA Section A.1.22 and letters dated March 30, and April 17, 2006, the applicant provided the UFSAR supplement for the Fuel Oil Chemistry Program. The staff determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Fuel Oil Chemistry Program, the staff determined that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exceptions and their justifications and determined that the AMP, with the exceptions, is adequate to manage the aging effects for which it is credited. Also, the staff reviewed the enhancements and confirmed that their implementation prior to the period of extended operation will make the AMP consistent with the GALL Report AMP to which it was compared. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concluded that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. The staff's review of the applicant's Reactor Vessel Surveillance Program and RAI responses determined that those program elements for which the applicant claimed consistency with the GALL Report are consistent. Also, the staff reviewed the enhancement and confirmed that its implementation prior to the period of extended operation will make the AMP consistent with the GALL Report AMP to which it was compared. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.21 Buried Piping Inspection

Summary of Technical Information in the Application. In LRA Section B.1.26, the applicant described the existing Buried Piping Inspection Program as consistent, with an exception and enhancement, with GALL AMP XI.M34, "Buried Piping and Tanks Inspection."

The Buried Piping Inspection Program includes preventive measures to mitigate corrosion and periodic inspection of external surfaces for loss of material to manage the effects of corrosion on the pressure-retaining capacity of piping and components in a soil (external) environment. Preventive measures are in accordance with standard industry practices for maintaining external coatings and wrappings. External inspections of buried components will occur opportunistically when they are excavated during maintenance. During the period of extended operation, inspection of buried piping will be within 10 years unless an opportunistic inspection occurs within any 10-year period. The program will be enhanced for reasonable assurance that buried piping and piping components will perform their intended function during the period of extended operation.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Section 3.0.3.2.21. The staff reviewed the exception and enhancement and their justifications to determine whether the AMP, with the exception and enhancement, remained adequate to manage the aging effects for which it is credited.

The staff reviewed those portions of the Buried Piping Inspection Program for which the applicant claimed consistency with GALL AMP XI.M34 and found them consistent. Furthermore, the staff concluded that the applicant's Buried Piping Inspection Program provides reasonable assurance that the aging effects for these materials will be adequately managed during the period of extended operation. The staff found that the applicant's Buried Piping Inspection Program conforms to the recommended GALL AMP XI.M34 with an exception and an enhancement described below.

Exception. In the LRA, the applicant stated an exception to the GALL Report program elements "scope of the program," "preventive actions," and "acceptance criteria." Specifically, the exception stated:

> Section X1.M.34, "Buried Piping and Tanks Inspection," AMP only includes buried carbon steel piping; however, Oyster Creek has other material, such as stainless steel, aluminum, bronze and cast iron, in their buried piping program that will be managed as part of this AMP.

102) Add the 2nd Exception in LRA B.1.26.

During the audit, the staff asked the applicant whether the buried pipe will be inspected within 10 years of the end of the current period of operation and during the first 10 years of the period of extended operation. The applicant replied that there will not be a focused inspection within 10 years of entering the period of extended operation because opportunistic inspections have occurred within this 10-year period. Also, a focused inspection will occur during the first 10 years of the period of extended operation unless an opportunistic inspection occurs during that time.

The staff also asked the applicant whether each buried material will be inspected. The applicant stated that all types of materials will not be examined. Rather, the inspections will be of a system with high likelihood of corrosion problems or systems with histories of corrosion. The Buried Piping Inspection Program contains aluminum, cast iron, stainless steel, and bronze in addition to the carbon steel. All but 25 feet of the aluminum pipe has been relocated to an above-ground location. The remaining buried aluminum pipe is part of the condensate transfer system. The cast iron pipe is part of the fire protection system. The heating and process steam and roof drain and overboard discharge systems may contain coated stainless steel and bronze fittings. OCGS has never experienced any failures of these materials. To be conservative, OCGS has included these materials in the scope of the Buried Piping Inspection Program.

The staff finds the applicant's exception to the GALL Report acceptable after discussions with the applicant. In particular, the applicant explained that the bronze fittings are coated and that, with the exception of the aluminum pipe, none of the other materials has experienced any problems. Only a small portion of the aluminum pipe remains buried. On this basis, the staff finds this exception acceptable.

Enhancement. In the LRA, the applicant stated that there is an enhancement to meet the GALL Report program elements "scope of the program," "parameters monitored or inspected," "detection of aging effects," and "acceptance criteria." Specifically, the enhancement stated:

> The Buried Piping Inspection aging management program will be enhanced to include Fire Protection components in the scope of the program. Inspection of buried piping within ten years of entering the period of extended operation will be conducted, unless an opportunistic inspection occurs within this ten-year period. Piping located inside the vault are in the scope of the program

103) Add New Enhancement, see comment form

In the LRA, the applicant stated that inspections will confirm that coating and wrapping are intact. These inspections effectively ensure that corrosion of external surfaces has not occurred and that intended function has been maintained. ~~Inspections confirm that coating and wrapping are intact.~~ External inspections of buried components occur opportunistically when they are excavated during maintenance. Buried piping will be opportunistically inspected whenever excavated for maintenance. The inspections will be on all of the areas made accessible to support the maintenance activity. Areas with the highest likelihood of corrosion problems with a history of corrosion problems have been identified in Topical Report (TR) "Oyster Creek Underground Piping Program Description and Status". Several yard excavation activities to date have uncovered buried piping that has been inspected. OCGS has focused inspection on their underground piping within the past 10 years. Several inspections have been performed on the ESW and SW systems, which have a high likelihood and a history of corrosion-related problems. In addition other inspections and testing have been performed ~~per~~ the Technical Data Report TDR-829, "Pipe Integrity Inspection Program," and TR-116, "Oyster Creek Underground Piping Program Description and Status."

104) delete text

106) and are documented in

105) performed

The applicant further stated that, during the period of extended operation, inspection of buried piping will be performed within 10 years unless an opportunistic inspection occurs within the 10-year period. Areas with the highest likelihood or a history of corrosion problems have been identified in the TR. These are primarily in the ESW and SW systems. These areas have been inspected within the past 10 years. ~~Additionally, ISI testing and monitoring for the ESW, SW, RBCCW, Fire Protection, and Condensate Transfer systems are performed.~~ Monitoring and trending from ~~these tests~~ can aid in the detection of system pipe leaks. Periodic leak testing and component inspections are credited as well. ASME Code Section XI, Pressure Testing, directs testing of buried cooling water piping for the detection of leaks. This pressure testing is via pump surveillances.

107) delete text

108) testing

The staff noted that this enhancement adds additional components into the Buried Piping Inspection Program, which is conservative. The staff finds this enhancement acceptable because when implemented the Buried Piping Inspection Program will be consistent with GALL AMP XI.M34 and will provide additional assurance that the effects of aging will be adequately managed.

Operating Experience. In LRA Section B.1.26, the applicant explained that the Buried Piping Inspection Program, as enhanced, will be effective in managing aging degradation for the period of extended operation by timely detecting aging effects and implementing appropriate corrective actions prior to loss of system or component intended functions. OCGS has performed numerous external inspections of buried pipe during excavation activities and repair of degraded coatings when necessary. In 1992, the SW system developed a leak that resulted from failure of the external coating. The root cause evaluation determined that failure was due to improper original coating application. Subsequently, OCGS initiated the Underground Piping Program. To date there have been no other buried pipe leaks due to external degradation. Although failure of buried piping has occurred, the applicant has determined that the leaks were caused from the inside of the buried piping, which is evaluated with the ~~Buried Piping Inspection~~ Program. OCGS conducts *pressure tests of SR buried piping to identify leaks and to ensure adequate pressure integrity.* This pressure testing is performed by pump surveillances.

109) Open-Cycle Cooling Water

In plant operating experience, coatings and wrappings have protected the external surfaces of buried piping adequately and loss of material due to external corrosion has not been a concern. There are some portions of buried stainless steel and bronze piping that may not be coated or wrapped. OCGS has had no failures of this piping due to external degradation. Therefore, in OCGS and industry operating experience stainless steel and copper alloy material are resistant to corrosion in a buried environment. Additionally, OCGS cast iron fire hydrants are not coated or wrapped and OCGS has had no failures of any of the buried hydrants due to external degradation. Furthermore, one of the hydrants was replaced in 2003 due to failure of the hydrant to drain and the external condition of the hydrant was good. Thus inspection of buried piping when excavated for maintenance provides reasonable assurance that the intended functions will be maintained. Inspections will be performed within 10 years after the start of the period of extended operation unless an opportunistic inspection occurs within this 10-year period.

The staff noted that the applicant has no exception to the GALL Report program element "parameters monitored or inspected" and has added enhancements of fire protection components to the scope of the program. In addition, the applicant has conducted numerous inspections and has identified key locations to inspect on a regular basis. When coating degradation or damage to pipe is discovered corrective action is taken. About half of the ESW piping has been replaced and the remainder will be replaced before the period of extended operation. OCGS has performed

numerous external inspections of their buried components since 1991. These inspections have shown no significant external coating failures. Coatings have been repaired during these inspections in accordance with corporate procedures.

In 2004, 50 percent of the buried ESW and 10 percent of SW piping were replaced with new, coated piping. During the audit, the staff asked the applicant when the remaining pipe will be replaced. In its letter dated May 1, 2006, the applicant committed (Commitment No. 63) to replace the remaining safety-related ESW piping prior to the period of extended operation.

In 1993 an inspection of 20 feet of RBCCW showed that the external coating was in good condition. In 1992 the fire protection system underground piping was inspected by excavation and some internal inspection. The external coating was in good condition as well as the internal carbon steel. In 1980 the uncoated aluminum underground piping in the vicinity of the CST was replaced. In 1991 and 1994 buried piping adjacent to the condensate transfer shack was determined to have severe corrosion during an inspection. As a result, a significant modification relocated aluminum piping above ground in tunnels or vaults. Currently 90 percent of all aluminum piping is located above ground. The remaining buried aluminum pipe was inspected in 1993 and has an expected service life of 15-20 years. ~~Action Request A2116126~~ has been submitted to inspect the remaining buried, uncoated aluminum pipe prior to December 2008. The remaining buried aluminum piping does have cathodic protection.

110) An Action Request

The operating experience of the Buried Piping Inspection Program has shown objective evidence that the program has identified susceptible buried pipe locations and has created a monitoring program effective in preventing failures prior to the loss of system intended function. The operating experience of the Buried Piping Inspection Program shows no adverse trend in performance. Problems identified will not cause significant impact to the safe operation of the plant, and adequate corrective actions were taken to prevent recurrence. There is sufficient confidence that the implementation of the Buried Piping Inspection Program will effectively determine loss of material due to the effects of corrosion on the pressure-retaining capacity of buried piping. Appropriate guidance for reevaluation, repair, or replacement is provided for loss of material. Periodic self-assessments of the Buried Piping Inspection Program identify areas that need improvement to maintain the quality performance of the program.

Continued implementation of the Buried Piping Inspection Program provides reasonable assurance that the effects of loss of material due to corrosion on the pressure-retaining capacity of buried carbon steel piping is adequately managed so that the intended functions of components within the scope of license renewal will be maintained during the period of extended operation.

The staff reviewed the operating experience provided in the LRA and interviewed the applicant's technical personnel to confirm that the plant-specific operating experience revealed no degradation not bounded by industry experience. On the basis of its review of the above industry and plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's Buried Piping Inspection Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

UFSAR Supplement. In LRA Section A.1.26 and letter dated May 1, 2006, the applicant provided the UFSAR supplement for the Buried Piping Inspection Program. The staff determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

(1) water leakage from the refueling cavity into the annulus between the drywell and the shield wall

(2) corrosion of the upper drywell region above the former sand bed region

(3) corrosion of the former sand bed region of the drywell

(4) pitting corrosion of the suppression chamber (torus)

111) license

The operating experience and proposed aging management activities for each of these areas were reviewed in detail, and additional information was requested, as necessary, to facilitate a thorough assessment and evaluation of the applicant's aging management plans for the ~~licence~~ renewal period. The results of this detailed audit are documented in the following paragraphs. The staff's overall evaluation of the information obtained is provided for each of these four areas at the end of this section.

Water Leakage from the Refueling Cavity. During the audit, the applicant stated that a special coating is applied to the refueling cavity liner prior to flooding the reactor for refueling to prevent leakage into the annular space between the drywell shell and the concrete shield wall. As a result, the applicant believes that water intrusion into the refueling cavity has been eliminated as a source of further degradation on the exterior surface of the drywell shell.

Since the applicant used this special coating to minimize water intrusion into the annulus between the drywell and the concrete shield wall; the staff requested that the applicant identify whether it is committed to continue the use of this special coating as part of its refueling procedure through the period of extended operation. If not, the applicant was asked to identify what enhanced inspections will be conducted during the period of extended operation to monitor potential corrosion on the drywell exterior surface from the upper flange region to the sand bed region.

In its response, the applicant stated that the strippable coating has been effective in mitigating water intrusion into the annular space and in reducing the rate of corrosion. The applicant committed to applying the strippable coating to the reactor cavity liner prior to flooding for refueling during the period of extended operation. In its letter dated April 4, 2006, the applicant committed (Commitment No. 27) to the following:

> Consistent with current practice, a strippable coating will be applied to the reactor cavity liner to prevent water intrusion into the gap between the drywell shield wall and the drywell shell during periods when the refueling cavity is flooded. This commitment applies to refueling outages prior to and during the period of extended operation.

In reviewing PBD-AMP-B.1.27 for the applicant's ASME Section XI, Subsection IWE Program, the staff noted that, page 7 of this document states that, "Under the current term, Oyster Creek is committed to the NRC to monitor the former sand bed region drains for water leakage. The commitment is to investigate the source of leakage, take corrective actions, evaluate the impact of the leakage and, if necessary, perform additional drywell inspections. This commitment will be implemented during the period of extended operation. This is a new commitment not previously identified in the LRA." In its letter dated April 4, 2006, the applicant committed (Commitment No. 27) to the following: The reactor cavity seal leakage trough drains and the drywell sand bed region drains will be monitored for water leakage periodically.

113) is consistent with

112) perform

113) of formal leakage monitoring

The staff requested that the applicant describe this commitment in more detail. In its response, the applicant stated that the commitment for monitoring the sand bed drains is in a staff SER transmitted by letter November 1, 1995. This SER requested a commitment to perform inspections "3 months after the discovery of any water leakage". Subsequent correspondence from General Public Utilities Nuclear Corporation (GPUN) clarified the commitment after discussions with the staff. The commitment made and accepted by the staff in a February 15, 1996, letter was to additional inspections of the drywell 3 months after discovery of any water leakage during power operation between scheduled drywell inspections. The requirement was not meant to apply to minor leakage from normal refueling activities. This commitment ~~in part is believed to be~~ the present commitment in PBD-AMP-B.1.27.

The applicant further stated in its response that, although there is no formal leakage monitoring in place, there has been no reported evidence of leakage from the former sand bed drains. Issue Report #348545 was submitted into the corrective action process when this lack was discovered. Corrective actions have been initiated to create recurring activities controlled by work management process and procedures for all future required inspections to meet the present commitment. Because there has been no reported leakage, there has been no need to investigate the source of leakage, take corrective actions, evaluate the impact of leakage, or perform additional drywell inspections.

The applicant further stated that numerous actions have been taken to alleviate the previous water leakage problem since discovery of the consequent drywell shell corrosion. Some of the significant actions consisted of inspections of the reactor cavity wall, remote visual inspection of the trough area below the reactor cavity bellows seal area, and subsequent repair of the trough area and clearing of its drain. Clearing of the trough drain and repair of the trough route any leakage away from the drywell shell. In addition, a strippable coating is applied to the reactor cavity walls before the reactor cavity is filled with water to minimize the likelihood of leakage into the trough area. These preventive actions have resulted in no evidence of leakage over the years at the former sand bed drains.

The staff reviewed the information in its overall evaluation of the drywell degradation issue presented at the end of this section.

Corrosion of the Upper Drywell above the Former Sand Bed Region. In reviewing the license renewal information for the upper region of the drywell shell, the staff noted that the applicant referred to the LRA Section 4.7.2, "Drywell Corrosion," TLAA evaluation for further discussion. In LRA Section 4.7.2, the applicant stated that the disposition of this TLAA is in accordance with 10 CFR 54.21(c)(1)(iii), and the ASME Section XI, Subsection IWE Program is credited to address the drywell corrosion TLAA. In LRA Section 4.7.2, under Analysis, the applicant stated that the ASME Section XI, Subsection IWE Program ensures that the reduction in vessel thickness will not adversely affect the ability of the drywell to perform its safety function. The ASME Section XI, Subsection IWE Program performs periodic UT inspections at critical locations, performs calculations to track corrosion rates, projects vessel thickness based on conservatives corrosion rates, and demonstrates maintenance of the minimum required vessel thickness.

114) delete text

The applicant further stated in the LRA that inspections conducted since 1992 demonstrate that, as a result of corrective actions, the corrosion rates are very low or, in some cases, arrested. The drywell surfaces that were coated show no signs of deterioration. Drywell vessel wall thickness measurements indicate substantial margin to the minimum wall thickness, even when projected to the year 2029 with conservative estimates of corrosion rates. The applicant stated that continued

assessment of the observed drywell vessel thickness ensures that timely action can be taken to correct degradation that could lead to loss of the intended function.

The staff reviewed the applicant's discussion of aging management activities for the upper region of the drywell shell and determined that additional information was needed on the augmented scope of IWE. In its response, the applicant stated that OCGS had been committed to the drywell corrosion program in 1986 before implementation of IWE in September 9, 2001. The program elements, including periodic UT inspections at critical locations, calculations to track corrosion rates, vessel thickness projections based on conservative corrosion rates, and demonstrations of maintenance of minimum required vessel thickness, are now incorporated into IWE as an augmented inspection. The applicant provided procedures ER-AA-330, ER-AA-330-007, OC-6, and 2400-GMM-3900.52 for review.

The applicant further stated in its response that examination of the drywell interior surfaces in the former sand bed region is included as part of the ASME Code Section XI IWE inspections. The inspection of the exterior surfaces of the drywell in the sand bed region is included in the ~~Protective Coatings and Monitoring Program.~~ 115) Protective Coating Monitoring and Maintenance Program

The applicant also provided a tabulation of measured thicknesses for the monitored elevation of the upper region of the drywell shell along with calculation 1302-187-E310-0037, which summarizes trending results, projected remaining wall thickness at the end of the period of extended operation, and the CLB minimum required thickness.

The applicant further stated that UT inspections are performed every other refueling outage and that calculation 1302-187-E310-0037 provides the corrosion calculation and end-of-operating life thickness calculation.

In its letter dated April 4, 2006, the applicant committed (Commitment No. 27) to conduct UT thickness measurements in the upper regions of the drywell shell every other refueling outage at the same locations currently measured prior to and during the period of extended operation.

The staff reviewed the information in its overall evaluation of the drywell degradation issue presented at the end of this section.

In reviewing PBD-AMP-B.1.27 for the applicant's ASME Section XI, Subsection IWE Program, the staff noted that, in the discussion on pages 25 through 31 of drywell corrosion above the sand bed region, the applicant stated that,

> Corrective action for these regions involved providing a corrosion allowance by demonstrating, through analysis, that the original drywell design pressure was conservative. Amendment 165 to the Oyster Creek Technical Specifications reduced the drywell design pressure from 62 psig to 44 psig. The new design pressure coupled with measures to prevent water intrusion into the gap between the drywell shell and the concrete will allow the upper portion of the drywell to meet ASME Code requirements.

During the audit, the staff requested that the applicant describe the measures to prevent water intrusion into the gap between the drywell shell and the concrete to allow the upper portion of the drywell to meet ASME Code requirements. In addition, the applicant was further asked to clarify

As a result of discussions between the staff and the applicant on January 26, 2006, and April 20, 2006, the applicant supplemented its initial response to include the following:

- OCGS will also perform periodic UT inspections of the drywell shell thickness in the sand bed region, as discussed previously in this section.
- OCGS will also enhance the Protective Coating Monitoring and Maintenance Program to require inspection of the coating credited for corrosion (torus internal, vent system internal, sand bed region external) in accordance with ASME Section XI, Subsection IWE Program. Details are provided later in this section.
- On April 20, 2006, OCGS provided supplemental information on torus coating.

Details of the enhancement to the Protective Coating Monitoring and Maintenance Program and the staff's evaluation of this AMP are discussed in SER Section 3.0.3.1.8.

After the applicant's initial response, the applicant was asked for its technical basis for not also crediting its ASME Section XI, Subsection IWE Program for managing loss of material due to corrosion in the former sand bed region of the drywell.

The applicant stated that visual inspection of the containment drywell shell, conducted in accordance with ASME Code Section XI, Subsection IWE, is credited for aging management of accessible areas of the containment drywell shell. Typically this inspection is for internal surfaces of the drywell. The exterior surfaces of the drywell shell in the sand bed region for Mark I containment are considered inaccessible by ASME Code Section XI, Subsection IWE; thus, visual inspection was not possible for a typical Mark I containment before the sand was removed from the sand bed region in 1992. After removal of the sand, an epoxy coating was applied to the exterior surfaces of the drywell shell in the sand bed region. The region was made accessible during refueling outages for periodic inspection of the coating. Subsequently, OCGS periodically visually inspected the coating under a CLB commitment implemented prior to the ASME Section XI, Subsection IWE Program. As a result, inspection of the coating was in accordance with the Protective Coating Monitoring and Maintenance Program. The applicant's evaluation of this AMP concluded the program is adequate to manage aging of the drywell shell in the sand bed region during the period of extended operation consistent with the CLB commitment and that inclusion of the coating inspection under the ASME IWE inspection is not required. However, the applicant will amend this position to commit to monitor the protective coating on the exterior surfaces of the drywell in the sand bed region in accordance with the requirements of ASME Code Section XI, Subsection IWE during the period of extended operation.

In its letter dated April 4, 2006, the applicant committed (Commitment No. 27) to the following: Prior to the period of extended operation, the applicant will perform additional visual inspections of the epoxy coating applied to the exterior surface of the drywell shell in the sand bed region so the coated surfaces in all 10 drywell bays will have been inspected at least once. In addition, the ISI program will be enhanced to require inspection of 100 percent of the epoxy coating every 10 years during the period of extended operation. These inspections will be in accordance with ASME Code Section XI, Subsection IWE. The inspections will be staggered so that at least three bays will be examined every other refueling outage. ~~This commitment applies prior to the period of extended operation, and every 10 years during the period of extended operation.~~

116) delete text

In its letter dated April 4, 2006, the applicant committed (Commitment No. 27) to the following: UT thickness measurements of the drywell shell in the sand bed region will be every 10 years. The

the version of the ASME Code incorporated into 10 CFR 50.55a twelve months before the start of the inspection interval.

117) IWF

The staff noted that the 1995 ASME Code Section XI, including 1996 addenda, was the edition incorporated into 10 CFR 50.55a at the time the applicant was required to declare its inspection basis for the current 10-year ~~IWE~~ inspection interval. The applicant will incorporate the requirements specified in the version of the ASME Code incorporated into 10 CFR 50.55a twelve months before the start of the next 120-month inspection interval. As this incorporation is consistent with the intent of the GALL Report guidance, the staff did not consider it an actual exception to the GALL Report and found it acceptable.

Enhancement 1. In the LRA, the applicant stated an enhancement in meeting the GALL Report program element "scope of program." Specifically, the enhancement stated:

> Enhancement activities, which are in addition to the existing Oyster Creek ASME Section XI, Subsection IWF program, consist of including additional MC supports inside the Torus, Torus Support - Base Plate and Saddle, Inner Support Column & Outer Support Column) and inspection of underwater MC supports for loss of material due to corrosion and loss of mechanical function (Torus Internal - Downcomer Brace Support (underwater), Vent Header Ring Header Support (above water), Vent System Inner Support Column (above and below water) and Vent System Outer Support Column (above and below water)). Enhancements will be implemented prior to entering the period of extended operation.

During the audit, the staff asked the applicant for clarifications about this enhancement to understand better what MC supports are in the ASME Section XI, Subsection IWF Program and will be added to the program and also to confirm that all MC supports under IWF are included in the program. In its response, the applicant stated that:

(1) The MC supports included in the existing IWF inspection program are:

- Existing containment program - IWE (above water line - internal)
- E1.20 downcomers
- E1.20 ring header within torus
- E1.20 vent lines - DW to torus vent lines
- Existing torus exterior - IWF MC supports
- F1.40 torus support - sway braces

(2) The MC supports that will be added to the scope of the IWF inspection program for the license renewal period are:

- torus (internal) - IWF MC supports
- torus support - base plate and saddle
- torus support - inner support column
- torus support - outer support column
- torus internal - downcomer brace support (underwater)
- vent header ring header support (above water)
- vent system inner support column (above and below water)
- vent system outer support column (above and below water)

The staff finds this enhancement acceptable because when the enhancement is implemented the program will be consistent with GALL AMP XI.E2 and will provide additional assurance that the effects of aging will be adequately managed.

Operating Experience. In LRA Section B.1.35, the applicant explained that the cable testing and calibrations for this AMP currently have proven effective in identifying degradation in the system tested. OCGS has experienced failures of monitoring system cables and connectors that were identified during the conduct of routine testing. For example, a step change in the air ejector offgas radiation monitor readings was corrected by replacement of the cables for both channels. When equipment cannot be brought into calibration or when cable system tests indicate unacceptable results evaluations are performed in accordance with the corrective action process and appropriate actions are taken.

The staff reviewed the operating experience provided in the LRA and interviewed the applicant's technical personnel to confirm that the plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review of the above plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrument Circuits Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

118) delete text

UFSAR Supplement. In LRA Section A.1.35 ~~and letters dated December 9, 2005 and May 1, 2006~~, the applicant provided the UFSAR supplement for the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrument Circuits Program. The staff determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrument Circuits Program, the staff determined that those program elements for which the applicant claimed consistency with the GALL Report are consistent. Also, the staff reviewed the enhancements and confirmed that their implementation prior to the period of extended operation will make the AMP consistent with the GALL Report AMP to which it was compared. The staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.27 Metal Fatigue of Reactor Coolant Pressure Boundary

Summary of Technical Information in the Application. In LRA Section B.3.1, the applicant described the existing Metal Fatigue of Reactor Coolant Pressure Boundary (RCPB) Program as consistent, with an enhancement, with GALL AMP ~~X.M1~~, "Metal Fatigue of Reactor Coolant Pressure Boundary."

118) XI.M1

The Metal Fatigue of Reactor Coolant Pressure Boundary Program provides for aging management of select components in the RCPB by tracking and evaluating key plant events

effects. Bolted joint inspections rely on detection of visible leakage during routine observations and equipment maintenance. 119) XI.M18 with

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Attachment 7 . In its response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated that the Bolting Integrity - FRCT Program is consistent with GALL AMP ~~X.M18with~~ exceptions. The staff reviewed the program elements (see SER Section 3.0.2.1) of the Bolting Integrity - FRCT Program and basis documents to determine their consistency with GALL AMP ~~X.M18.~~ 120) XI.M18

The staff reviewed those portions of the Bolting Integrity - FRCT Program for which the applicant claimed consistency with GALL AMP XI.M18 and found them consistent. Furthermore, the staff concluded that the applicant's Bolting Integrity - FRCT Program provides reasonable assurance that aging effects will be adequately managed so that the intended functions of bolting within the scope of license renewal at the FRCT station are maintained consistent with the CLB during the period of extended operation. The staff found that the applicant's Bolting Integrity - FRCT Program conforms to the recommended GALL AMP XI.M18 with exceptions described below.

Exception 1. In its response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated an exception to the GALL Report program elements "scope of program," "preventive actions," "parameters monitored/inspected," "detection of aging effects," "monitoring and trending," and "acceptance criteria." Specifically, the exception stated:

> The Bolting Integrity - FRCT program does not specifically incorporate NRC and industry recommendations delineated in NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants." The program also does not specifically address Electric Power Research Institute (EPRI) NP-5769 for safety-related bolting, or EPRI TR- 104213. These documents were developed specifically for the nuclear power industry. The Forked River Combustion Turbine station is a non-nuclear fossil-fueled station. The Bolting Integrity - FRCT program was evaluated against the ten elements of aging management program ~~XI.M18~~, "Bolting Integrity," specified in NUREG-1801. Each element is evaluated, and the associated portions of the element that are applicable to the Forked River Combustion Turbine power plant have been incorporated into this program. This program applies good industry bolting practices based on General Electric (the original FRCT designer and supplier) recommendations, supplemented with periodic walkdown inspections to confirm bolting integrity. The requirements for safety-related bolting, and bolting for nuclear steam supply system component supports, do not apply to the Forked River Combustion Turbine power plant.

The applicant stated, in its response to RAI 2.5.1.19-1 dated November 11, 2005, and in the basis document PBD-AMP-B.1.12A, the following:

> The scope of the program covers bolting within the scope of license renewal at the Forked River Combustion Turbine power plant. There is no safety-related bolting or bolting for nuclear steam supply system (NSSS) component supports at the Forked River Combustion Turbine power plant. The program scope includes pressure-retaining component bolting and structural bolting used on the Forked

The operating experience with the FRCT includes a significant number of past inspections including observations of bolting and bolted joints. The documented inspection results provide objective evidence that existing environmental conditions do not result in significant bolting degradation that could cause a loss of the bolting intended functions. Past inspections have been at various frequencies, as long as 16 years for some components, with the units performing reliably between inspections. Implementation of this new program will assure that proper bolting maintenance practices are continued and that walkdown inspections for leakage and inspections for bolting degradation will be performed at least once every four years for reasonable assurance that the aging effects will be adequately managed for the period of extended operation.

The staff reviewed the operating experience provided in the basis document and interviewed the applicant's technical personnel to confirm that the plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review of the above plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's Bolting Integrity - FRCT Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

UFSAR Supplement. The applicant provided its UFSAR supplement for the Bolting Integrity - FRCT Program in response to RAI 2.5.1.19-1. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's program and RAI response, the staff finds that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exceptions and their justifications and determined that the AMP, with the exceptions, is adequate to manage the aging effects for which it is credited. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that intended function(s) will be maintained for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.29 Closed-Cycle Cooling Water System - FRCT

Summary of Technical Information in the Application. In its November 11, 2005, supplemental response to RAI 2.5.1.19-1, the applicant stated that the new AMP B.1.14A, "Closed-Cycle Cooling Water System - FRCT," is consistent with GALL AMP XI.M21, "Closed-Cycle Cooling Water System," with exceptions ~~and an enhancement~~. 121) delete text

The program manages aging of pumps, tanks, piping, piping components, piping elements, and heat exchangers included in the scope of license renewal and exposed to a closed cooling water environment at the FRCT station. This program incorporates experience with existing activities of the closed cooling water system at the FRCT station. The closed cooling water environment at the FRCT station is blended water-glycol. This program includes preventive measures to minimize corrosion and SCC and monitoring and maintenance inspection activities to monitor the effects of corrosion and SCC on the intended function of the components.

Preventive activities rely on maintenance of appropriate water chemistry control parameters within the specified limits of EPRI TR-1007820, "Closed Cooling Water Chemistry Guideline," Revision 1, for blended glycol formulations to minimize corrosion and SCC. These control parameters include percent glycol or freeze point and pH. EPRI TR-1007820 does not require monitoring of system corrosion inhibitor concentrations for blended glycol formulations unless corrosion inhibitors have been added. Then EPRI TR-1007820 Section 5.9 requires that the corrosion inhibitor concentrations be monitored to within the range recommended by the manufacturer. The FRCT closed-cycle cooling water system utilizes a proprietary inhibited glycol product and does not add supplemental corrosion inhibitors.

The applicant also stated that performance monitoring indicates degradation in closed-cycle cooling water systems with plant operating conditions indicates degradation in frequently operated systems. In addition, station maintenance inspections monitor the condition of heat exchangers exposed to closed-cycle cooling water environments. These measures will ensure that the intended functions of the systems and components serviced by the closed cooling water system are not compromised by aging.

122) XI.M21

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Attachment 7. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated that the Closed-Cycle Cooling Water System - FRCT Program is consistent with GALL AMP ~~X.M21~~ with exceptions ~~and an enhancement~~. The staff reviewed the program elements and basis documents to determine their consistency with GALL AMP ~~X.M21~~.

123) delete text

The staff reviewed those portions of the Closed-Cycle Cooling Water System - FRCT Program for which the applicant claimed consistency with GALL AMP XI.M21 and found them consistent. Furthermore, the staff concluded that the applicant's Closed-Cycle Cooling Water System - FRCT Program provides reasonable assurance that aging effects of the closed cycle cooling water system at the FRCT station will be adequately managed during the period of extended operation. The staff found that the applicant's Closed-Cycle Cooling Water System - FRCT Program conforms to the recommended GALL AMP XI.M21, with exceptions ~~and an enhancement~~ described below.

Exception 1. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated an exception to the GALL Report program elements "preventive actions," "parameters monitored or inspected," "monitoring and trending," and "acceptance criteria." Specifically, the exception stated:

> NUREG 1801 refers to EPRI TR-107396 "Closed Cooling Water Chemistry Guidelines" 1997 Revision. Oyster Creek implements the guidance provided in EPRI 1007820 "Closed Cooling Water Chemistry Guideline," Revision 1, which is the 2004 Revision to TR-107396. EPRI periodically updates industry water chemistry guidelines, as new information becomes available. Oyster Creek has reviewed EPRI 1007820 and has determined that the most significant difference is that the new revision provides more prescriptive guidance and has a more conservative monitoring approach. EPRI 1007820 meets the same requirements of EPRI TR-107396 for maintaining conditions to minimize corrosion and microbiological growth in closed cooling water systems for effectively mitigating many aging effects.

During the audit, the applicant described its review and evaluation of the differences between EPRI TR-107396, "Closed Cooling Water Chemistry Guidelines," the 1997 revision of the guidelines referred to in the GALL Report, and EPRI TR-1007820, "Closed Cooling Water Chemistry Guideline," Revision 1, which is the 2004 revision implemented by OCGS. The applicant stated that the most significant difference from the original version of the closed cooling water chemistry guidelines document is that EPRI TR-1007820 provides more prescriptive guidance and has a more conservative monitoring approach. The applicant further stated that EPRI TR-1007820 meets the same requirements of EPRI TR-107396 for maintaining conditions to minimize corrosion and microbiological growth in closed cooling water systems and effectively mitigate many aging effects.

In addition, the applicant stated that as part of its comparative review of the guideline documents it had contacted Anthony Selby, the author of EPRI TR-107396 and EPRI TR-1007820, to confirm that the new guidance provided in TR-1007820 was not contrary to the guidance in TR-107396.

The staff reviewed EPRI TR-1007820, "Closed Cooling Water Chemistry Guideline," Revision 1, and EPRI TR-107396, Revision 0, and confirmed the applicant's assessment that the new revision provides more prescriptive guidance, has a more conservative monitoring approach, and meets the same requirements for maintaining conditions to minimize corrosion and microbiological growth in closed cooling water systems to effectively mitigate many aging effects. On this basis, the staff finds this exception acceptable.

Exception 2. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated an exception to the GALL Report program elements "corrective actions," "confirmation process," and "administrative controls." Specifically, the exception stated:

> These elements are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B.

As discussed in SER Section 3.0.4, the applicant stated that a QA program based on the recommendations of RG 1.155, Appendix A, will be used to implement the corrective actions, confirmation process, and administrative controls attributes for the FRCT mechanical AMPs. This QA program contains attributes that are equivalent to the guidance in Branch Technical Position IQMB-1, "Quality Assurance for Aging Management Programs." On this basis, the staff finds this exception acceptable.

~~Enhancement. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated an enhancement in meeting the GALL Report program element "scope of program." Specifically, the enhancement stated:~~

124) delete text

> ~~The closed-cycle cooling water - FRCT aging management program is a new program to be implemented for the components in the scope of license renewal and subject to a closed-cycle cooling water environment located at the Forked River combustion Turbine power plant.~~

~~In the November 11, 2005 supplemental response to RAI 2.5.1.19-1, the applicant stated that this program manages aging of pumps, tanks, piping, piping components, piping elements, and heat exchangers included in the scope of license renewal and exposed to a closed-cooling water environment at the FRCT system. This program incorporates experience with activities of the~~

~~closed cooling water system at the FRCT station. The closed cooling water environment at the FRCT station is blended water-glycol. This program includes preventive measures to minimize corrosion and SCC and performance monitoring and maintenance inspection activities to monitor the effects of corrosion and SCC on the intended function of the components; therefore, the staff determined that this new program is justifiable.~~

125) delete text

~~The staff finds this enhancement acceptable because when implemented the Closed-Cycle Cooling Water System - FRCT Program will be consistent with GALL AMP XI.M21 and will provide additional assurance that the effects of aging will be adequately managed.~~

Operating Experience. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated that the FRCT system has not experienced a loss of component intended function due to corrosion product buildup, through-wall loss of material, or SCC for components within the scope of license renewal subject to a closed-cycle cooling water environment.

The FRCT units undergo periodic major inspection outages in accordance with manufacturer recommendations. In March 2004, GE Energy Services performed major inspection and maintenance of FRCT Unit 1 and documented all work performed in an inspection report dated June 7, 2004. In October 2005 GE began a major inspection and maintenance outage on FRCT Unit 2. The scope of equipment inspections included the turbine and its internals and support equipment. Acceptance criteria and corrective actions for these activities ensure that equipment is maintained within design specifications.

The combustion turbine lube oil heat exchangers were removed, disassembled, and inspected during the major inspection outages for each combustion turbine unit. GE did not identify any significant degradation of these heat exchangers in the FRCT Unit 1 outage final report. The FRCT Unit 2 lube oil heat exchangers were visually inspected during the current (October 2005) outage and found in good condition with only minor pitting of carbon steel components with no significant signs of corrosion or wall thinning in the copper alloy tubes. Pump casings, piping, and valve internal surfaces exposed to closed cooling water were also visually inspected during this outage with no significant corrosion or wall thinning observed.

FRCT system components within the scope of license renewal and exposed to closed cooling water, including head tanks, the water-to-air heat exchanger located at the mechanical draft cooling tower, and the various heat exchangers cooled by the closed cooling water system, have experienced no loss of intended function failures due to age-related degradation.

The combustion turbine operating experience provides objective evidence that the FRCT components subject to closed cooling water experience no significant age-related degradation and that the closed-cycle cooling water chemistry has been maintained adequately to manage the effects of aging. This new Closed-Cycle Cooling Water System - FRCT Program will include additional chemistry controls and component condition monitoring activities, providing further assurance that a non-corrosive environment is maintained to continue to minimize aging-related degradation.

The staff reviewed the operating experience provided in the November 11, 2005, supplemental response to RAI 2.5.1.19-1, and interviewed the applicant's technical personnel to confirm that the plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review of the above plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's Closed-Cycle Cooling Water System - FRCT Program will adequately manage the aging effects identified in the applicant's LRA AMRs for which this AMP is credited.

UFSAR Supplement. The applicant provided its UFSAR supplement for the Closed-Cycle Cooling Water System - FRCT Program in its supplemental response to RAI 2.5.1.19-1. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's program and RAI response, the staff finds that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exceptions and their justifications and determined that the AMP, with the exceptions, is adequate to manage the aging effects for which it is credited. ~~Also, the staff has reviewed the enhancement and determined that its implementation prior to the period of extended operation will make the AMP consistent with the GALL Report AMP to which it was compared.~~ The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that intended function(s) of the combustion turbine components exposed to closed cooling water environments within the scope of license renewal will be maintained for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.30 Aboveground Steel Tanks - FRCT

126) delete text

Summary of Technical Information in the Application. In its November 11, 2005, supplemental response to RAI 2.5.1.19-1, the applicant stated that the new AMP B.1.21A, "Aboveground Steel Tanks - FRCT," is consistent with GALL AMP XI.M29, "Aboveground Carbon Steel Tanks," with an exception.

The Aboveground Steel Tanks - FRCT Program will provide management of loss of material aging effects for outdoor carbon steel storage tanks. The tanks included in this program are the main fuel oil storage tank, the closed cooling water system head tanks located at the closed cooling water mechanical draft cooling towers, and the diesel starter jacket water (closed cooling water) head tanks located on the roof of the combustion turbine auxiliary enclosure. The program credits the application of paint coating as a corrosion preventive measure and includes periodic visual inspections to monitor degradation of the paint coating and any resulting metal degradation for the steel tanks.

Periodic internal UT inspections will be performed on the bottom of the outdoor steel main fuel oil tank supported by an earthen/concrete foundation. Other outdoor carbon steel tanks in the scope of this program are not directly supported by earthen or concrete foundations and therefore undergo external visual inspections without the necessity of bottom surface UT inspections

The main fuel oil tank is the only in-scope outdoor tank supported by an earthen/concrete foundation. This tank does not have caulking or sealing around the tank-foundation interface. Raised tanks not directly supported by earthen or concrete foundations also have no caulking or sealing. Therefore, sealant or caulking inspection at the tank-foundation interface does not apply.

The Aboveground Steel Tanks - FRCT Program is a new program. External tank inspections will

be at a frequency of every 2 years. Bottom surface UT inspections will be at a frequency of once every 20 years based on plant-specific operating experience with the FRCT system main fuel oil storage tank. This program, including the initial tank external paint inspections, will be implemented prior to the period of extended operation. The recommended UT inspection of the main fuel oil tank bottom was performed in October 2000; therefore, it is not necessary to perform this initial inspection again prior to the period of extended operation. Based on the results of the October 2000 inspections and subsequent repairs to the tank floor, the tank was certified to be suitable for the storage of number 2 fuel oil for a period not to exceed 20 years before the next internal inspection will be necessary. Therefore, UT inspections of the tank floor are not necessary prior to the period of extended operation and will be performed again prior to October 2020.

127) XI.M29

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Attachment 7. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated that Aboveground Steel Tanks - FRCT Program is consistent with GALL AMP ~~X.M29~~ with an exception. The staff reviewed the program elements and basis documents to determine their consistency with GALL AMP ~~X.M29~~.

The staff reviewed those portions of the Aboveground Steel Tanks - FRCT Program for which the applicant claimed consistency with GALL AMP XI.M29 and found them consistent with the GALL Report AMP. Furthermore, the staff concluded that the applicant's Aboveground Steel Tanks - FRCT Program provides reasonable assurance that aging effects are adequately managed so that the intended functions of above-ground steel tanks within the scope of license renewal at the FRCT station will be maintained consistent with the CLB during the period of extended operation. The staff found that the applicant's Aboveground Steel Tanks - FRCT Program conforms to the recommended GALL AMP XI.M29 with an exception described below.

Exception. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated an exception to the GALL Report program elements "corrective actions," "confirmation process," and "administrative controls." Specifically, the exception stated:

> These elements are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B.

As discussed in SER Section 3.0.4, the applicant stated that a QA program based on the recommendations of RG 1.155, Appendix A, will be used to implement the corrective actions, confirmation process, and administrative controls attributes for the FRCT mechanical AMPs. This QA program contains attributes that are equivalent to the guidance in Branch Technical Position IQMB-1, "Quality Assurance for Aging Management Programs." On this basis, the staff finds this exception acceptable.

Operating Experience. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated that painting has protected the external surfaces of outdoor steel tanks adequately and that loss of material due to external corrosion has not been a concern. Some coating degradation has been observed, and the resulting exposed steel surfaces have experienced minor surface rusting with no impact on the tank intended function. Implementation of this new program prior to the period of extended operation will result in specific evaluations of any identified coating degradation, including the potential impact on the tank intended function.

for reasonable assurance that the aging effects will be adequately managed for the period of extended operation.

The staff reviewed the operating experience provided in the basis document and interviewed the applicant's technical personnel to confirm that plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review and discussions with the applicant's technical personnel, the staff concludes that the applicant's Aboveground Steel Tanks Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

UFSAR Supplement. The applicant provided its UFSAR supplement for the Aboveground Steel Tanks - FRCT Program in its supplemental response to RAI 2.5.1.19-1. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. The staff's review and audit of the applicant's program and RAI response, the staff finds that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff has reviewed the exception and its justifications and determined that the AMP, with the exception, is adequate to manage the aging effects for which it is credited. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and found that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.31 Fuel Oil Chemistry - FRCT

Summary of Technical Information in the Application. In its November 11, 2005 supplemental response to RAI 2.5.1.19-1, the applicant stated that the new AMP B.1.22A, "Fuel Oil Chemistry - FRCT," is consistent with GALL AMP XI.M30, "Fuel Oil Chemistry," with exceptions.

The new Fuel Oil Chemistry - FRCT Program assures that contaminants are maintained at acceptable levels in new and stored fuel oil for systems and components within the scope of license renewal. The fuel oil storage tank will be maintained by monitoring and controlling fuel oil contaminants in accordance with the guidelines of the ASTM. Fuel oil sampling activities will be in accordance with ASTM D 4057 for multilevel and tank bottom sampling. Fuel oil will be periodically sampled and analyzed for particulate contamination in accordance with modified ASTM Standard D 2276 Method A, or ASTM Standard D 6217 and for the presence of water and sediment in accordance with ASTM Standard D 2709 or ASTM Standard D 1796. The fuel oil storage tank will be periodically drained of accumulated water and sediment, cleaned, and internally inspected. These activities effectively manage the effects of aging by providing reasonable assurance that potentially harmful contaminants are maintained at low concentrations.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Attachment 7. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated that the Fuel Oil Chemistry - FRCT Program is consistent with GALL AMP ~~X.M30~~ with exceptions. The staff reviewed the program elements and basis documents to determine their consistency with GALL AMP ~~X.M30~~.

128) XI.M30

actions will be implemented, including evaluation or inspection of additional system components potentially affected, including the diesel fuel tanks.

The staff reviewed the applicant's response and determined that the turnover rate for the FRCT diesel starter engine tanks is reasonable and will prevent stratification of the fuel stored in these tanks. Further, the enclosed location of the FRCT diesel starter engine tanks together with the use of the enclosure heaters to minimize thermal cycling of these tanks reduces the potential for condensation forming inside them. In operating experience with the FRCT fuel oil storage tank, moisture intrusion has not been a problem. If corrosion due to moisture intrusion occurred, the one-time inspections of the FRCT system components will detect it promptly. On this basis, the staff concludes that this exception is acceptable.

Exception 2. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated an exception to the GALL Report program elements "scope of program," and "monitoring and trending." Specifically, the exception stated:

> The Program Description, Scope of Program (Element 1), and Monitoring and Trending (Element 5) refer to plant technical specifications related to fuel oil quality. There are no plant technical specifications at the Forked River Combustion Turbine power plant.

The staff requested additional information on the specifications that will be used to determine whether fuel oil sampling results are acceptable.

In its response, the applicant stated that water and sediment concentrations are tested in accordance with ASTM Standards D 1796 or D 2709. Particulate contamination is determined by the use of modified ASTM Standard D 2276, Method A, or ASTM Standard D 6217. Acceptance criteria are per ASTM D 975 consistent with GE Specification GEI-41047H for the FRCT.

The staff reviewed the applicant's response and determined that the specifications to establish acceptance criteria for the fuel oil samples are based on ASTM Standard D 975 consistent with GE specification GEI-41047H for the FRCT ~~as well as the specifications referenced in RG 1.137~~. On this basis, the staff concludes that this exception is acceptable.

129) delete text

Exception 3. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated an exception to the GALL Report program elements "corrective actions," "confirmation process," and "administrative controls." Specifically, the exception stated:

> These elements are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B.

As discussed in SER Section 3.0.4, the applicant stated that a QA program based on the recommendations of RG 1.155, Appendix A, will be used to implement the corrective actions, confirmation process, and administrative controls attributes for the FRCT mechanical AMPs. This QA program contains attributes that are equivalent to the guidance in Branch Technical Position IQMB-1, "Quality Assurance for Aging Management Programs." On this basis, the staff finds this exception acceptable.

130) XI.M32 with

131) XI.M32

RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated that the One-Time Inspection - FRCT Program is consistent with GALL AMP ~~X.M32with~~ exceptions. The staff reviewed the program elements and basis documents to determine their consistency with GALL AMP ~~X.M32~~.

In reviewing this AMP, the staff noted in the FRCT license renewal document program description for the One-Time Inspection - FRCT Program that the description of the "parameters monitored or inspected" AMP element stated that inspection methods consist of NDE including visual, volumetric, and surface techniques. The One-Time Inspection - FRCT Program is not based on the requirements of the ASME Code, as stated in the first exception for this AMP, and the applicant was asked to describe the rationale to be used in selecting the inspection method for the various types of components in the AMP scope.

In its response, the applicant stated that this AMP performs one-time inspections to confirm the effectiveness of the Fuel Oil Chemistry - FRCT and Lubricating Oil Analysis - FRCT Programs. The inspection methods selected will depend on the component type, intended function, material, and aging effect. Heat transfer surfaces of components with a heat transfer intended function will be inspected visually to identify fouling or other surface degradation that could impair the heat transfer function. This same visual inspection also assures that the pressure boundary intended function is maintained. The stainless steel filter element with a filter intended function also will be inspected by visual techniques to identify accumulations of dirt or sediment or degradation of the filter element that could impair or reduce the effectiveness of the filter intended function. Similarly, restricting orifices will be inspected by visual techniques to identify degradation of the orifice that could impair or reduce the effectiveness of the throttle intended function. This same visual inspection also assures that the pressure boundary intended function is maintained.

The applicant further stated that remaining mechanical components in the scope of this program have a pressure boundary intended function and are subject to a loss of material aging effect. Mechanical components will be inspected by VT or UT techniques to determine the extent of loss of material by evaluation of loss of wall thickness. The technique selected will depend on the component type and on whether the inspection involves disassembly. For combustion turbine components, the most appropriate technique will be determined based on the manufacturer's experience and recommendations for the component. Piping can be inspected for wall thickness by UT techniques. VT techniques are appropriate for pump casings, strainer bodies, filter housings, and valve bodies when disassembled for maintenance. Such component inspections will confirm the effectiveness of the Fuel Oil Chemistry - FRCT and Lubricating Oil Analysis - FRCT Programs.

The staff reviewed the applicant's response and determined that these inspection techniques are reasonable for the fuel oil system and the lubricating oil system for the FRCTs and will provide reasonable assurance that the aging effects for which this program is credited will be managed. On this basis, the staff concludes that the applicant's rationale for selecting inspection techniques was acceptable.

Upon further review of this AMP, the staff noted in the FRCT license renewal document description for the One-Time Inspection - FRCT Program that the program element "detection of aging effects" addresses sample selection; however, the rationale for selecting the sample was not provided. The applicant was asked for additional information on how the sample for the one-time inspection will be selected.

As discussed in SER Section 3.0.4, the applicant stated that a QA program based on the recommendations of RG 1.155, Appendix A, will be used to implement the corrective actions, confirmation process, and administrative controls attributes for the FRCT mechanical AMPs. This QA program contains attributes that are equivalent to the guidance in Branch Technical Position IQMB-1, "Quality Assurance for Aging Management Programs." On this basis, the staff finds this exception acceptable.

Operating Experience. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated that in October 2001 (FRCT Unit 2) and March 2004 (FRCT Unit 1) GE Energy Services performed major inspection and maintenance and documented all work in inspection reports dated January 4, 2002, and June 7, 2004, respectively. The equipment inspections included the turbine and its internals and support equipment. All work was carried out closely following the instructions and guidance of the original equipment manufacturer's design, maintenance, and inspection manuals. Acceptance criteria and corrective actions for these activities ensure that equipment is maintained within design specifications.

The applicant further stated that the FRCT Unit 1 inspection was major maintenance, the first major inspection of the unit since initial installation in 1988. During the FRCT Unit 1 inspection, the fuel forwarding pumps and emergency DC lube oil pumps were removed and sent to the GE service shop for cleaning, inspection, and repairs. The GE report does not indicate any degradation of these pump casings. The combustion turbine lube oil system was drained, cleaned, and inspected, various pumps were inspected, and the lube oil coolers were cleaned. No degradation of these components was identified. The main lube oil pump was disassembled and inspected, and no defects were observed.

The applicant further stated that the FRCT Unit 2 inspection was of the fuel nozzle and combustion section. The lube oil filters were replaced. Included were a borescope and combustion inspection, removal of exhaust frame cooling piping, disconnection of the fuel lines for inspection, and fuel nozzle inspection, repair, and testing. The GE report does not identify any issues with the disassembled fuel oil piping. FRCT Unit 2 began a major outage inspection in October 2005 with components disassembled and visually inspected for age-related degradation. The internal surfaces of disassembled stainless steel piping and flexible hoses showed no corrosion or wall thinning. The combustion turbine lube oil heat exchangers were disassembled, cleaned, and inspected. The carbon steel and copper alloy heat exchanger components normally exposed to lubricating oil were found in excellent condition. The standby heat exchanger not normally in service was found to have some minor accumulation of sediment that was cleaned off. Carbon steel pump casings normally submerged in the lubricating oil reservoir were visually observed to be in excellent condition no corrosion. The carbon steel internal surfaces of the lubricating oil reservoir were also observed to be in excellent condition no corrosion.

132) with

The staff reviewed the operating experience provided for the FRCT to confirm that the plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review of the above plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's One-Time Inspection - FRCT Program will adequately manage the aging effects identified in the LRA AMRs for which this AMP is credited.

UFSAR Supplement. The applicant provided its UFSAR supplement for the One-Time Inspection - FRCT Program in its supplemental response to RAI 2.5.1.19-1. The staff reviewed this section

and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's program and RAI response, the staff finds that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exceptions and their justifications and determined that the AMP, with the exceptions, is adequate to manage the aging effects for which it is credited. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that intended function(s) will be maintained for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.33 Selective Leaching of Materials - FRCT

Summary of Technical Information in the Application. In its November 11, 2005, supplemental response to RAI 2.5.1.19-1, the applicant stated that the new AMP B.1.25A," Selective Leaching of Materials - FRCT," is consistent with GALL AMP XI.M33, "Selective Leaching of Materials," with an exception.

The Selective Leaching of Materials - FRCT Program will ensure the integrity of components that may be susceptible to selective leaching at the FRCT station. The AMP includes a one-time visual inspection and hardness measurement of selected components to determine whether loss of materials due to selective leaching occurs and whether the process will affect the ability of the components to perform intended functions for the period of extended operation. The One-Time Inspection Program includes visual inspections, hardness tests, and other appropriate examination methods as may be required to confirm or rule out selective leaching and to evaluate the remaining component wall thickness when leaching is identified. Components of susceptible materials at the FRCT site are comprised of copper alloy materials exposed to treated water (closed cooling water) environments. The purpose of the program is to determine whether loss of material due to selective leaching of the zinc component of the alloy (dezincification) occurs. If selective leaching is found, the program evaluates the effect it will have on the ability of the affected components to perform intended functions for the period of extended operation.

The new Selective Leaching of Materials - FRCT will be implemented in the final 10 years of the period of extended operation.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Attachment 7. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated that the Selective Leaching of Materials - FRCT Program is consistent with GALL AMP ~~X.M33~~ with exceptions. The staff reviewed the program elements and basis documents to determine their consistency with GALL AMP ~~X.M33~~ 133) XI.M33.

The staff reviewed those portions of the Selective Leaching of Materials - FRCT Program for which the applicant claimed consistency with GALL AMP XI.M18 and found them consistent with the GALL Report AMP. Furthermore, the staff concluded that the applicant's program provides reasonable assurance that the loss of material aging effects due to selective leaching will be effectively managed so that the intended functions of components within the scope of license

The staff reviewed the operating experience provided in the basis document and interviewed the applicant's technical personnel to confirm that plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review of the above plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's Selective Leaching of Materials - FRCT Program will adequately manage the aging effects and mechanism identified in the LRA for which this AMP is credited.

UFSAR Supplement. The applicant provided its UFSAR supplement for the Selective Leaching of Materials - FRCT Program in its supplemental response to RAI 2.5.1.19-1. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's program and RAI response, the staff finds that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exception and its justifications and determined that the AMP, with the exception, is adequate to manage the aging effects for which it is credited. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that intended function(s) will be maintained for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.34 Buried Piping Inspection - FRCT

Summary of Technical Information in the Application. In its November 11, 2005, supplemental response to RAI 2.5.1.19-1, the applicant stated that AMP B.1.26A, "Buried Pipe Inspection - FRCT," is consistent with GALL AMP XI.M34, "Buried Piping and Tanks," with an exception.

The new Buried Piping Inspection - FRCT Program includes preventive measures to mitigate corrosion and periodic inspection of external surfaces for loss of material to manage the effects of corrosion on the pressure-retaining capacity of carbon steel piping in a soil (external) environment. Preventive measures are in accordance with standard industry practices for maintaining external coatings and wrappings. External inspections of buried piping will occur opportunistically during maintenance excavations. Within 10 years prior to the period of extended operation, inspection of buried piping will be performed unless an opportunistic inspection occurs within this period. During the period of extended operation, inspection of buried piping will be performed again within the first 10 years unless an opportunistic inspection occurs during this period.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Attachment 7. In its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, the applicant stated that the Buried Piping Inspection - FRCT Program is consistent with GALL AMP ~~X.M34~~ with an exception. The staff reviewed the program elements and associated basis documents to determine their consistency with GALL AMP ~~X.M34~~.

UFSAR Supplement. The applicant provided its UFSAR supplement for the Buried Piping Inspection - FRCT Program in its supplemental response to RAI 2.5.1.19-1. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion: On the basis of its audit and review of the applicant's program and RAI response, the staff finds that those program elements for which the applicant claimed consistency with the GALL Report are consistent. In addition, the staff reviewed the exception and its justifications and determined that the AMP, with the exception, is adequate to manage the aging effects for which it is credited. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2.35 Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT

Summary of Technical Information in the Application. In its November 11, 2005, supplemental response to RAI 2.5.1.19-1, the applicant stated that the new AMP B.1.38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT," will be consistent with GALL AMP XI.M38,."Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," with an exception.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT Program, as implemented for the FRCT system, will consist of visual inspections of the internal surfaces of steel piping, valve bodies, ductwork, filter housings, fan housings, damper housings, mufflers, and heat exchanger shells not covered by other AMPs. These components are subject to an internal environment of indoor air assumed to have sufficient moisture for loss of material aging effects. In addition, this program includes piping and mufflers with diesel engine exhaust gas as an internal environment. Internal inspections will be during scheduled maintenance activities when the surfaces are accessible for visual inspection. The program includes visual inspections to assure that existing environmental conditions do not cause material degradation that could result in loss of component intended functions.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Attachment 7. In its supplemental response to RAI 2.5.1.19-1, the applicant stated that the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT Program is consistent with GALL AMP ~~X.M38~~ with an exception. The staff reviewed the program elements and associated basis documents to determine their consistency with GALL AMP ~~X.M38~~. 135) XI.M38

The staff reviewed those portions of the applicant's Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT Program for which the applicant claimed consistency with GALL AMP XI.M38 and found them consistent. Furthermore, the staff concluded that the applicant's program provides reasonable assurance that the aging effects for which this program is credited will be adequately managed. The staff found that the applicant's Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT Program conforms to the recommended GALL AMP XI.M38, with an exception described below.

Exception 2. In its supplemental response to RAI 2.5.1.15-1 dated December 9, 2005, the applicant stated an exception to the GALL Report program elements "corrective actions," "confirmation process," and "administrative controls." Specifically, the exception stated:

> These elements are not accomplished in accordance with the AmerGen quality assurance (QA) program and are not in accordance with the requirements of 10 CFR Part 50, Appendix B.

In its supplemental response to RAI 2.5.1.15-1 dated June 7, 2006, the applicant stated that this exception was eliminated and that these elements will be accomplished in accordance with the requirements of 10 CFR Part 50, Appendix B. In the response the applicant also stated that it will meet the guidance in Branch Technical Position IQMB-1, "Quality Assurance for Aging Management Programs." The adequacy of the applicant's 10 CFR 50, Appendix B program for these elements is addressed in SER Section 3.0.4. On this basis, the staff finds this exception acceptable.

Operating Experience. In its response to RAI 2.5.1.15-1 dated December 9, 2005, the applicant stated that the new Buried Piping and Tank Inspection - Met Tower Repeater Engine Fuel Supply Program will be effective in managing aging degradation for the period of extended operation by timely detecting aging effects and implementing appropriate corrective actions prior to loss of system or component intended functions. The buried piping and tank at the Forked River Met Tower included in the scope of license renewal are below-grade, propane-filled, and next to the Forked River meteorological tower. There is no history of buried pipe or tank leaks in this system.

In Forked River meteorological tower repeater engine fuel supply buried piping and tank operating experience, loss of material due to external corrosion has not been a concern. Inspection of the buried piping and tank when excavated for maintenance therefore ensures that intended functions will be maintained. Inspections will be within 10 years of the period of extended operation, and again within the first 10 years of period of extended operation, crediting opportunistic inspections that may occur within each of these periods. The staff concludes that the applicant's Buried Piping and Tank Inspection - Met Tower Repeater Engine Fuel Supply Program will adequately manage the aging effects and mechanism identified in the LRA for which this AMP is credited.

UFSAR Supplement. The applicant provided its UFSAR supplement for the Buried Piping and Tank Inspection - Met Tower Repeater Engine Fuel Supply Program in its supplemental response to RAI 2.5.1.15-1. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

136) delete text

Conclusion. On the basis of its audit and review of the applicant's program and RAI response finds that the applicant has demonstrated that the effects of aging will be adequately managed so that intended function(s) will be maintained during the period of extended operation, as required by 10 CFR 54.21(a)(3). ~~The Buried Piping and Tank Inspection - Met Tower Repeater Engine Fuel Supply Program has been effective in monitoring OCGS buried pipe and is expected to be equally effective for the Met Tower repeater engine fuel supply buried pipe and tanks.~~ To date, there have been no leaks from the Met Tower repeater engine fuel supply buried pipe and tanks. The staff's review of the UFSAR supplement for this program also finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3 AMPs That Are Not Consistent with or Not Addressed in the GALL Report

To establish action levels for the various physical parameters, wear metals, additives, and contaminant levels, information from oil manufacturers, equipment manufacturers, and industry guidelines was reviewed. In addition, historical trends from existing analysis were evaluated.

137) delete text

~~Monitoring and control of oil impurities and properties mitigate loss of material, cracking, and loss of heat transfer (fouling) in lubricating oil systems by preserving an environment not conducive to such aging effects, thus assuring that the components within the scope of the program remain capable of performing intended functions.~~

The Lubricating Oil Monitoring Activities Program monitors the effects of corrosion by sampling and analyzing various lubricating oils in accordance with ASTM and ISO standards to evaluate system and component performance. Proper lubricating oil properties are monitored to mitigate corrosion. The One-Time Inspection Program will be used to confirm the absence of aging effects (loss of material) in low flow or stagnant areas in lubricating oil systems.

Monitoring and control of oil impurities and properties mitigate the loss of material, cracking, and loss of heat transfer (fouling) in lubricating oil systems by preserving an environment not conducive to such aging effects, thus assuring that the components within the scope of the program remain capable of performing intended functions. Testing activities verify maintenance of heat exchanger intended functions.

Surveillance procedures for the diesel-driven fire protection system pumps will be enhanced to verify flow through the gearbox lubricating oil coolers. The EDG lubricating oil coolers do not require a similar procedural enhancement because temperature monitoring for these coolers exists.

The Lubricating Oil Monitoring Activities Program includes specifications for known oil degradation indicators and characteristics, sampling and analysis frequencies, and corrective actions for control of lubricating oil properties. Lubricating oil physical properties are tested to standard ASTM and ISO methods for the applicable oil type for accurate numbers with repeatable results (Reference: MA-AA-716-230-1001). Samples are taken and analyzed for indications of degraded chemical and physical properties depending on oil type and type of service. Surveillance testing verifies proper heat exchanger performance to support system operation.

The Lubricating Oil Monitoring Activities Program manages the aging effects of loss of material, cracking ,and reduction of heat transfer by preserving an environment not conducive to these aging effects.

Flash point can be a measure to detect the contamination of lubricating oils by fuel oil, as is the case for diesel engine lubricating oil. Therefore, oil analysis guidelines will be enhanced to include measurement of flash point for diesel engine lubricating oil. Flash point is not measured for all lubricating oil in service. Flash point is a quality control measurement when purchasing new oil. It is not a primary measurement to determine the presence of water or contaminants, the parameters for assessing the environment of concern.

138) (EPRI 1003056)

Monitoring for the presence of chloride ions is not performed. Based on past precedents the staff concluded that monitoring for chloride ions in lubrication oil is not required. Industry guidance addresses oil environments in general and lubricating oil environments for heat exchangers, respectively. Appendix C identifies damaging effects of chlorides in fuel environments but not for lubricating oil environments. Appendix G does not identify any applicable aging effects from chlorides for lubricating oil environments in heat exchanger components. Additionally, there is no OCGS site operating experience of failure or degradation in oil environments attributed to the presence of chlorides.

The Lubricating Oil Monitoring Activities Program will be enhanced as follows:

> Surveillance procedures for the diesel driven fire protection system pumps will be enhanced to verify flow through the gearbox lubricating oil coolers.
>
> Oil analysis guidelines will be enhanced to include measurement of flash point for diesel engine lubricating oil. This is a new enhancement based on the reconciliation of this AMP from the draft January 2005 NUREG 1800, Revision 1 to the approved September 2005 NUREG-1801, Rev. 1.

The staff determined that this program element satisfies SRP-LR Section A.1.2.3.3 because it includes specific parameters being controlled to achieve prevention or mitigation of aging effects. Although the applicant classified this program as plant-specific, enhancements have been added to ensure flow through the gearbox lubrication oil coolers. The staff finds these enhancements acceptable because verification of flow through the gearbox lubrication oil coolers will significantly increase the ability to detect the effects of aging. Although the applicant has identified this program as plant-specific these enhancements make the program consistent with the recommendations for lubricating oil monitoring programs in the GALL Report.

139) 38

The staff noted that the enhancement related to the flash points was not identified in the LRA. Subsequently, the applicant committed (Commitment No. ~~59~~) to revise LRA Section B2.2 to state that oil analysis guidelines will be enhanced to include measurement of flash point for diesel engine lubricating oil. The staff finds this commitment (Commitment No. 38) acceptable as it follows the recommendations in the GALL Report.

(4) Detection of Aging Effects - The "detection of aging effects" program element in SRP-LR Section A.1.2.3.4 states that the applicant should:

- Provide information that links the parameters to be monitored or inspected to the aging effects managed.
- Describe when, where, and how program data are collected (i.e., all aspects of activities to collect data as part of the program).
- Link the method or technique and frequency, if applicable, to plant-specific or industry-wide operating experience.
- Provide the basis for the inspection and sample size when sampling is used to inspect a group of SCs. The SCs inspected should be based on such aspects as a similarity of materials of construction, fabrication, procurement, design, installation, operating environment, or aging effects.

- In 2001, a core spray pump oil analysis detected a high ratio of large to small particles after an oil change. Further investigation determined there had been no increase in pump vibration levels for an extended period and that the source of the particles in the changed oil was contamination from the reservoir when the oil change occurred. The reservoir was flushed to remove particles and new oil was added. An increased oil surveillance frequency was established to confirm oil condition.
- In 2002, a CRD pump oil analysis indicating high wear particle concentration resulted in flushing of the bearing, adding new oil, and monitoring further for bearing wear. A followup oil sample was scheduled for more data for analysis in addition to the scheduled pump vibration analysis.

The staff noted that the operating experience for the Lubricating Oil Monitoring Activities Program showed no adverse trend in performance. Problems identified will not cause significant impact to safe operation of the plant, and adequate corrective actions were taken to prevent recurrence. There is confidence that implementation of the Lubricating Oil Monitoring Activities Program will effectively maintain proper lubricating oil properties. Periodic self-assessments of the program identify areas that need improvement to maintain the quality performance of the program.

On the basis of its review of the above plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's Lubricating Oil Monitoring Activities Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

UFSAR Supplement. The applicant provided its UFSAR supplement for the Lubricating Oil Monitoring Activities Program in LRA Section A.2.2, which stated that the existing Lubricating Oil Monitoring Activities Program manages loss of material, cracking, and fouling in lubricating oil heat exchangers, systems, and components within the scope of license renewal by monitoring physical and chemical properties in lubricating oil. Sampling, testing, and monitoring verify lubricating oil properties. Oil analysis identifies specific wear mechanisms, contamination, and oil degradation within operating machinery and system components within the scope of license renewal. The Lubricating Oil Monitoring Activities Program will be enhanced to add surveillance for verification of flow through the fire protection system diesel-driven pump gearbox lubricating oil cooler. ~~The enhancement~~ will be implemented prior to the period of extended operation.

The staff also reviewed the commitment (Commitment No. 38) to confirm that this program will be implemented prior to the period of extended operation.

140) These enhancements

The staff's review of the UFSAR supplement finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its review of the applicant's program the staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that intended function(s) will be maintained during the period of extended operation, as required by 10 CFR 54.21(a)(3).

The staff's review of the UFSAR supplement for this program also finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

140) In addition, the program will be enhanced to include sampling and measurement for flashpoint of diesel engine lubricating oil to detect contamination of lubricating oil by fuel oil.

that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its review, the staff's concludes that the applicant has demonstrated that the Generator Stator Water Chemistry Activities Program will adequately manage aging effects from cooling water consistent with the CLB for the period of extended operation as required by 10 CFR 54.29(a).

The staff's review of the UFSAR supplement for this program finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3.4 Periodic Inspection of Ventilation Systems

Summary of Technical Information in the Application. In LRA Section B.2.4, the applicant described the existing, plant-specific Periodic Inspection of Ventilation Systems Program.

The Periodic Inspection of Ventilation Systems Program includes periodic visual inspections of the ventilation systems within the scope of license renewal. Periodic visual inspections are performed during system preventive maintenance activities on a frequency not exceeding 5 years. Components subject to visual inspections include:

- buried ventilation ductwork
- flexible connections
- ~~fans~~ ← 141) fan housing
- filter and heater housings
- damper housings
- access door seals
- valves
- piping and fittings
- cooling and heating coils
- thermowells
- flow elements and restricting orifices

The exterior surfaces of ventilation ducts and damper housings will be inspected by the Structures Monitoring Program. The Periodic Inspection of Ventilation Systems Program inspects internal and external surfaces of ventilation system components to identify and assess aging effects that may occur. The program includes surface inspections for such indications of loss of material as rust, corrosion, and pitting. Heat transfer surfaces are inspected for fouling. Flexible connection and door seal elastomer materials are inspected for detrimental changes in material properties as evidenced by cracking, perforations in the material, or leakage and for loss of material due to wear. Existing maintenance activities will be enhanced to include ducts exposed to soil, instrument piping and valves, restricting orifices and flow elements, and thermowells.

Staff Evaluation. The staff reviewed the information in LRA Section B.2.4 on the applicant's Periodic Inspection of Ventilation Systems Program to determine whether the effects of aging will be adequately managed so that intended functions will be maintained consistent with the CLB for the period of extended operation.

(6) Acceptance Criteria. The "acceptance criteria" program element in SRP-LR Section A.1.2.3.6, related to condition monitoring programs, states that:

- The acceptance criteria of the program and its basis should be described. The acceptance criteria, against which the need for corrective actions will be evaluated, should ensure that the structure and components intended function(s) are maintained under all CLB design conditions during the period of extended operation.
- The program should include a methodology for analyzing the results against applicable acceptance criteria.

The applicant stated that acceptance criteria will be provided in the specification for inspection of wooden poles carried out by approved maintenance contractors experienced in the inspection, treatment, and reinforcement of wooden poles. The inspector, through a combination of visual, sounding, boring, and excavation will determine the condition of the pole. Remedial actions will be taken based on inspection findings.

The staff determined that the use of an acceptance criteria developed by an experienced wooden pole inspector is reasonable and that this program element satisfies SRP-LR Section A.1.2.3.6. On this basis, the staff finds the applicant's description of the "monitoring and trending" program element acceptable.

(10) Operating Experience. The "operating experience" program element criteria in SRP-LR Section A.1.2.3.10 states that:

- Operating experience should provide objective evidence to support the conclusion that the effects of aging will be managed adequately so that the structure and component intended function(s) will be maintained during the period of extended operation.
- An applicant may have to commit to providing operating experience in the future for new programs to confirm their effectiveness.

142),

The applicant stated that although this program is new inspections of wooden utility poles has been conducted by the industry for many years. Utility experience over several decades indicates that a 10-year inspection interval is adequate to detect age-related degradation before a loss of intended function.

The staff determined that the applicant provided industry experience to support an adequate 10-year inspection interval for wooden poles and that this program element satisfies SRP-LR Section A.1.2.3.10 . On this basis, the staff finds the applicant's description of the "operating experience" element acceptable.

UFSAR Supplement. The applicant provided its UFSAR supplement for the Wooden Utility Pole Program in LRA Section A.2.6, which stated that this new program will be used to manage loss of material and change of material properties for wooden utility poles in or near the OCGS substation providing structural support for the conductors connecting the offsite power system and the 480/208/120V utility (JCP&L) non-vital power system. The program consists of inspection on a 10-year interval by a qualified inspector. The wooden poles will be inspected for

loss of material due to insects and moisture damage and for change in material properties due to moisture damage. This new program will be implemented prior to the period of extended operation. The staff also reviewed the commitment (Commitment No. 42) to confirm that this program will be implemented prior to the period of extended operation. The staff determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its review of the applicant's Wooden Utility Pole Program, the staff concludes that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.3.7 Periodic Monitoring of Combustion Turbine Power Plant

In its response to RAI 2.5.1.19-1 dated October 12, 2005, the applicant stated that it had revised its approach to aging management for the OCGS SBO combustion turbine power plant. Specifically, the applicant has taken a more detailed approach to scoping, screening, AMRs, and AMPs. As a result, the Periodic Monitoring of Combustion Turbine Power Plant Program has been deleted. Therefore, the staff did not review this program.

3.0.3.3.8 Periodic Monitoring of Combustion Turbine Power Plant Electrical

Summary of Technical Information in the Application. In its October 12, 2005, response to RAI 2.5.1.19-1, the applicant stated that the new plant-specific Periodic Monitoring of Combustion Turbine Power Plant - Electrical Program will include elements of GALL AMPs XI.E1, "Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements," XI.E3, "Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements," and XI.E4, "Metal Enclosed Bus."

The Periodic Monitoring of Combustion Turbine Power Plant - Electrical Program will be used to manage aging effects for the electrical commodities that support FRCT operation. The new Periodic Monitoring of Combustion Turbine Power Plant - Electrical Program, the existing Structures Monitoring Program, and the new Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program will be used to manage aging effects for the electrical commodities that support FRCT operation. This program will include elements of GALL AMP XI.E1 for accessible electrical cables and connections; GALL AMP XI.E3 for manholes, pits, and cable trenches; and GALL AMP XI.E4 for the phase bus, connections, and phase bus insulators. This program will inspect accessible electrical cables and connections before the period of extended operation with an inspection frequency of at least once every 10 years.

143) new paragraph

This program will inspect manholes, pits, and cable trenches containing inaccessible medium-voltage cables located on the FRCT site for water collection so that draining or other corrective actions can be taken. Inspections for water collection will be performed at least once every 2 years, and the frequency of inspection will be adjusted based on the results obtained. The first inspections will be completed before the period of extended operation.

144) delete text

This program will also inspect the accessible phase bus, connections, and insulators before the period of extended operation with an inspection frequency of at least once every 5 years. Inspection of the phase bus enclosure external surfaces will be performed under the existing Structures Monitoring Program. The first inspection will be performed before the period of extended operation with an inspection frequency of at least once every 4 years.

The following represents the ~~the~~ Periodic Monitoring of Combustion Turbine Power Plant - Electrical Program scope for 13.8 kV cables that distribute the output of the FRCT to both the SBO transformer and the 230 kV switchyard. Inaccessible medium-voltage cable circuits supporting the FRCT and the associated manholes, pits, and trenches located on the OCGS site will be tested or inspected by the new Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program. The first tests and inspections will be before the period of extended operation with a cable test frequency of at least once every 10 years, and a manhole, pit, and trench inspection frequency of at least once every 2 years. These aging management activities ensure the continued availability of the FRCTs as the alternate AC source in the event of an SBO.

Staff Evaluation. During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report. Details of the staff's audit evaluation of this AMP are documented in the Audit and Review Report Attachment 7. In its response to RAI 2.5.1.19-1, the applicant stated that the Periodic Monitoring of Combustion Turbine Power Plant - Electrical Program is consistent with elements of GALL AMPs XI.E1, XI.E3, and XI.E4. The staff reviewed the program elements and associated basis documents to determine their consistency with GALL AMPs XI.E1, XI.E3, and XI.E4.

The staff asked the applicant whether the program elements included phase bus enclosure internal surfaces inspections. The applicant stated that this program also includes inspection of the internal portion of the metal enclosed buses to identify age-related degradation of insulating and metallic components, excessive dust buildup and foreign debris, and evidence of moisture or debris intrusion. The staff's review concluded that the applicant's Periodic Monitoring of Combustion Turbine Power Plant - Electrical Program will effectively manage the aging of accessible cables and connections, inaccessible medium-voltage cables, phase bus and connections, phase bus insulators, and phase bus enclosure internal surfaces for reasonable assurance that intended functions of the electrical commodities supporting the FRCTs will be maintained consistent with the CLB during the period of extended operation. The staff finds that the applicant's Periodic Monitoring of Combustion Turbine Power Plant - Electrical Program conforms to the recommendations in GALL AMPs XI.E1, X1.E3, and X1.E4.

Operating Experience. In its response to RAI 2.5.1.19-1 dated October 12, 2005, the applicant stated that although this program is new, FRCT has experienced no cable- or bus-related failure during its period of operation. The applicant also stated that a 2004 inspection involved major rework and repair of the exhaust plenum after and forward walls, including a complete rebuild and rewiring of the load compartment and junction boxes as well as extensive alignment activities. These major efforts ensured that the FRCT cables and connections were in optimal condition when returned to service. Lessons learned from routine inspections are incorporated into the future outage scope. A review of the applicant's corrective action documents did not indicate the occurrence of aging degradation with electrical commodities at the FRCT station or a combustion turbine reliability below the 95 percent requirement.

145) the

146) In its letter dated May 9, 2006 and June 2, 2006, the applicant committed (Commitment No. 43) to perform twice per year visual inspections of high voltage insulators. These letters also reflect that cable connections (metallic parts) located at the FRCT power plant are part of the population from which a sample will be selected for testing under the Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program.

The staff reviewed the operating experience provided in PBD-AMP-B.1.37 and interviewed the applicant's technical personnel to confirm that the plant-specific operating experience revealed no degradation not bounded by industry experience.

On the basis of its review of the above plant-specific operating experience and discussions with the applicant's technical personnel, the staff concludes that the applicant's Periodic Monitoring of Combustion Turbine Power Plant - Electrical Program will adequately manage the aging effects identified in the LRA for which this AMP is credited.

UFSAR Supplement. The applicant provided its UFSAR supplement for the Periodic Monitoring of Combustion Turbine Power Plant - Electrical Program in its supplemental response to RAI 2.5.1.19-1. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

147) , the staff

Conclusion. On the basis of its audit and review of the applicant's program and RAI response finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained during the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff's review of the UFSAR supplement for this program also finds that it provides an adequate summary description of the program as required by 10 CFR 54.21(d).

3.0.3.3.9 Periodic Inspection Program - FRCT

Summary of Technical Information in the Application. In its November 11, 2005, supplemental response to RAI 2.5.1.19-1, the applicant stated that AMP B.2.5A, "Periodic Inspection Program - FRCT" is a new program.

The Periodic Inspection Program - FRCT Program will address FRCT system components within the scope of license renewal requiring periodic monitoring of aging effects and not covered by other AMPs. Activities will consist of a periodic inspection of selected components to verify integrity and confirm the absence of aging effects. The inspections will be condition monitoring examinations intended to assure that environmental conditions do not cause material degradation that could result in a loss of intended functions. This program is used to confirm that:

- Change in material properties due to aging does not occur in elastomer expansion joints and flexible connections exposed to fuel oil, indoor air, or outdoor air environments.
- Reduction of heat transfer due to aging does not occur in heat exchangers exposed to indoor air or outdoor air environments.
- Loss of material in various steel and stainless steel components subject to an intermittent combustion turbine exhaust gas environment is monitored so there is no loss of component intended functions.
- Loss of material in copper heat exchanger components subject to an indoor air or outdoor air environment is monitored so there is no loss of component intended functions.
- Cracking in stainless steel components subject to an intermittent combustion turbine exhaust gas environment is monitored so there is no loss of component intended functions.

UFSAR Supplement. The applicant provided its UFSAR supplement for the Periodic Inspection Program - FRCT Program in its supplemental response to RAI 2.5.1.19-1. The staff reviewed this section and determined that the information in the UFSAR supplement provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's program and RAI response finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained during the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff's review of the UFSAR supplement for this program also finds that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.4 Quality Assurance Program Attributes Integral to Aging Management Programs

3.0.4.1 Summary of Technical Information in Application

Section 3.0, "Aging Management Review Results," of the LRA provided an AMR summary for each unique component type or commodity group at OCGS determined to require aging management during the period of extended operation. This summary includes identification of aging effects requiring management and AMPs managing these aging effects. In LRA Sections A.0.5 and B.0.3, "Quality Assurance Program and Administrative Controls," the applicant described the "corrective action," "confirmation process," and "administrative controls" attributes applied to both safety-related and nonsafety-related SSCs within the scope of license renewal. In LRA Sections B.1 and B.2 the applicant further described the "corrective action," "confirmation process," and "administrative controls" attributes for each AMP.

148) 39

The existing QA program meeting the requirements of 10 CFR 50, Appendix B, and a separate QA program based on Appendix A of RG 1.155, "Station Blackout," will implement the AMP "corrective action," "confirmation process," and "administrative controls" attributes. The existing QA program that meets the requirements of 10 CFR 50, Appendix B, will be applied to all but the mechanical AMPs for the FRCT. A QA program based on Appendix A of RG 1.155 will be applied to the FRCT mechanical AMPs described in LRA Sections B.1.12A, B.1.14A, B.1.21A, B.1.22A, B.1.24A, B.1.25A, B.1.26A, B.1.38, B.1.~~29~~, and B.2.05A. A separate QA program based on Appendix A of RG 1.155 is necessary because the existing QA program that meets the requirements of 10 CFR 50, Appendix B, is not implemented for activities not performed by the applicant. The applicant will establish an agreement with the FRCT owner to ensure that the processes and procedures that address the AMP "corrective action," "confirmation process," and "administrative controls" attributes applicable to the nonsafety-related FRCT mechanical system AMPs are established prior to the period of extended operation. The existing QA program that meets the requirements of 10 CFR 50, Appendix B, will be applied to the FRCT structural and electrical AMP "corrective action," "confirmation process," and "administrative controls" attributes.

3.0.4.2 Staff Evaluation

Pursuant to 10 CFR 54.21(a)(3), a license renewal applicant is required to demonstrate that the effects of aging on SCs subject to an AMR will be adequately managed so that their intended functions will be maintained consistent with the CLB for the period of extended operation. SRP-LR, Branch Technical Position RLSB-1, "Aging Management Review - Generic," describes 10 attributes of an acceptable AMP. Three of these 10 attributes are associated with the QA activities of corrective action, confirmation process, and administrative control. Table A.1-1,

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Steel and stainless steel isolation condenser components exposed to reactor coolant (Item 3.1.1-13)	Loss of material due to general (steel only), pitting and crevice corrosion	Water Chemistry and One-Time Inspection	Water Chemistry (B.1.2) and an augmented inspection program to ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B.1.1)	Acceptable- The augmented inspection program is equivalent to GALL's one-time inspection program and hence, consistent with GALL. (See SER Section 3.1.2.2.2)
Stainless steel, nickel-alloy, and steel with nickel-alloy or stainless steel cladding reactor vessel flanges, nozzles, penetrations, safe ends, vessel shells, heads and welds (Item 3.1.1-14)	Loss of material due to pitting and crevice corrosion	Water Chemistry and One-Time Inspection 149) Water Chemistry and One-Time Inspection	Water Chemistry and One-Time Inspection	Consistent with GALL, which recommends further evaluation. (See SER Section 3.1.2.2.2) 149) Consistent with GALL which recommends further evaluation.
Stainless steel; steel with nickel-alloy or stainless steel cladding; and nickel-alloy reactor coolant pressure boundary components exposed to reactor coolant (Item 3.1.1-15)	Loss of material due to pitting and crevice corrosion	Water Chemistry and One-Time Inspection	~~Not Applicable~~	~~Not applicable since no GALL AMR line items related to this component group/ aging effect combination were credited in the LRA.~~ (See SER Section 3.1.2.2.2)
Steel (with or without stainless steel cladding) reactor vessel beltline shell, nozzles, and welds (Item 3.1.1-17)	Loss of fracture toughness due to neutron irradiation embrittlement	TLAA, evaluated in accordance with Appendix G of 10 CFR 50 and RG 1.99. The applicant may choose to demonstrate that the materials of the nozzles are not controlling for the TLAA evaluations.	TLAA, evaluated in accordance with Appendix G of 10 CFR 50 and RG 1.99.	This TLAA is evaluated in SER Section ~~4.3~~. (See SER Section 3.1.2.2.3) 150) 4.2

will be adequately managed so that their intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.1.2.2 AMR Results That Are Consistent with the GALL Report, for Which Further Evaluation is Recommended

Summary of Technical Information in the Application. In LRA Section 3.1.2.2, the applicant provided further evaluation of aging management, as recommended by the GALL Report, for the reactor vessel, internals, and RCS components. The applicant provided information concerning how it will manage the following aging effects:

- cumulative fatigue damage
- loss of material due to general, pitting, and crevice corrosion
- loss of fracture toughness due to neutron irradiation embrittlement
- cracking due to stress corrosion cracking and intergranular stress corrosion cracking
- crack growth due to cyclic loading
- loss of fracture toughness due to neutron irradiation embrittlement and void swelling
- cracking due to stress corrosion cracking
- cracking due to cyclic loading
- loss of preload due to stress relaxation
- loss of material due to erosion
- cracking due to flow-induced vibration — 151) cracking due to thermal and mechanical loading
- cracking due to stress corrosion cracking and irradiation-assisted stress corrosion cracking
- cracking due to primary water stress corrosion cracking
- wall thinning due to flow-accelerated corrosion
- changes in dimensions due to void swelling
- cracking due to stress corrosion cracking and primary water stress corrosion cracking
- cracking due to stress corrosion cracking, primary water stress corrosion cracking, and irradiation-assisted stress corrosion cracking
- quality assurance for aging management of nonsafety-related components

Staff Evaluation. For component groups evaluated in the GALL Report for which the applicant had claimed consistency with the GALL Report and for which the GALL Report recommends further evaluation, the staff audited and reviewed the applicant's evaluation to determine whether it adequately addressed the issues further evaluated. In addition, the staff reviewed the applicant's further evaluations against the criteria of SRP-LR Section 3.1.2.2. Details of the staff's audit are documented in the Audit and Review Report Section 3.2.1.1. The staff's evaluation of the aging effects is discussed in the following sections.

3.1.2.2.1 Cumulative Fatigue Damage

152) piping at Oyster Creek require cutting and re-welding of pressure boundary piping in order to perform eddy current inspections of the tubes and gain access to the tubesheet and internal surfaces of the channel head.

Correction of the valve leakage condition has significantly reduced the number of isolation condenser water level oscillations and resultant thermal cycles applied to the isolation condenser components. The Oyster Creek isolation condenser tube bundles were replaced in the "A" isolation condenser in 2000 and in the "B" isolation condenser in 1998, utilizing improved materials that are more resistant to intergranular stress corrosion cracking. The physical configuration of the isolation condensers and ~~internal surfaces of the channel head require cutting and re-welding of pressure boundary piping.~~ Because of the significant reduction in frequency of initiating conditions, and the relatively recent replacement of the tube bundles with improved materials, these inspections will be performed once during the first ten years of the period of extended operation. Radioactivity and temperature monitoring of the shell side water, as specified in the GALL recommendations for isolation condenser aging management, are currently being performed weekly, and will continue throughout the period of extended operation. Additionally, during the NRC Region 1 Inspection, AmerGen has committed to performing a one-time UT inspection of the "B" Isolation Condenser shell for pitting corrosion, prior to the period of extended operation. Plant experience has indicated that the condition of the "B" isolation condenser is the more limiting of the two condensers. This commitment will be added to the Table A.5 License Renewal Commitment List Item No. 24.

In a followup discussion, the staff requested that the applicant clarify its planned corrective action activities if any tube leakage was observed. In its letter dated May 3, 2006, the applicant stated:

> Should any of the monitoring activities conducted on the isolation condensers reveal conditions potentially indicative of a tube leak, initiation of the corrective action process would result in an engineering evaluation of the observed condition. Confirmatory testing could be performed, which may include controlled-inventory testing of the shell water volume with the bundle side pressurized, and enhanced radioactivity analysis of shell side water. Upon confirmation of tube leakage, repair or plugging of leaking tubes would be performed, and if warranted, eddy current testing of the bundles to determine extent of condition would be considered. Conceivably, depending on the extent, repair could consist of tube bundle replacement. Appropriate corrective action to correct a tube leakage condition in the isolation condensers would be taken, regardless of when it occurred during the period of extended operation.

The staff reviewed the applicant's response and determined that the Water Chemistry and ASME Section XI ISI, Subsection IWB, IWC, and IWD Programs and the commitment (Commitment No. 24) to perform one-time UT inspection of "B" isolation condenser are adequate to manage loss of material due to pitting and crevice corrosion in stainless steel BWR isolation condenser components. The identified above, the staff concludes that the loss of material in the isolation condenser components exposed to reactor coolant will be adequately managed by the ASME Section XI ISI, Subsection IWB, IWC, and IWD, and Water Chemistry Programs.

The staff finds that, based on these programs identified above, the applicant has met the criteria of SRP-LR Section 3.1.2.2.2.2 for further evaluation. The staff also finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions

will be maintained during the period of extended operation. The staff's concerns described in RAI 3.1.1-1 are resolved.

In Attachment 7, items RP-25 and RP-27, of its reconciliation document, the applicant addressed loss of material due to pitting and crevice corrosion for stainless steel, nickel alloy, and steel with stainless steel or nickel alloy cladding flanges, nozzles, penetrations, pressure housings, safe ends, and vessel shells, heads, and welds exposed to reactor coolant.

SRP-LR Section 3.1.2.2.2.3 states that loss of material due to pitting and crevice corrosion can occur for stainless steel, nickel alloy, and steel with stainless steel or nickel alloy cladding flanges, nozzles, penetrations, pressure housings, safe ends, and vessel shells, heads, and welds exposed to reactor coolant. The existing program relies on control of reactor water chemistry to mitigate corrosion. However, control of water chemistry does not preclude loss of material due to pitting and crevice corrosion at locations of stagnant flow conditions. Therefore, the effectiveness of the Water Chemistry Program should be verified to ensure that corrosion does not occur. The GALL Report recommends further evaluation of programs to verify the effectiveness of the Water Chemistry Program. A one-time inspection of select components at susceptible locations is an acceptable method to determine whether an aging effect does not occur or progresses so slowly that the component's intended function will be maintained during the period of extended operation.

Attachment 7, item RP-25, of the applicant's reconciliation document states that the specifications of new line item RP-25 will be addressed as follows: The aging effect of loss of material due to pitting and crevice corrosion in reactor vessel flanges, nozzles, penetrations, pressure housings, safe ends, and vessel shells, heads, and welds will be managed by the Water Chemistry and One-Time Inspection Programs. The selection of susceptible locations for one-time inspections will be based on severity of conditions, time of service, and lowest design margin.

In its letter dated March 30, 2006, the applicant revised LRA Section 3.1 to address loss of material due to pitting and crevice corrosion for stainless steel, nickel alloy, and steel with stainless steel or nickel alloy cladding flanges, nozzles, penetrations, pressure housings, safe ends, and vessel shells, heads, and welds exposed to reactor coolant. The aging effect will be managed through the use of the Water Chemistry and One-Time Inspection Programs. The selection of susceptible locations for one-time inspections will be based on severity of conditions, time of service, and lowest design margin.

153) pressure vessel (RPV) components

The staff reviewed the applicant's Water Chemistry Program and verified that this AMP includes activities for managing loss of material due to pitting and crevice corrosion. In addition, the staff reviewed the applicant's One-Time Inspection Program and verified that this AMP includes inspections of the reactor ~~vessel internals (RVI)~~ to detect loss of material as a means of verifying the effectiveness of the Water Chemistry Program. The staff concludes that these AMPs will adequately manage loss of material due to pitting and crevice corrosion in reactor vessel flanges, nozzles, penetrations, pressure housings, safe ends, and vessel shells, heads, and welds.

Attachment 7, item RP-27, of the applicant's reconciliation document states that for piping, piping components, and piping elements in RCPB systems and systems with RCPB interface the LRA refers to line items EP-32, A-58, and AP-57 for loss of material due to pitting and crevice corrosion of stainless steel in treated water (including reactor coolant) by the Water Chemistry and One-Time Inspection Programs in conformance with the September 2005 GALL Report.

Stainless Steel Reactor Vessel Attachment Welds. The AMPs recommended by the GALL Report for managing cracking due to SCC, IGSCC, and cyclic loading for the RPV attachment welds are GALL AMPs XI.M4, "BWR Vessel Inner Diameter (ID) Attachment Welds," and XI.M2, "Water Chemistry."

In LRA Table 3.1.2.1.5, the applicant identified SCC as an aging effect for the stainless steel RPV attachment welds. The applicant stated that the Water Chemistry Program will be used to manage this aging effect. The applicant further stated that the Water Chemistry Program is consistent with GALL AMP XI.M2 with one exception. In SER Section 3.0.3.2.2, the staff evaluated the requirements of the Water Chemistry Program and determined that it is consistent with the recommendations of GALL AMP XI.M2.

The applicant indicated that the BWR Vessel ID Attachment Welds Program will manage aging degradation of the RPV attachment welds. The BWR Vessel ID Attachment Welds Program invokes the inspection requirements specified in the BWRVIP-48 Report, "Vessel ID Attachment Weld Inspection and Evaluation Guidelines," and the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. The applicant stated that the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program is consistent with GALL AMP XI.M1, "ASME Code Section XI Inservice Inspection, Subsections IWB, IWC, IWD," with one exception. In SER Section 3.0.3.2.1, the staff evaluated the requirements of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program and determined that it is consistent with the recommendations of GALL AMP XI.M1.

The staff's review of LRA Section 3.1.2.2.4 identified areas in which additional information was necessary to complete the review of the applicant's AMR results. The applicant responded to the staff's RAI as discussed below.

In RAI 3.1.1-2 dated March 20, 2006, the staff requested that the applicant provide details on the frequency and the method of inspection (as specified in the BWRVIP-48 Report,"Vessel ID Attachment Weld Inspection and Evaluation Guidelines") that will be implemented for the attachment welds. According to Section 2.2.3 of the BWRVIP-48 Report, furnace-sensitized stainless steel vessel ID attachment welds are highly susceptible to ~~SCC~~. The applicant should identify whether there are any furnace-sensitized stainless steel attachment welds at the OCGS unit and explain what type of AMP is implemented, including details on any augmented inspections, for any existing furnace-sensitized stainless steel attachment welds.

In its response dated April 18, 2006, the applicant stated that the bracket materials and nickel-alloy attachment welds at OCGS were determined to have been furnace-sensitized during vessel fabrication. However, results of the previous inspections did not indicate any flaws in these attachment welds. As no flaws were identified in the furnace-sensitized attachment welds, the identified above, the staff concludes that so far there has been no aging degradation in these attachment welds. The applicant further stated that the attachment welds would be inspected in accordance with the requirements of ASME Code Section XI and the BWRVIP-48 Report.

The staff finds that, by implementing these inspection requirements, the applicant has demonstrated that it would adequately manage the aging degradation of the RPV attachment welds for the period of extended operation. The staff also concluded that the implementation of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program, Chemistry Control Program, and the BWR ID Attachment Welds Program would be consistent with the

(3) The effect of the event at Pilgrim Nuclear Power Station (leaking weld at capped nozzle, September 30, 2003) on the OCGS unit. The staff's IN 2004-08, "Reactor Coolant Pressure Boundary Leakage Attributable to Propagation of Cracking in Reactor Vessel Nozzle Welds," dated April 22, 2004, stated that the cracking occurred in a nickel-alloy 182 (trade name) weld previously repaired extensively. The staff requested that the applicant provide information on the plant experience with previous leakage at the capped nozzle including the past inspection techniques applied, the results obtained, and mitigative strategies imposed.

In its response dated April 18, 2006, the applicant stated that the CRD return line has not been capped and therefore, RAIs 3.1.1-3(B) (1) through (3) would not be applicable to OCGS. The applicant claimed that implementation of the BWR Control Rod Drive Return Line Nozzle Program and the prior installation of an improved thermal sleeve design inside the nozzle bore ensures that the aging effect in the CRD return line nozzle is effectively managed.

The staff finds that the implementation of the BWR CRD Return Line Nozzle and ASME Section XI Inservice Inspection Programs for the CRD return lines would be consistent with GALL AMP XI.M6. The staff finds this implementation acceptable. The staff's concerns described in RAI 3.1.1-3(B) are resolved.

3.1.2.2.6 Loss of Fracture Toughness Due to Neutron Irradiation Embrittlement and Void Swelling

LRA Section 3.1.2.2.6 states that loss of fracture toughness of PWR reactor internals with reference to the further evaluation in SRP-LR Section 3.1.2.2.6 applies to PWRs only. The staff finds acceptable the applicant's evaluation that this aging effect does not apply to OCGS because it is a BWR plant.

3.1.2.2.7 Cracking Due to Stress Corrosion Cracking

LRA Section 3.1.2.2.7~~.1~~ states that cracking due to SCC for PWR stainless steel reactor flange leak detection lines with reference to the further evaluation in SRP-LR Section 3.1.2.2.7.1, applies to PWRs only. The staff finds acceptable the applicant's evaluation that this aging effect does not apply to OCGS because it is a BWR plant.

155) delete text

LRA Section 3.1.2.2.7~~.2~~ states that cracking due to SCC of PWR Class 1 CASS piping, piping components, and piping elements, with reference to the further evaluation in SRP-LR Section 3.1.2.2.7.2, applies to PWRs only. The staff finds acceptable the applicant's assessment that this aging effect does not apply to OCGS because it is a BWR plant.

3.1.2.2.8 Cracking Due to Cyclic Loading

156) delete text

The staff reviewed LRA Sections 3.1.2.2.8~~.1~~ and 3.1.2.2.4.3 against the criteria in SRP-LR Section 3.1.2.2.8.

LRA Section 3.1.2.2.8~~.1~~ states that cracking due to cyclic loading for jet pump sensing lines, with reference to the further evaluation in SRP-LR Section 3.1.2.2.8.1, does not apply. OCGS has no jet pumps or jet pump sensing lines. The staff determined that the OCGS reactor has no jet pumps and, therefore, the staff finds acceptable the applicant's assessment that this aging effect and mechanism is not applicable.

158) Insert new section 3.1.2.2.12 "Cracking Due to Thermal and Mechanical Loading."

the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR Part 54.

3.1.2.2.~~12~~ Cracking Due to Stress Corrosion Cracking and Irradiation-Assisted Stress Corrosion Cracking (IASCC)

157) 18

LRA Section 3.1.2.2.~~12~~ states that cracking due to SCC and IASCC of PWR RVI components, with reference to the further evaluation in SRP-LR Section 3.1.2.2.~~12~~, applies to PWRs only. The staff finds acceptable the applicant's assessment that this aging effect does not apply to OCGS because it is a BWR plant.

3.1.2.2.13 Cracking Due to Primary Water Stress Corrosion Cracking (PWSCC)

LRA Section 3.1.2.2.13 states that cracking due to primary water SCC of PWR components inside the reactor vessel, with reference to the further evaluation in SRP-LR Section 3.1.2.2.13, applies to PWRs only. The staff finds acceptable the applicant's assessment that this aging effect does not apply to OCGS because it is a BWR plant.

3.1.2.2.14 Wall Thinning Due to Flow-Accelerated Corrosion

LRA Section 3.1.2.2.14 states that wall thinning due to flow-accelerated corrosion of PWR steam generator feedwater inlet ring and supports, with reference to the further evaluation in SRP-LR Section 3.1.2.2.14, applies to PWRs only. The staff finds acceptable the applicant's assessment that this aging effect does not apply to OCGS because it is a BWR plant.

3.1.2.2.15 Changes in Dimensions Due to Void Swelling

LRA Section 3.1.2.2.15 states that changes in dimensions due to void swelling of PWR RVI components, with reference to the further evaluation in SRP-LR Section 3.1.2.2.15, applies to PWRs only. The staff finds acceptable the applicant's assessment that this aging effect does not apply to OCGS because it is a BWR plant.

3.1.2.2.16 Cracking Due to Stress Corrosion Cracking and Primary Water Stress Corrosion Cracking

LRA Section 3.1.2.2.16.1 states that cracking due to SCC and primary water SCC of PWR CRD penetration components, with reference to the further evaluation in SRP-LR Section 3.1.2.2.16.1, applies to PWRs only. The staff finds acceptable the applicant's assessment that this aging effect does not apply to OCGS because it is a BWR plant.

LRA Section 3.1.2.2.16.2 states that cracking due to SCC and primary water SCC of PWR pressurizer head spray components, with reference to the further evaluation in SRP-LR Section 3.1.2.2.16.2, applies to PWRs only. The staff finds acceptable the applicant's assessment that this aging effect does not apply to OCGS because it is a BWR plant.

3.1.2.2.17 Cracking Due to Stress Corrosion Cracking, Primary Water Stress Corrosion Cracking, and Irradiation-Assisted Stress Corrosion Cracking

LRA Section 3.1.2.2.17 states that cracking due to SCC, primary water SCC, and IASCC of PWR RVI components, with reference to the further evaluation in SRP-LR Section 3.1.2.2.17, applies

159) 19

to PWRs only. The staff finds acceptable the applicant's assessment that this aging effect does not apply to OCGS because it is a BWR plant.

3.1.2.2.~~18~~ Quality Assurance for Aging Management of Nonsafety-Related Components

SER Section 3.0.4 provides the staff's evaluation of the applicant's quality assurance program for safety-related and nonsafety-related components.

Conclusion. On the basis of its review, for component groups evaluated in the GALL Report, for which the applicant has claimed consistency with the GALL Report and for which the GALL Report recommends further evaluation, the staff determined that the applicant has adequately addressed the issues further evaluated. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.1.2.3 AMR Results That Are Not Consistent with or Not Addressed in the GALL Report

Summary of Technical Information in the Application. In LRA Tables 3.1.2.1.1 through 3.1.2.1.6, the staff reviewed additional details of the results of the AMRs for material, environment, AERM, and AMP combinations not consistent with or not addressed in the GALL Report.

In LRA Tables 3.1.2.1.1 through 3.1.2.1.6, the applicant indicated, via Notes F through J, that the combination of component type, material, environment, and AERM does not correspond to a line item in the GALL Report. The applicant provided further information concerning how the aging effects will be managed. Specifically, Note F indicates that the material for the AMR line item component is not evaluated in the GALL Report. Note G indicates that the environment for the AMR line item component and material is not evaluated in the GALL Report. Note H indicates that the aging effect for the AMR line item component, material, and environment combination is not evaluated in the GALL Report. Note I indicates that the aging effect identified in the GALL Report for the line item component, material, and environment combination is not applicable. Note J indicates that neither the component nor the material and environment combination for the line item is evaluated in the GALL Report.

Staff Evaluation. For component type, material, and environment combinations not evaluated in the GALL Report, the staff reviewed the applicant's evaluation to determine whether the applicant had demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation. The staff's evaluation is discussed in the following sections.

3.1.2.3.1 Isolation Condenser System Summary of Aging Management Evaluation – LRA Table 3.1.2.1.1

The staff reviewed LRA Table 3.1.2.1.1, which summarizes the results of AMR evaluations for the isolation condenser system component groups.

160) Loss of Preload

The applicant stated that it will manage ~~this~~ aging effect by implementing the Bolting Integrity Program. The Bolting Integrity Program complies with the recommendations of GALL AMP XI.M18, "Bolting Integrity," which recommends application of ASME Code Section XI, Subsection IWB, Table IWB 2500-1 requirements for the bolts included in the ASME Section XI Inservice

Inspection, Subsections IWB, IWC, and IWD Program to monitor this aging effect. In addition, GALL AMP XI.M18 invokes the guidelines specified in NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation Failure in Nuclear Power Plants." NUREG-1339 provides adequate technical bases and inspection guidelines as a part of the AMP for safety-related bolting. For bolts not included in the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program, the applicant proposed to use routine inspection methods in its maintenance activities to identify any degradation of the closure bolting in the isolation condenser systems. The applicant's proposed AMP complies with the recommendations of NUREG-1339 for safety-related bolting and is consistent with the recommendations of GALL AMP XI.M18. The staff determined that the applicant's compliance with the recommendations specified in NUREG-1339 and in GALL AMP XI.M18 provides reasonable assurance that the aging degradation of safety-related bolting in the isolation condenser systems will be adequately managed at OCGS.

The applicant provided Program Basis Document PBD-B.1.12, "Oyster Creek License Renewal Project, Bolting Integrity Program," which addresses the inspection methods, inspection frequency, and mitigation methods implemented in the AMP for the closure bolting components. The staff reviewed this document and concluded that the applicant had adequately demonstrated its capability in managing the aging degradation of the closure bolting in the isolation condenser systems for the period of extended operation. The staff finds that, by implementing the Bolting Integrity Program, the applicant has demonstrated that the aging effect due to loss of pre-load in the stainless steel closure bolting (covered by ASME Code Section XI) will be adequately managed during the period of extended operation. The staff, however, recommended that the applicant comply with the inspection frequency specified in the "monitoring and trending" program element of the GALL AMP XI.18 for stainless steel closure bolting not covered by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. The staff also concludes that the implementation of the Bolting Integrity Program would be consistent with the GALL AMP XI.M18.

161) then

161) if

In its supplemental letter dated July 7, 2006, the applicant modified its Bolting Integrity Program UFSAR to specify that these non-ASME pressure retaining bolted joint connections are observed to be leaking, the leakage will be evaluated as part of the corrective action process. The process ~~will~~ allow for pressure retaining components (not covered by ASME Code Section XI) that are reported to be leaking to be inspected daily. If the leak rate does not increase, the inspection frequency will be decreased to biweekly or weekly. The staff finds this acceptable because it follows the recommendations in the GALL Report.

162) may

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the isolation condenser system components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.1.2.3.2 Nuclear Boiler Instrumentation Summary of Aging Management Evaluation – LRA Table 3.1.2.1.2

The staff reviewed LRA Table 3.1.2.1.2, which summarizes the results of AMR evaluations for the nuclear boiler instrumentation component groups.

163) Loss of Preload

The applicant stated that it will manage ~~this~~ aging effect by implementing the Bolting Integrity Program. The Bolting Integrity Program complies with the recommendations of GALL

AMP XI.M18, "Bolting Integrity." GALL AMP XI.M18 recommends application of ASME Code Section XI, Subsection IWB, Table IWB 2500-1 for bolts included in the ASME Code Section XI Program to monitor this aging effect. In addition, GALL AMP XI.M18 invokes the guidelines specified in NUREG-1339, which provides adequate technical bases and inspection guidelines as a part of the AMP for safety-related bolting. For closure bolts not included in the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program, the applicant proposed to use routine inspection methods in its maintenance activities to identify any degradation of the closure bolting in the nuclear boiler instrumentation systems. The applicant's proposed AMP is consistent with the recommendations of NUREG-1339 for safety-related bolting and is consistent with the recommendations of GALL AMP XI.M18.

The staff determined that the applicant's consistency with the recommendations specified in NUREG-1339 and in GALL AMP XI.M18 provides reasonable assurance that the aging degradation of safety-related bolting in the nuclear boiler instrumentation systems will be adequately managed at OCGS.

The applicant provided Program Basis Document PBD-B.1.12, "Oyster Creek License Renewal Project, Bolting Integrity Program," which addresses the inspection methods, inspection frequency, and mitigation methods implemented in the AMP for the closure bolting components. The staff reviewed this document and concluded that the applicant had adequately demonstrated its capability in managing the aging degradation of the closure bolting in the nuclear boiler instrumentation system components for the period of extended operation. The staff determined that by implementing the Bolting Integrity Program the applicant demonstrated that the aging effect due to loss of pre-load of the stainless steel closure bolting in the nuclear boiler instrumentation systems (covered by ASME Code Section XI) will be adequately managed during the period of extended operation. The staff, however, recommended that the applicant adopt the inspection frequency specified in the "monitoring and trending" program element of the GALL AMP XI.18 for stainless steel closure bolting not covered by the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program. The staff also concludes that implementation of the Bolting Integrity Program would be consistent with GALL AMP XI.M18.

164) then

164) if

In its supplemental letter dated July 7, 2006, the applicant modified its Bolting Integrity Program UFSAR to specify that these non-ASME pressure retaining bolted joint connections are observed to be leaking, the leakage will be evaluated as part of the corrective action process. The process

165) may

will allow for pressure retaining components (not covered by ASME Code Section XI) that are reported to be leaking to be inspected daily. If the leak rate does not increase, the inspection frequency will be decreased to biweekly or weekly. The staff finds this acceptable because it follows the recommendations in the GALL Report.

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the nuclear boiler instrumentation components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.1.2.3.3 Reactor Head Cooling System Summary of Aging Management Evaluation – LRA Table 3.1.2.1.3

The staff reviewed LRA Table 3.1.2.1.3, which summarizes the results of AMR evaluations for the reactor head cooling system component groups.

LRA Table 3.1.2.1.3 did not identify any aging effect for the carbon steel valve body exposed to RCS water. However, LRA Table 3.1.2.1.3 footnotes I-3 and I-4 state that the carbon steel valve body is not susceptible to SCC and IGSCC and that thus far no failures in carbon steel valve bodies due to SCC or IGSCC have been reported.

The staff's review identified an area in which additional information was necessary to complete the review of the applicant's AMR results. The applicant responded to the staff's RAI as discussed below.

In RAI 3.1.2.1-1(B) dated March 20, 2006, the staff requested that the applicant address whether there was any previous plant experience with cracking (due to SCC or IGSCC) in carbon steel valve bodies of the RPV head cooling system when exposed to treated water.

In its response dated April 18, 2006, the applicant stated that there are no carbon steel valve bodies in the reactor head cooling system. As there are no carbon steel valve bodies in the reactor head cooling system, the staff's concern described in RAI 3.1.2.1-1(B) is resolved.

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the reactor head cooling system components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.1.2.3.4 Reactor Internals Summary of Aging Management Evaluation – LRA Table 3.1.2.1.4

The staff reviewed LRA Table 3.1.2.1.4, which summarizes the results of AMR evaluations for the reactor internals component groups.

LRA Table 3.1.2.1.4 states that the AMRs for the reactor internals either are consistent with the GALL Report or have no AERM. The staff confirmed that the AMR results presented in this table are consistent with the GALL Report. The staff's evaluation for AMR items that are consistent with the GALL Report is documented in SER Sections 3.1.2.1 and 3.1.2.2.

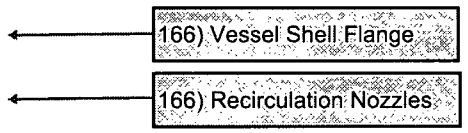
On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the reactor internals components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.1.2.3.5 Reactor Pressure Vessel Summary of Aging Management Evaluation – LRA Table 3.1.2.1.5

The staff reviewed LRA Table 3.1.2.1.5, which summarizes the results of AMR evaluations for the RPV component groups.

LRA Table 3.1.2.1.5 identifies cracking as an aging degradation mechanism in the SA 105 Grade II carbon steel RPV components. The applicant stated that it will credit the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD, and Water Chemistry Programs to monitor this aging effect in the following RPV components:

- bottom head drain nozzle
- feedwater and main steam nozzles and safe ends



- core spray nozzle
- isolation condenser nozzle
- top head nozzles
- top head flange
- bottom head ~~flange~~ 167) delete text
- RPV shell welds

The staff's review of LRA Section 3.1.2.1 identified an area in which additional information was necessary to complete the review of the applicant's AMR results. The applicant responded to the staff's RAI as discussed below.

In RAI 3.1.2.1-1(A) dated March 20, 2006, the staff requested that the applicant provide the following information on the subject aging effect in the carbon steel components:

(1) previous plant experience with cracking in carbon steel RPV components when exposed to treated water

(2) any established mechanism of the cracking in carbon steel RPV components

(3) the scope and the techniques of the past inspections, the results obtained, applied mitigative methods, repairs, frequency of the inspections, and any other relevant information related to identification of the subject aging effect

In its response dated April 18, 2006, the applicant stated that thus far the only cracking experienced in the components was due to thermal fatigue of the feedwater nozzles, which were subsequently repaired. The applicant also has inspected the components (except the bottom head drain nozzle) in accordance with the ASME Code Section XI requirements and found no cracking. The applicant did not inspect the bottom head drain nozzles because they are exempt from ASME Code Section XI inspection (UT) requirements. Previous industry experience indicates that carbon steel bottom head nozzles are not prone to cracking.

The staff reviewed the applicant's response and concluded that there is no active aging degradation due to SCC in the bottom head nozzles. The carbon steel RPV components are not susceptible to SCC and with no previous failures identified in inspections of these components, the staff determined that there is no active aging degradation in these carbon steel RPV components. Therefore, the staff's concerns described in RAI 3.1.2.1-1(A) are resolved.

LRA Table 3.1.2.1.5 did not identify any aging effect specified in GALL Report Table V.C-1 for the carbon and low alloy steel RPV components. This table identifies loss of material due to general corrosion as an aging effect of the carbon and low alloy steel materials of the RPV components externally exposed to inside (atmospheric) environments. The applicant stated that based on past precedents (NUREG-1796, "Safety Evaluation Report Related to the License Renewal of Dresden Nuclear Power Station, Units 2 and 3 and Quad Cities Nuclear Power Station, Units 1 and 2," Section 3.1.2.4.1) the staff had concluded that the loss of material due to corrosion is not considered a credible aging effect for carbon steel components in a containment nitrogen environment because a negligible amount of free oxygen (less than 4 percent by volume) is present in this environment during normal operation. Both oxygen and moisture must be present for general corrosion to occur because oxygen alone or water free of dissolved oxygen (high humidity in a nitrogen atmosphere) does not corrode carbon steel to any practical extent. Therefore, the applicant determined that loss of material due to general corrosion would not be applicable to the following carbon steel RPV components:

- bottom head drain nozzle
- core spray nozzle
- CRD return line nozzle
- feedwater nozzle
- main steam nozzle
- isolation condenser nozzle
- re-circulation inlet and outlet nozzle
- top head flange
- top head enclosure head
- vessel bottom head
- vessel shell
- vessel shell flange

168) nozzle safe ends (feedwater and main steam)

The staff finds the applicant's evaluation acceptable because the carbon and low-alloy steel components are exposed to negligible amounts of free oxygen and, therefore, are not likely to experience corrosion. In addition, the external surface of the carbon and low-alloy steel RPV components are exposed to an inside (atmospheric) environment containing no aggressive ions to cause loss of material due to corrosion. The staff concludes that in the absence of oxygen the carbon steel RPV components are not susceptible to corrosion when externally exposed to inside (atmospheric) environments. Based on this review consistent with the industry experience, the staff determined that the exclusion of the aging effect (general corrosion) from carbon steel RPV materials listed in LRA Table 3.1.2.1.5 is acceptable.

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the RPV components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.1.2.3.6 Reactor Recirculation System Summary of Aging Management Evaluation – LRA Table 3.1.2.1.6

The staff reviewed LRA Table 3.1.2.1.6, which summarizes the results of AMR evaluations for the reactor recirculation system component groups.

LRA Table 3.1.2.1.6 does not identify any aging effect specified in GALL Report Table VII.I-7 for the carbon and low alloy steel materials used in reactor recirculation system piping and valve components. Table VII.I-7 of the GALL Report identified loss of material due to general corrosion as an aging effect for the carbon and low alloy steel materials of the reactor recirculation system piping and valve components externally exposed to inside (atmospheric) environments. The applicant stated that based on past precedence (NUREG-1796 Section 3.1.2.4.1) the staff had concluded that the loss of material due to corrosion is not considered a credible aging effect for carbon steel components in a containment nitrogen environment because a negligible amount of free oxygen (less than 4% by volume) is present in this environment during normal operation. Both oxygen and moisture must be present for general corrosion to occur because oxygen alone or water free of dissolved oxygen (high humidity in a nitrogen atmosphere) does not corrode carbon steel to any practical extent. Therefore, the applicant determined that loss of material due to general corrosion would not be applicable to the carbon and low alloy steel materials of the reactor recirculation system piping and valve components.

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Steel piping, piping components, and piping elements exposed to treated water (Item 3.2.1-14)	Loss of material due to general, pitting, and crevice corrosion	Water Chemistry and One-Time Inspection	Water Chemistry (B.1.2) and One-Time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.2.2.2.8)
Steel containment isolation piping, piping components, and piping elements internal surfaces exposed to treated water (Item 3.2.1-15)	Loss of material due to general, pitting, and crevice corrosion	Water Chemistry and One-Time Inspection	Water Chemistry (B.1.2) and One-Time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.2.2.2.8)
Steel piping, piping components, and piping elements exposed to lubricating oil (Item 3.2.1-16)	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Not applicable	Not applicable, since Oyster Creek has no such ESF components within the scope of license renewal. (See SER Section 3.2.2.2.8)
Steel (with or without coating or wrapping) piping, piping components, and piping elements buried in soil (Item 3.2.1-17)	Loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion	Buried Piping and Tanks Surveillance or Buried Piping and Tanks Inspection	Buried Piping Inspection (B.1.26)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.2.2.2.9)
Stainless steel piping, piping components, and piping elements exposed to treated water > 60°C (> 140°F) (Item 3.2.1-18)	Cracking due to stress corrosion cracking and intergranular stress corrosion cracking	BWR Stress Corrosion Cracking and Water Chemistry	Not applicable	Not applicable, since Oyster Creek has no such ESF components within the scope of license renewal.
Steel piping, piping components, and piping elements exposed to steam or treated water (Item 3.2.1-19)	Wall thinning due to flow-accelerated corrosion	Flow-Accelerated Corrosion	~~Flow-Accelerated Corrosion (B.1.11)~~ 169) Not applicable	~~Consistent with GALL. (See SER Section 3.2.2.1)~~ 169) Not applicable since Oyster Creek has no such ESF components within the scope of license renewal.

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Stainless steel containment isolation piping and components internal surfaces exposed to raw water (Item 3.2.1-38)	Loss of material due to pitting, crevice, and microbiologically-influenced corrosion, and fouling	Open-Cycle Cooling Water System	Not Applicable	Not Applicable since, in ESF, the drywell floor and equipment drain line is the only component subject to this aging effect and it is managed by One-time Inspection.
Stainless steel heat exchanger components exposed to raw water (Item 3.2.1-39)	Loss of material due to pitting, crevice, and microbiologically-influenced corrosion, and fouling	Open-Cycle Cooling Water System	Not applicable	Not applicable, since OCGS has no such ESF components within the scope of license renewal.
Steel and stainless steel heat exchanger tubes (serviced by open-cycle cooling water) exposed to raw water (Item 3.2.1-40)	Reduction of heat transfer due to fouling	Open-Cycle Cooling Water System	Not applicable	Not applicable, since OCGS has no such ESF components within the scope of license renewal.
Copper alloy > 15% Zn piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water (Item 3.2.1-41)	Loss of material due to selective leaching	Selective Leaching of Materials	Not applicable 170) Not applicable	Not applicable, since OCGS has no such ESF components within the scope of license renewal.
Gray cast iron piping, piping components, piping elements exposed to closed-cycle cooling water (Item 3.2.1-42)	Loss of material due to selective leaching	Selective Leaching of Materials 170) Not applicable since Oyster Creek has no such ESF components within the scope of license renewal.	~~Selective Leaching of Materials (B.1.25)~~	~~Consistent with GALL. (See SER Section 3.2.2.1)~~
Gray cast iron piping, piping components, and piping elements exposed to soil (Item 3.2.1-43)	Loss of material due to selective leaching	Selective Leaching of Materials	Not applicable	Not applicable, since OCGS has no such ESF components within the scope of license renewal.
Gray cast iron motor cooler exposed to treated water (Item 3.2.1-44)	Loss of material due to selective leaching	Selective Leaching of Materials	Selective Leaching of Materials (B.1.25)	Consistent with GALL. (See SER Section 3.2.2.1)

line items, indicating that the material, environment, and aging effect were consistent with the GALL Report; however, a different AMP was credited. The GALL Report recommended GALL AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," for this aging effect.

171) As (typical for 16 places, see comment form for page numbers)

The staff reviewed the applicant's Periodic Inspection of Ventilation Systems Program and verified that this AMP includes activities consistent with the recommendations of GALL AMP XI.M38 to manage loss of material in components with an indoor air (internal) or outdoor air (external) environment. ~~The~~ identified above, the staff concludes that this AMP is adequate to manage the aging effect for which it is credited.

LRA Tables 3.2.2.1.1 to 3.2.2.1.3 for the ESF systems included AMR line items that credited the Structures Monitoring Program to manage loss of material due to general corrosion for the external surfaces of steel piping, piping components, piping elements, and ducting in indoor air or outdoor air environments. Generic Note E was cited for these AMR line items, indicating that the material, environment, and aging effect were consistent with the GALL Report; however, a different AMP was credited. The GALL Report recommends GALL AMP XI.M36, "External Surfaces Monitoring," for this aging effect.

The staff reviewed the applicant's Structures Monitoring Program and verified that this AMP includes activities consistent with GALL AMP XI.M36 to manage the loss of material in components exposed to indoor or outdoor air external environments. The staff concludes that this AMP is adequate to manage the aging effect for which it is credited.

3.2.2.1.2 Loss of Material Due to General, Pitting, and Crevice Corrosion

LRA Section 3.2.2.2.8.2 states that the ESF systems have no steel piping, piping components, or piping elements (internal surfaces) exposed to condensation, treated water, or air-indoor uncontrolled environments.

The staff noted that the containment isolation system includes steel components exposed to treated water on the internal surface. Therefore, the applicant was asked to clarify why it had credited AMPs for loss of material due to general, pitting, and crevice corrosion in steel piping, piping components, and piping elements in contact with treated water, and to clarify the discrepancy in the statement, "Oyster Creek Engineered Safety Features Systems have no steel piping, piping components, or piping elements (internal surfaces) exposed to condensation, treated water, or air-indoor uncontrolled environments."

In its letter dated April 17, 2006, the applicant revised the further evaluation in LRA Section 3.2.2.2.8.2 to state that OCGS ESF systems have no steel piping, piping components, or piping elements (internal surfaces) exposed to condensation, treated water (in the form of condensation wetting the internal surface), or air-indoor uncontrolled environments.

The staff reviewed LRA Tables 3.2.2.1.1 through 3.2.2.1.3 and confirmed that no steel components exposed to condensation are identified for the ESF systems. Therefore, the staff finds that the applicant's revision of the further evaluation in LRA Section 3.2.2.2.8.2 acceptable.

On the basis of its review, the staff finds that the applicant appropriately addressed the loss of material due to general, pitting, and crevice corrosion for internal surfaces of carbon and low alloy steel components.

Conclusion. The staff evaluated the applicant's claim of consistency with the GALL Report. The staff also reviewed information pertaining to the applicant's consideration of recent operating experience and proposals for managing the associated aging effects. On the basis of its review, the staff concludes that the AMR results, which the applicant claimed to be consistent with the GALL Report, are indeed consistent with the AMRs in the GALL Report. Therefore, the staff concludes that the applicant has demonstrated that the effects of aging for these components will be adequately managed so that their intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.2.2.2 AMR Results That Are Consistent with the GALL Report, for Which Further Evaluation Is Recommended

Summary of Technical Information in the Application. In LRA Section 3.2.2.2, the applicant provided further evaluation of aging management, as recommended by the GALL Report, for the ESF systems components and information about how it will manage the following aging effects:

- cumulative fatigue damage
- loss of material due to ~~cladding~~ ← 172) general corrosion
- loss of material due to pitting and crevice corrosion
- reduction of heat transfer due to fouling
- hardening and loss of strength due to elastomer degradation
- loss of material due to erosion
- loss of material due to general corrosion and fouling
- loss of material due to general, pitting, and crevice corrosion
- loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion (MIC)
- quality assurance for aging management of nonsafety-related components

Staff Evaluation. For component groups evaluated in the GALL Report, for which the applicant had claimed consistency with the GALL Report and for which the GALL Report recommends further evaluation, the staff audited and reviewed the applicant's evaluation to determine whether it adequately addressed the issues that were further evaluated. In addition, the staff reviewed the applicant's further evaluations against the criteria of SRP-LR Section 3.2.2.2. Details of the staff's audit are documented in the Audit and Review Report. The staff's evaluation of the aging effects is discussed in the following sections.

3.2.2.2.1 Cumulative Fatigue Damage

In LRA Section 3.2.2.2.1, the applicant stated that fatigue is a TLAA, as defined in 10 CFR 54.3. Applicants must evaluate TLAAs in accordance with 10 CFR 54.21(c)(1). SER Section 4.3 documents the staff's review of the applicant's evaluation of this TLAA.

3.2.2.2.2 Loss of Material Due to General Corrosion

LRA Section 3.2.2.2.2 states that loss of material due to general corrosion of carbon steel PWR charging pump casings, with reference to the further evaluation in SRP-LR Section 3.2.2.2.2, is

173) Add items 3.3.1-7 through 3.3.1-9 which, although are only applicable to PWRs, are addressed in DSER Section 3.3.2.2.4.

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
High-strength steel closure bolting exposed to air with steam or water leakage. (Item 3.3.1-10)	Cracking due to stress corrosion cracking, cyclic loading	Bolting Integrity The AMP is to be augmented by appropriate inspection to detect cracking if the bolts are not otherwise replaced during maintenance.	Bolting Integrity (B.1.12)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.4)
Elastomer seals and components exposed to air - indoor uncontrolled (internal/external) (Item 3.3.1-11)	Hardening and loss of strength due to elastomer degradation	A plant specific aging management program is to be evaluated	Periodic Inspection of Ventilation Systems (B.2.4)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.5)
Elastomer lining exposed to treated water or treated borated water (Item 3.3.1-12)	Hardening and loss of strength due to elastomer degradation	A plant-specific aging management program is to be evaluated.	Periodic Inspection (B.2.5)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.5)
Boral, boron steel spent fuel storage racks neutron-absorbing sheets exposed to treated water or treated borated water (Item 3.3.1-13)	Reduction of neutron-absorbing capacity and loss of material due to general corrosion	A plant specific aging management program is to be evaluated	None	Acceptable since operating experience shows that aging effects for this component are insignificant. (See SER Section 3.3.2.2.6)
Steel piping, piping component, and piping elements exposed to lubricating oil (Item 3.3.1-14)	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Lubricating Oil Monitoring Activities (B.2.2) and One-Time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation (See SER Section 3.3.2.2.7)
Steel reactor coolant pump oil collection system piping, tubing, and valve bodies exposed to lubricating oil (Item 3.3.1-15)	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Not Applicable	Not applicable since ~~Oyster Creek does not have a reactor coolant pump oil collection system.~~ (See SER Section 3.3.2.2.7)
Steel reactor coolant pump oil collection system tank exposed to lubricating oil (Item 3.3.1-16)	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection to evaluate the thickness of the lower portion of the tank	Not Applicable	Not applicable since ~~Oyster Creek does not have a reactor coolant pump oil collection system.~~ (See SER Section 3.3.2.2.7)

174) and Structures Monitoring (B.1.31)

175) Part 50, Appendix R Section III.O of 10CFR does not apply because the containment is inerted during normal operation.

176) or Water Chemistry (B.1.2) and ASME Section XI, Subsection IWF (B.1.28)

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Steel piping, piping components, and piping elements exposed to treated water (Item 3.3.1-17)	Loss of material due to general, pitting, and crevice corrosion	Water Chemistry and One-Time Inspection	Water Chemistry (B.1.2) and One-Time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation (See SER Section 3.3.2.2.7)
Stainless steel and steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust (Item 3.3.1-18)	Loss of material/general (steel only), pitting and crevice corrosion	A plant specific aging management program is to be evaluated	Periodic Inspection (B.2.5)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.7)
Steel (with or without coating or wrapping) piping, piping components, and piping elements exposed to soil (Item 3.3.1-19)	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion	Buried Piping and Tanks Surveillance or Buried Piping and Tanks Inspection	Buried Piping Inspection (B.1.26) 177) and Aboveground Outdoor Tanks Program (B.1.21)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.8)
Steel piping, piping components, piping elements, and tanks exposed to fuel oil (Item 3.3.1-20)	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Fuel Oil Chemistry and One-Time Inspection	Fuel Oil Chemistry (B.1.22) and One-Time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.9)
Steel heat exchanger components exposed to lubricating oil (Item 3.3.1-21)	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Lubricating Oil Analysis and One-Time Inspection	Lubricating Oil Monitoring Activities (B.2.2) and One-Time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.9)
Steel with elastomer lining or stainless steel cladding piping, piping components, and piping elements exposed to treated water and treated borated water (Item 3.3.1-22)	Loss of material due to pitting and crevice corrosion (only for steel after lining/cladding degradation)	Water Chemistry and One-Time Inspection	Water Chemistry (B.1.2) and One-Time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.10)

178) or Water Chemistry (B.1.2) and ASME Section XI, Subsection IWF (B.1.28)

179 & 180) or Water Chemistry (B.1.2) and ASME Section XI, Subsection IWF (B.1.28)

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Stainless steel and steel with stainless steel cladding heat exchanger components exposed to treated water (Item 3.3.1-23)	Loss of material due to pitting and crevice corrosion	Water Chemistry and One-Time Inspection	Water Chemistry (B.1.2) and One-Time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.10)
Stainless steel and aluminum piping, piping components, and piping elements exposed to treated water (Item 3.3.1-24)	Loss of material due to pitting and crevice corrosion	Water Chemistry and One-Time Inspection	Water Chemistry (B.1.2) and One-Time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.10)
Copper alloy HVAC piping, piping components, piping elements exposed to condensation (external) (Item 3.3.1-25)	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Periodic Inspection of Ventilation Systems (B.2.4)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.10)
Copper alloy piping, piping components, and piping elements exposed to lubricating oil (Item 3.3.1-26)	Loss of material due to pitting and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Lubricating Oil Monitoring Activities (B.2.2) and One-Time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.10)
Stainless steel HVAC ducting and aluminum HVAC piping, piping components and piping elements exposed to condensation (Item 3.3.1-27)	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	One-time Inspection (B.1.24)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.10)
Copper alloy fire protection piping, piping components, and piping elements exposed to condensation (internal) (Item 3.3.1-28)	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Not Applicable	Not applicable since no GALL AMR line items related to this component group/ aging effect combination were credited in the LRA. (See SER Section 3.3.2.2.10)

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Elastomer seals and components exposed to air - indoor uncontrolled (internal or external) (Item 3.3.1-34)	Loss of material due to Wear	A plant specific aging management program is to be evaluated.	Periodic Inspection of Ventilation Systems (B.2.4)	Consistent with GALL, which recommends further evaluation. (See SER Section 3.3.2.2.13)
Boraflex spent fuel storage racks neutron-absorbing sheets exposed to treated water (Item 3.3.1-36)	Reduction of neutron-absorbing capacity due to boraflex degradation	Boraflex Monitoring	Boraflex Rack Management (B.1.15)	Consistent with GALL. (See SER Section 3.3.2.1)
Stainless steel piping, piping components, and piping elements exposed to treated water > 60 °C (> 140 °F) (Item 3.3.1-37)	Cracking due to stress corrosion cracking, intergranular stress corrosion cracking	BWR Reactor Water Cleanup System	BWR Reactor Water Cleanup System (B.1.18) 181) or Water Chemistry (B.1.2) and One-Time Inspection (B.1.24)	Consistent with GALL. (See SER Section 3.3.2.1)
Stainless steel piping, piping components, and piping elements exposed to treated water > 60 °C (> 140 °F) (Item 3.3.1-38)	Cracking due to stress corrosion cracking	BWR Stress Corrosion Cracking and Water Chemistry	Not Applicable	Not applicable since Oyster Creek has no stainless steel non-RCPB shutdown cooling system piping exposed to treated water >140 °F.
Stainless steel BWR spent fuel storage racks exposed to treated water > 60 °C (> 140 °F) (Item 3.3.1-39)	Cracking due to stress corrosion cracking	Water Chemistry	Not Applicable	Not applicable since stainless steel spent fuel storage racks are exposed to treated water <140 °F.
Steel tanks in diesel fuel oil system exposed to air - outdoor (external) (Item 3.3.1-40)	Loss of material due to general, pitting, and crevice corrosion	Aboveground Steel Tanks	Aboveground Outdoor Tanks (B.1.21)	Consistent with GALL. (See SER Section 3.3.2.1)
High-strength steel closure bolting exposed to air with steam or water leakage (Item 3.3.1-41)	Cracking due to cyclic loading, stress corrosion cracking	Bolting Integrity	Not Applicable	Not applicable since auxiliary system high strength steel closure bolting is only applicable to the CRD system, and this is addressed in item 3.3.1-7.

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Steel closure bolting exposed to air - indoor uncontrolled (external) (Item 3.3.1-45)	Loss of preload due to thermal effects, gasket creep, and self-loosening	Bolting Integrity	Bolting Integrity (B.1.12), or ASME Section XI, Subsection IWE (B.1.27)	Consistent with GALL for AMRs crediting the OCGS bolting integrity program. Acceptable for AMRs crediting the OCGS ASME Section XI, Subsection IWE Program, since it is consistent with the GALL bolting integrity program for this component group/ aging effect combination. (See SER Section 3.3.2.1.4)
Stainless steel and stainless clad steel piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water > 60 °C (> 140 °F) (Item 3.3.1-46)	Cracking due to stress corrosion cracking	Closed-Cycle Cooling Water System	Not Applicable	Not applicable since no GALL AMR line items related to this component group/ aging effect combination were credited in the LRA.
Steel piping, piping components, piping elements, tanks, and heat exchanger components exposed to closed cycle cooling water (Item 3.3.1-47)	Loss of material due to general, pitting, and crevice corrosion	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System (B.1.14) and One-Time Inspection (B.1.24)	Consistent with GALL. Addition of one-time inspection provides additional assurance that aging effects are adequately managed.
Steel piping, piping components, piping elements, tanks, and heat exchanger components exposed to closed cycle cooling water (Item 3.3.1-48)	Loss of material due to general, pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System (B.1.14) and 182) and One-Time Inspection (B.1.24)	Consistent with GALL. (See SER Section 3.3.2.1)

182) Addition of one-time inspection provides additional assurance that aging effects are adequately managed.

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Stainless steel; steel with stainless steel cladding heat exchanger components exposed to closed cycle cooling water (Item 3.3.1-49)	Loss of material due to microbiologically influenced corrosion	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System (B.1.14)	Consistent with GALL. (See SER Section 3.3.2.1)
Stainless steel piping, piping components, and piping elements exposed to closed cycle cooling water (Item 3.3.1-50)	Loss of material due to pitting and crevice corrosion	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System (B.1.14) 183 & 184) and One-Time Inspection (B.1.24)	Consistent with GALL. (See SER Section 3.3.2.1)
Copper alloy piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water (Item 3.3.1-51)	Loss of material due to pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System (B.1.14)	Consistent with GALL. (See SER Section 3.3.2.1) 183 & 184) Addition of one-time inspection provides additional assurance that aging effects are adequately managed.
Steel, stainless steel, and copper alloy heat exchanger tubes exposed to closed cycle cooling water (Item 3.3.1-52)	Reduction of heat transfer due to fouling	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water System (B.1.14)	Consistent with GALL. (See SER Section 3.3.2.1)
Steel compressed air system piping, piping components, and piping elements exposed to condensation (internal) (Item 3.3.1-53)	Loss of material due to general and pitting corrosion	Compressed Air Monitoring	Not Applicable	Not applicable since no GALL AMR line items related to this component group/ aging effect combination were credited in the LRA.
Stainless steel compressed air system piping, piping components, and piping elements exposed to internal condensation (Item 3.3.1-54)	Loss of material due to pitting and crevice corrosion	Compressed Air Monitoring	Not Applicable	Not applicable since no GALL AMR line items related to this component group/ aging effect combination were credited in the LRA.

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Steel external surfaces exposed to air - indoor uncontrolled (external), air - outdoor (external), and condensation (external) (Item 3.3.1-58)	Loss of material due to general corrosion	External Surfaces Monitoring 185) Structures Monitoring (B.1.31)	Fire Protection (B.1.19), or Fire Water System (B.1.20), or Structures Monitoring (B.1.31) or Periodic Inspection of Ventilation Systems (B.2.4)	Acceptable since the OCGS fire protection, fire water system, structures monitoring, and periodic inspection of ventilation systems programs are consistent with the GALL external surfaces monitoring program for this component group/ aging effect combination. (See SER Section 3.3.2.1.3)
Steel heat exchanger components exposed to air - indoor uncontrolled (external) or air -outdoor (external) (Item 3.3.1-59)	Loss of material due to general, pitting, and crevice corrosion	External Surfaces Monitoring 185) Acceptable since the OCGS structures monitoring program is consistent with GALL external surfaces monitoring program for this component group/aging effect combination. (See SER Section 3.3.2.1.3)	~~Not Applicable~~	~~Not applicable since no GALL AMR line items related to this component group/ aging effect combination were credited in the LRA.~~
Steel piping, piping components, and piping elements exposed to air - outdoor (external) (Item 3.3.1-60)	Loss of material due to general, pitting, and crevice corrosion	External Surfaces Monitoring	10 CFR 50, Appendix J (B.1.29) plus One-Time Inspection (B.1.24), or One-Time Inspection (B.1.24), or Fire Protection (B.1.19), or Fire Water System (B.1.20), or Structures Monitoring (B.1.31), or Periodic Inspection of Ventilation Systems (B.2.4)	Acceptable since the OCGS one-time inspection, fire protection, fire water system, structures monitoring, and periodic inspection of ventilation systems programs are consistent with the GALL external surfaces monitoring program for this component group/ aging effect combination. (See SER Section 3.3.2.1.3)

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Elastomer fire barrier penetration seals exposed to air - outdoor or air - indoor uncontrolled (Item 3.3.1-61)	Increased hardness, shrinkage and loss of strength due to weathering	Fire Protection 186) Acceptable since the OCGS fire water system program is consistent with GALL fire protection program for this component group/ aging effect combination.	Fire Protection (B.1.19) or Structures Monitoring (B.1.31)	Consistent with GALL for AMRs crediting the Fire Protection Program. Acceptable for AMRs crediting the structures monitoring program since the OCGS structures monitoring program is consistent with the GALL Fire Protection Program for this component group/ aging effect combination. (See SER Section 3.3.2.1.6)
Aluminum piping, piping components, and piping elements exposed to raw water (Item 3.3.1-62)	Loss of material due to pitting and crevice corrosion	Fire Protection	Fire Water System (B.1.20)	~~No applicable aging effects.~~ (See SER Section 3.3.2.3)
Steel fire rated doors exposed to air - outdoor or air - indoor uncontrolled (Item 3.3.1-63)	Loss of material due to Wear	Fire Protection	Fire Protection (B.1.19)	Consistent with GALL. (See SER Section 3.3.2.1)
Steel piping, piping components, and piping elements exposed to fuel oil (Item 3.3.1-64)	Loss of material due to general, pitting, and crevice corrosion	Fire Protection and Fuel Oil Chemistry	Fire Protection (B.1.19) and Fuel Oil Chemistry (B.1.20)	Consistent with GALL. (See SER Section 3.3.2.1)
Reinforced concrete structural fire barriers - walls, ceilings and floors exposed to air - indoor uncontrolled (Item 3.3.1-65)	Concrete cracking and spalling due to aggressive chemical attack, and reaction with aggregates	Fire Protection and Structures Monitoring Program	Fire Protection (B.1.19) and Structures Monitoring (B.1.31)	Consistent with GALL. (See SER Section 3.3.2.1)
Reinforced concrete structural fire barriers - walls, ceilings and floors exposed to air - outdoor (Item 3.3.1-66)	Concrete cracking and spalling due to freeze thaw, aggressive chemical attack, and reaction with aggregates	Fire Protection and Structures Monitoring Program	Fire Protection (B.1.19) and Structures Monitoring (B.1.31)	Consistent with GALL. (See SER Section 3.3.2.1)

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Reinforced concrete structural fire barriers - walls, ceilings and floors exposed to air - outdoor or air - indoor uncontrolled (Item 3.3.1-67)	Loss of material due to corrosion of embedded steel	Fire Protection and Structures Monitoring Program	Fire Protection (B.1.19) and Structures Monitoring (B.1.31)	Consistent with GALL. (See SER Section 3.3.2.1)
Steel piping, piping components, and piping elements exposed to raw water (Item 3.3.1-68)	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Fire Water System	Fire Water System (B.1.20)	Consistent with GALL. (See SER Section 3.3.2.1)
Stainless steel piping, piping components, and piping elements exposed to raw water (Item 3.3.1-69)	Loss of material due to pitting and crevice corrosion, and fouling	Fire Water System	Fire Water System (B.1.20)	Consistent with GALL. (See SER Section 3.3.2.1)
Copper alloy piping, piping components, and piping elements exposed to raw water (Item 3.3.1-70)	Loss of material due to pitting, crevice, and microbiologically influenced corrosion, and fouling	Fire Water System	Fire Water System (B.1.20)	Consistent with GALL. (See SER Section 3.3.2.1)
Steel piping, piping components, and piping elements exposed to moist air or condensation (Internal) (Item 3.3.1-71)	Loss of material due to general, pitting, and crevice corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	~~Not Applicable~~ 187) Periodic Inspection (B.2.5)	~~Not applicable since no GALL AMR line items related to this component group/ aging effect combination were credited in the LRA.~~
Steel HVAC ducting and components internal surfaces exposed to condensation (Internal) (Item 3.3.1-72)	Loss of material due to general, pitting, crevice, and (for drip pans and drain lines) microbiologically influenced corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Periodic Inspection of Ventilation Systems (B.2.4)	Acceptable since the OCGS periodic inspection of ventilation systems program is consistent with the GALL inspection of internal surfaces in miscellaneous piping and ducting components program for this component group/ aging effect combination. (See SER Section 3.3.2.1.3)

187) Acceptable since the OCGS periodic inspection program is consistent with GALL inspection of internal surfaces in miscellaneous piping and ducting components program for this component group/aging effect combination. (See SER Section 3.3.2.3)

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Steel crane structural girders in load handling system exposed to air - indoor uncontrolled (external) (Item 3.3.1-73)	Loss of material due to general corrosion	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B.1.16)	Consistent with GALL. (See SER Section 3.3.2.1)
Steel cranes - rails exposed to air - indoor uncontrolled (external) (Item 3.3.1-74)	Loss of material due to Wear	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B.1.16)	Consistent with GALL. (See SER Section 3.3.2.1)
Elastomer seals and components exposed to raw water (Item 3.3.1-75)	Hardening and loss of strength due to elastomer degradation; loss of material due to erosion	Open-Cycle Cooling Water System	Periodic Inspection (B.2.5)	Acceptable since the OCGS periodic inspection program is consistent with the GALL open-cycle cooling water system program for this component group/ aging effect combination. (See SER Section 3.3.2.3)
Steel piping, piping components, and piping elements (without lining/ coating or with degraded lining/coating) exposed to raw water (Item 3.3.1-76)	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, fouling, and lining/coating degradation	Open-Cycle Cooling Water System	~~Not Applicable~~	~~Not applicable since no GALL AMR line items related to this component group/ aging effect combination were credited in the LRA.~~
Steel heat exchanger components exposed to raw water (Item 3.3.1-77)	Loss of material due to general, pitting, crevice, galvanic, and microbiologically influenced corrosion, and fouling	Open-Cycle Cooling Water System	Open-Cycle Cooling Water System (B.1.13)	Consistent with GALL. (See SER Section 3.3.2.1)

188) Acceptable since the OCGS periodic inspection, open-cycle cooling water system, and one-time inspection programs are consistent with GALL open-cycle cooling water system program for this component group/aging effect combination. (See SER Sections 3.3.2.1 and 3.3.2.3)

188) Periodic Inspection (B.2.5), Open-Cycle Cooling Water system (B.1.13), and One-Time Inspection (B.1.24)

LRA Section 3.3.2.2.5.2 states that a Periodic Inspection Program will be implemented for the internal inspection of expansion joint and flexible connection elastomers exposed to treated water internal environments in the condensate system, condensate transfer system, heating and process steam system, and process sampling system. The Periodic Inspection Program ~~to periodically~~ used to monitor component aging effects when the component is not covered by other existing periodic monitoring programs. The Periodic Inspection Program relies on periodic inspections to identify and evaluate the internal degradation of elastomer components exposed to treated water internal environments to ensure that there is no loss of intended function. Observed conditions with potential impact on intended function will be evaluated or corrected in accordance with the corrective action process.

189) is

The staff reviewed the applicant's Periodic Inspection Program and determined that it is adequate to manage hardening and loss of strength of elastomer linings of the filters, valves, and ion exchangers in spent fuel pool cooling and cleanup systems due to elastomer degradation. The staff finds that the applicant's program meets the criteria of SRP-LR Section 3.3.2.2.5.2 for further evaluation.

Based on the programs identified above, the staff concludes that the applicant has met the criteria of SRP-LR Section 3.3.2.2.5. For those LRA line items to which this SRP-LR section applies, the staff determined that the LRA is consistent with the GALL Report and the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.2.6 Reduction of Neutron-Absorbing Capacity and Loss of Material Due to General Corrosion

The staff reviewed LRA Section 3.3.2.2.14 against the criteria in SRP-LR Section 3.3.2.2.6.

In LRA Section 3.3.2.2.14, the applicant addressed reduction of neutron-absorbing capacity and loss of material due to general corrosion in the neutron absorbing sheets of the spent fuel storage racks.

SRP-LR Section 3.3.2.2.6 states that reduction of neutron-absorbing capacity and loss of material due to general corrosion can occur in the neutron-absorbing sheets of BWR spent fuel storage racks exposed to treated water. The GALL Report recommends further evaluation of a plant-specific AMP to ensure adequate management of these aging effects.

LRA Section 3.3.2.2.14 states that the aging effects of the Boral spent fuel storage racks exposed to treated water environments are insignificant and require no aging management. The potential aging effects resulting from sustained irradiation of Boral were previously evaluated by the staff (BNL-NUREG-25582, dated January 1979; NUREG-1787, "Safety Evaluation Report Related to the License Renewal of Virgil C. Summer Nuclear Station," Section 3.5.2.4.2) and determined to be insignificant. In the year 2000, four spent fuel storage racks manufactured by HOLTEC International that utilized Boral neutron absorbing material were installed at OCGS. The Boral coupons kept inside the spent fuel storage pool were removed and inspected in 2002 and again in 2004. Inspection results showed no blisters, pits, dimensional changes, or other

In LRA Section 3.3.2.2.10.2, the applicant addressed loss of material due to pitting and crevice corrosion for copper alloy HVAC piping, piping components, and piping elements exposed to condensation (external).

SRP-LR Section 3.3.2.2.10.3 states that loss of material due to pitting and crevice corrosion can occur for copper alloy HVAC piping, piping components, and piping elements exposed to condensation (external). The GALL Report recommends further evaluation of a plant-specific AMP to ensure adequate management of these aging effects.

~~LRA Section 3.3.2.2.10.2 states that a One-Time Inspection Program will be implemented for susceptible locations to verify the effectiveness of the Water Chemistry Program to manage the loss of material in stainless steel and copper alloy piping, piping components, and piping elements exposed to a treated water internal or external environment in the heating and process steam~~

190) LRA Section 3.3.2.2.10.2 states that a Periodic Inspection of Ventilation Systems program will be implemented to manage the loss of material in copper heat exchanger coils exposed to an indoor air/condensation external environment in the Control Room HVAC System. The program will inspect the external surfaces of ventilation system components to identify and assess aging effects that may be occurring. The program will include surface inspections of copper alloy components for indications of loss of material. Observed conditions that have the potential for impacting an intended function are evaluated or corrected in accordance with the corrective action process.

The staff reviewed...

~~piping, piping components, and piping elements exposed to condensation (external). The staff finds that the applicant's programs meet the criteria of SRP-LR Section 3.3.2.2.10.3 for further evaluation.~~

In LRA Section 3.3.2.2.11, the applicant addressed loss of material due to pitting and crevice corrosion can occur for copper alloy piping, piping components, and piping elements exposed to lubricating oil.

SRP-LR Section 3.3.2.2.10.4 states that loss of material due to pitting and crevice corrosion can occur for copper alloy piping, piping components, and piping elements exposed to lubricating oil. The existing AMP relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment that is not conducive to corrosion. However, control of lube oil contaminants may not always be adequate to prevent corrosion. Therefore, the effectiveness of lubricating oil control should be verified to ensure that corrosion does not occur. The GALL Report recommends further evaluation of programs to manage corrosion to verify the effectiveness of the Lubricating Oil Monitoring Activities Program. A one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion does not occur and that the component's intended function will be maintained during the period of extended operation.

LRA Section 3.3.2.2.11 states that a One-Time Inspection Program will be implemented for susceptible locations to verify the effectiveness of the Lubricating Oil Monitoring Activities Program to manage the loss of material in copper alloy piping, piping components, piping

function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.3.2.2.12 Loss of Material Due to Pitting, Crevice, and Microbiologically-Influenced Corrosion

The staff reviewed LRA Section 3.3.2.2.12, and Attachment 3, item AP-54, of the applicant's reconciliation document against the criteria in SRP-LR Section 3.3.2.2.12.

LRA Section 3.3.2.2.12.1 addresses loss of material due to pitting, crevice, and MIC for aluminum and copper alloy piping, piping components, and piping elements exposed to fuel oil. In Attachment 3, item AP-54, of its reconciliation document, the applicant addressed loss of material due to pitting and crevice corrosion and MIC of stainless steel piping, piping components, and piping elements exposed to fuel oil.

SRP-LR Section 3.3.2.2.12.1 states that loss of material due to pitting and crevice corrosion and MIC can occur in stainless steel, aluminum, and copper alloy piping, piping components, and piping elements exposed to fuel oil. The existing AMP relies on the Fuel Oil Chemistry Program to monitor and control fuel oil contamination to manage loss of material due to corrosion. However, corrosion may occur at locations where contaminants accumulate and the effectiveness of fuel oil chemistry control should be verified to ensure that corrosion does not occur. The GALL Report recommends further evaluation of programs to manage corrosion to verify the effectiveness of the Fuel Oil Chemistry Program. A one-time inspection of selected components at susceptible locations is an acceptable method to ensure that corrosion does not occur and that the component's intended function will be maintained during the period of extended operation.

LRA Section 3.3.2.2.12.1 states that a One-Time Inspection Program will be implemented for susceptible locations to verify the effectiveness of the Fuel Oil Chemistry Program to manage the loss of material in aluminum and copper alloy piping, piping components, and piping elements exposed to a fuel oil environment in the EDG and auxiliary system, main fuel oil storage and transfer system, and fire protection system. Observed conditions with potential impact on intended function will be evaluated or corrected in accordance with the corrective action process.

The staff reviewed the applicant's Fuel Oil Chemistry Program and verified that it will mitigate loss of material due to pitting and crevice corrosion and MIC. In addition, the staff reviewed the applicant's One-Time Inspection Program and verified that it includes inspections to detect loss of material due to pitting and crevice corrosion and MIC as a means of verifying the effectiveness of the Fuel Oil Chemistry Program. The staff concludes that these AMPs will manage loss of material due to pitting and crevice corrosion and MIC for ~~steel~~ piping, piping components, piping elements, and tanks exposed to fuel oil in the EDG and auxiliary system, main fuel oil storage and transfer system, and fire protection system.

191) aluminum and copper alloy

Attachment 3, item AP-54, of the applicant's reconciliation document states that the line item for stainless steel piping elements in fuel oil, addressing loss of material due to corrosion, recommends the Fuel Oil Chemistry Program with no further evaluation required per the January 2005 draft GALL Report that was changed in the September 2005 GALL Report to recommend the Fuel Oil Chemistry and One-Time Inspection Programs with a further evaluation

In RAI 3.4-7 dated March 30, 2006, the staff requested that the applicant respond to these concerns about the main steam system and justify its position.

In its response dated April 28, 2006, the applicant stated:

> As stated in the response to RAI 3.4-8, AmerGen will perform a one-time inspection of carbon steel main steam system piping located inside containment. The one-time inspection will be a visual inspection of the carbon steel piping external surface for loss of material due to corrosion. This inspection will be performed prior to entering the period of extended operation. This ~~onetime~~ inspection is intended to confirm that there is no significant age related degradation occurring on the external carbon steel surfaces of the main steam system located inside containment. Since the piping, valves, expansion joints, flow elements and thermowells are carbon steel, and the environment is the same, results of the one-time inspection of the piping surface will also be applicable to these other carbon steel component external surfaces. If aging degradation is identified, the condition will be documented on an Issue Report and evaluated for corrective actions including additional main steam system piping and component inspection locations.

192) one-time

192) main steam system

The staff finds the applicant's response acceptable because the applicant agreed to a one-time inspection of the carbon steel piping external surface for loss of material due to corrosion. The staff's concern described in RAI 3.4-7 is resolved.

LRA Table 3.4.2.1.6 states that no AERMs were identified for carbon and low alloy steel piping and fittings and valve bodies in internal and external containment air and internal treated water environments. As discussed in RAI 3.4-4, the staff considers a one-time inspection prior to the period of extended operation appropriate for these components.

In RAI 3.4-8 dated March 30, 2006, the staff requested that the applicant respond to its concerns about the main steam system and justify its position.

In its response dated April 28, 2006, the applicant stated:

> AmerGen will perform a one-time inspection of carbon steel main steam system piping located inside containment. The one-time inspection will be a visual inspection of the carbon steel piping external surface for loss of material due to corrosion. This inspection will be performed prior to entering the period of extended operation. This one-time inspection is intended to confirm that there is no significant age related degradation occurring on the external carbon steel surfaces of the main steam system located inside containment. Since the piping and valves are carbon steel, and the environment is the same, results of the one-time inspection of the piping surface will also be applicable to the carbon steel valve external surfaces. If aging degradation is identified, the condition will be documented on an Issue Report and evaluated for corrective actions including additional main steam system piping and component inspection locations.

193) 3.4-8

The staff finds the applicant's response acceptable because the applicant agreed to one-time inspection of carbon steel main steam system piping located inside containment in accordance with the staff position. The staff's concern described in RAI ~~3.5-8~~ is resolved.

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the main steam system components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.4.2.3.7 Main Turbine and Auxiliary System Summary of Aging Management Evaluation – LRA Table 3.4.2.1.7

The staff reviewed LRA Table 3.4.2.1.7, which summarizes the results of AMR evaluations for the main turbine and auxiliary system component groups.

LRA Table 3.4.2.1.7 states that the AMRs for the main turbine and auxiliary system either are consistent with the GALL Report or have no AERM. The staff confirmed that the AMR results presented in this table are consistent with the GALL Report. The staff's evaluation for AMR items that are consistent with the GALL Report is documented in SER Sections 3.4.2.1 and 3.4.2.2.

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the main turbine and auxiliary system components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

Conclusion. On the basis of its review, the staff finds that the applicant appropriately evaluated the AMR results involving material, environment, AERMs, and AMP combinations that are not evaluated in the GALL Report. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.4.3 Conclusion

The staff concludes that the applicant had provided sufficient information to demonstrate that the effects of aging for the steam and power conversion system components, that are within the scope of license renewal and subject to an AMR, will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.5 Aging Management of Containment, Structures, Component Supports, and Piping and Component Insulation

This section of the SER documents the staff's review of the applicant's AMR results for the containment, structures, component supports, and piping and component insulation components and component groups of the following structures, and commodity groups:

- primary containment

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Concrete elements: dome, wall, basemat, ring girder, buttresses, containment, concrete fill-in annulus (as applicable) (Item 3.5.1-4)	Reduction of strength and modulus of concrete due to elevated temperature	A plant-specific aging management program is to be evaluated	Not Applicable	Not Applicable; Steel containment (See SER Section 3.5.2.2.1)
Steel elements: Drywell; torus; drywell head; embedded shell and sand pocket regions; drywell support skirt; torus ring girder; downcomers; liner plate, ECCS suction header, support skirt, region shielded by diaphragm floor, suppression chamber (as applicable) (Item 3.5.1-5)	Loss of material due to general, pitting and crevice corrosion	ISI (IWE) and 10 CFR Part 50, Appendix J	ASME Section XI, Subsection IWE (B.1.27) and 10 CFR Part 50, Appendix J (B.1.29); Protective Coatings (B.1.33) 194) Not Applicable	Consistent with GALL, which recommends further evaluation (See SER Section 3.5.2.2.1) 194) Not Applicable; Steel containment
Steel elements: steel liner, liner anchors, integral attachments (Item 3.5.1-6)	Loss of material due to general, pitting and crevice corrosion	ISI (IWE) and 10 CFR Part 50, Appendix J	~~ASME Section XI, Subsection IWE (B.1.27) and 10 CFR Part 50, Appendix J (B.1.29)~~	~~Consistent with GALL, which recommends further evaluation~~ (See SER Section 3.5.2.2.1)
Prestressed containment tendons (Item 3.5.1-7)	Loss of prestress due to relaxation, shrinkage, creep, and elevated temperature	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Not Applicable	Not Applicable; Steel containment (See SER Section 3.5.2.2.1)
Steel and stainless steel elements: vent line, vent header, vent line bellows; downcomers; (Item 3.5.1-8)	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA, evaluated in accordance with 10 CFR 54.21(c)	TLAA	This TLAA is evaluated in Section 4.3. (See SER Section 3.5.2.2.1)

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Group 4: Radial beam seats in BWR drywell; RPV support shoes for PWR with nozzle supports; Steam generator supports (Item 3.5.1-30)	Lock-up due to wear	ISI (IWF) or Structures Monitoring Program	Structures Monitoring Program (B.1.31)	Consistent with GALL. (See SER Section 3.5.2.1)
Groups 1-3, 5, 7-9: below-grade concrete components, such as exterior walls below grade and foundation (Item 3.5.1-31)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/aggressive chemical attack; Cracking, loss of bond, and loss of material (spalling, scaling)/corrosion of embedded steel	Structures monitoring Program; Examination of representative samples of below-grade concrete, and periodic monitoring of groundwater, if the environment is non-aggressive. A plant specific program is to be evaluated if environment is aggressive.	Structures Monitoring Program (B.1.31); Examination of representative samples of below-grade concrete, and periodic monitoring of groundwater (non-aggressive environment).	Consistent with GALL, which recommends further evaluation (See SER Section 3.5.2.2.2)
Groups 1-3, 5, 7-9: exterior above and below grade reinforced concrete foundations (Item 3.5.1-32)	Increase in porosity and permeability, and loss of strength due to leaching of calcium hydroxide	Structures Monitoring Program for accessible areas. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77.	Structures Monitoring Program (B.1.31)	Consistent with GALL, which recommends further evaluation (See SER Section 3.5.2.2.2)
Groups 1-5: concrete (Item 3.5.1-33)	Reduction of strength and modulus due to elevated temperature	A plant-specific aging management program is to be evaluated	Structures Monitoring Program (B.1.31) with a ~~2 year inspection frequency~~ and a quantitative criterion for crack width	Consistent with GALL, which recommends further evaluation (See SER Section 3.5.2.2.2)

195) when excavated for any reason or if observed conditions in accessible areas exposed to the same environment show significant concrete degradation has occurred

196) frequency of every refueling outage

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Building concrete at locations of expansion and grouted anchors; grout pads for support base plates (Item 3.5.1-40)	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program	Structures Monitoring Program (B.1.31)	Consistent with GALL (See SER Section 3.5.2.2.2)
Vibration isolation elements (Item 3.5.1-41)	Reduction or loss of isolation function/radiation hardening, temperature, humidity, sustained vibratory loading	Structures Monitoring Program	Structures Monitoring Program (B.1.31)	Consistent with GALL. (See SER Section 3.5.2.2.2)
Groups B1.1, B1.2, and B1.3: support members: anchor bolts, welds (Item 3.5.1-42)	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA, evaluated in accordance with 10 CFR 54.21(c)	~~Not applicable; no CLB fatigue analyses)~~	~~Not applicable; no CLB fatigue analyses.~~ (See SER Section 3.5.2.2.2)
Groups 1-3, 5, 6: all masonry block walls (Item 3.5.1-43)	Cracking due to restraint shrinkage, creep, and aggressive environment	Masonry Wall Program	Masonry Wall Program (B.1.30)	Consistent with GALL. (See SER Section 3.5.2.1)
Group 6 elastomer seals, gaskets, and moisture barriers (Item 3.5.1-44)	Loss of sealing due to deterioration of seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)	Structures Monitoring Program	Structures Monitoring Program (B.1.31)	Consistent with GALL. (See SER Section 3.5.2.1)
Group 6: exterior above and below grade concrete foundation; interior slab (Item 3.5.1-45)	Loss of material due to abrasion, cavitation	Inspection of Water-Control Structures or FERC/US Army Corps of Engineers dam inspections and maintenance	RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.1.32)	Consistent with GALL. (See SER Section 3.5.2.1)

197) TLAA for Group B1.3 supports; CLB fatigue analysis exists. Not applicable to B1.1 and B1.2; no CLB fatigue analysis

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Group B1.1: high strength low-alloy bolts (Item 3.5.1-51)	Cracking due to stress corrosion cracking; loss of material due to general corrosion	Bolting Integrity	Not applicable 198) Not Applicable	Not applicable; no high strength low-alloy bolts used in Group B1.1 supports.
Groups B2, and B4: sliding support bearings and sliding support surfaces (Item 3.5.1-52)	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	Structures Monitoring Program	~~Structures Monitoring Program (B.1.31)~~ 199) Not applicable; Lubrite graphitic tool steel is not used for Group B2 and B4 supports sliding surfaces	~~Consistent with GALL. (See SER Section 3.5.2.1)~~
Groups B1.1, B1.2, and B1.3: support members: welds; bolted connections; support anchorage to building structure (Item 3.5.1-53)	Loss of material due to general and pitting corrosion	ISI (IWF)	ASME Section XI, Subsection (IWF) (B.1.28)	Consistent with GALL. (See SER Section 3.5.2.1)
Groups B1.1, B1.2, and B1.3: Constant and variable load spring hangers; guides; stops; (Item 3.5.1-54)	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ISI (IWF)	ASME Section XI, Subsection (IWF) (B.1.28)	Consistent with GALL. (See SER Section 3.5.2.1)
Groups B1.1, B1.2, and B1.3: Sliding surfaces (Item 3.5.1-56)	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ISI (IWF)	ASME Section XI, Subsection (IWF) (B.1.28)	Consistent with GALL. (See SER Section 3.5.2.1)
Groups B1.1, B1.2, and B1.3: Vibration isolation elements (Item 3.5.1-57)	Reduction or loss of isolation function/ radiation hardening, temperature, humidity, sustained vibratory loading	ISI (IWF)	ASME Section XI, Subsection (IWF) (B.1.28)	Consistent with GALL. (See SER Section 3.5.2.1)

200) The applicant will perform a baseline inspection prior to the period of extended operation and evaluate the results of the inspections to determine if there is a need to inspect the structures more frequently than every 4 years.

potential impact on an intended function are evaluated or corrected in accordance with the corrective action process.

The staff determined that the applicant's approach to aging management for the freshwater pump-house and the service water seal well is appropriate. ~~The need to inspect more frequently than every 4 years will be determined prior to the period of extended operation.~~

The staff concludes that for inaccessible areas the recommendations of SRP-LR Section 3.5.2.2.2.2.4 is achieved by performing: (1) opportunistic inspection of normally inaccessible areas if exposed for any reason, and (2) inspection of inaccessible areas of structures if observed conditions in accessible areas exposed to the same environment show that significant concrete degradation has occurred. ~~The need for periodic inspection of inaccessible areas of the freshwater pump-house and the service water seal well will be determined prior to the period of extended operation.~~ The staff finds that, based on the programs identified above, the applicant has met the criteria of SRP-LR Section 3.5.2.2.2.2.4 for further evaluation.

In Attachment 3, item T-02, of its reconciliation document, the applicant addressed increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide in below-grade inaccessible concrete areas of Groups 1-3, 5, and 7-9 structures.

SRP-LR Section 3.5.2.2.2.2.5 states that increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide could occur in below-grade inaccessible concrete areas of Groups 1-3, 5, and 7-9 structures. The GALL Report recommends further evaluation of this aging effect for inaccessible areas of these groups of structures if concrete was not constructed in accordance with ACI 201.2R-77 recommendations.

In Attachment 3, item T-02, of its reconciliation document, the applicant stated that this item change requires no change to the LRA. Further evaluation is required only for inaccessible areas with concrete not constructed as stated (in accordance with ACI 201.2R-77 recommendations). In the LRA, the use of this line item is not for inaccessible areas. Accessible areas inspections are performed in accordance with the Structures Monitoring Program.

The staff concludes that for inaccessible areas the recommendations of SRP-LR Section 3.5.2.2.2.2.5 can be achieved perform: (1) opportunistic inspection of normally inaccessible areas if exposed for any reason and (2) inspection of inaccessible areas of structures if observed conditions in accessible areas exposed to the same environment show that significant concrete degradation has occurred. The staff finds that, based on the information identified above, the applicant has met the criteria of SRP-LR Section 3.5.2.2.2.2.5 for further evaluation.

The staff concludes that the applicant has met the criteria of SRP-LR Section 3.5.2.2.2.2. For those LRA line items that apply to this SRP-LR section, the staff determined that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

200) The need for periodic inspection of inaccessible areas of the fresh water pump-house will be determined prior to the period of extended operation based on inspection results of the accessible areas with the same environment.

The applicant's 2002 inspection report noted that the structural condition of the shield walls was the same as that observed in 1998, that cracks observed were minor, and that the walls were adequate for their intended functions. The 2005 inspection report noted that the shield walls were in good and sound condition and capable of performing their intended function. The minor hairline cracks and rust stains were the same as noted in previous inspections.

The applicant further stated that, as evident from operating experience discussed above, the extent of the elevated temperature region and the extent of the cracked region have not significantly changed since the benchmark report of 1994. Additional minor cracks and stains have been observed since that time but not considered so significant as to impact the intended function of the drywell shield wall. A reanalysis for GPUN by ABB Impell Corporation (Report #0037-00196-0) was transmitted to NRC in November 19, 1993 (Letter, R. Keaton, GPUN, to NRC, "Response to Request for Additional Information on Drywell Temperature (SEP Topic III-7.B)," dated November 19, 1993). There has been no need for repairs. The license renewal commitment (Commitment No. 31) under the Structures Monitoring Program is equal to the condition monitoring activities conducted under the current term to satisfy staff recommendations.

As a followup to the applicant's response, the staff reviewed the May 11, 1994, letter from A. Dromerick and the November 19, 1993, letter from R. Keaton along with ABB Impell Corporation Report #03-0370-1341, "Oyster Creek Nuclear Generating Station Structural Evaluation of the Spent Fuel Pool," Revision 0, June 29, 1992.

201) delete text

The staff reviewed the applicant's responses and concluded that the applicant's program to manage concrete cracking in the drywell shield wall, ~~the biological shield wall,~~ and the spent fuel pool supporting structural elements is adequate based on ~~the 2-year inspection frequency~~, the inclusion of a quantitative acceptance criterion for crack width consistent with the staff recommendations, and the apparent stability of the existing crack patterns and crack widths.

201) an inspection frequency of every refueling outage

Based on the information identified above, the staff concludes that the applicant has met the criteria of SRP-LR Section 3.5.2.2.2.3. For those LRA line items that apply to this SRP-LR section, the staff determined that the LRA is consistent with the GALL Report and and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

Aging Management of Inaccessible Areas for Group 6 Structures. The staff reviewed LRA Section 3.5.2.2.2.4, and Attachment 3 of the applicant's reconciliation document against the criteria in SRP-LR Section 3.5.2.2.2.4.

In Attachment 3, items T-18 and T-19, of its reconciliation document, the applicant addressed increase in porosity and permeability, cracking, loss of material (spalling, scaling) - aggressive chemical attack; and cracking, loss of bond, and loss of material (spalling, scaling) - corrosion of embedded steel in below-grade inaccessible concrete areas of Group 6 structures (T-18, T-19).

SRP-LR Section 3.5.2.2.2.4.1 states that increase in porosity and permeability, cracking, loss of material (spalling, scaling) - aggressive chemical attack; and cracking, loss of bond, and loss of

The staff finds that, based on the programs identified above, the applicant has met the criteria of SRP-LR Section 3.5.2.2.2.4.3 for further evaluation.

Based on the programs identified above, the staff concludes that the applicant has met the criteria of SRP-LR Section 3.5.2.2.2.4. For those LRA line items that apply to this SRP-LR section, the staff determined that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

Cracking Due to Stress Corrosion Cracking and Loss of Material Due to Pitting and Crevice Corrosion. The staff noted that the applicant had not provided a further evaluation for cracking of stainless steel tank liners, with reference to the further evaluation in SRP-LR Section 3.5.2.2.2.5; however, LRA Table 3.5.1, item number 3.5.1-30, addresses this aging effect.

SRP-LR Section 3.5.2.2.2.5 states that cracking due to SCC and loss of material due to pitting and crevice corrosion could occur for Group 7 and 8 stainless steel tank liners exposed to standing water. The GALL Report recommends further evaluation of plant-specific programs to manage these aging effects.

LRA Table 3.5.1, item number 3.5.1-30, states that cracking due to SCC or loss of material due to pitting and crevice corrosion for Group 7 and 8 stainless steel tank liners is not applicable. The only stainless steel lined concrete tank is the spent fuel pool surge tank. Aging effects of the stainless steel tank liner are evaluated with the mechanical auxiliary systems.

The staff reviewed LRA Tables 3.5.2.1.1 through 3.5.2.1.19 and noted that the only stainless steel tank liner listed is the fuel pool skimmer surge tank liner, in LRA Table 3.5.2.1.2. The AMR for this tank references GALL Report Table 2 item VII.A4-11 and Table 1 item 3.3.1-22 in auxiliary systems. The Water Chemistry and One-Time Inspection Programs are credited for aging management. The staff concludes that the applicant's AMP for the stainless steel tank liner is acceptable.

Based on the programs identified above, the staff concludes that the applicant has met the criteria of SRP-LR Section 3.5.2.2.2.5. For those LRA line items that apply to this SRP-LR section, the staff determined that the LRA is consistent with the GALL Report and that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB during the period of extended operation, as required by 10 CFR 54.21(a)(3).

Aging of Supports Not Covered by Structures Monitoring Program. The staff reviewed Attachment 3 of the applicant's reconciliation document against the criteria in SRP-LR Section 3.5.2.2.2.6.

In Attachment 3, items T-29, T-30, and T-31, of its reconciliation document, the applicant addressed aging management of component ~~support~~ and aging effect combinations not covered by the Structures Monitoring Program.

202) supports

TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c). At OCGS, there are no fatigue analyses applicable to Groups B1.1 and B1.2 component supports in the CLB. Therefore, cumulative fatigue damage for Groups B1.1 and B1.2 component supports is not a TLAA as defined in 10 CFR 54.3. The CLB includes fatigue analysis for certain Group B1.3 ASME Class MC component supports. For these supports (torus support columns and sway braces) cumulative fatigue damage is a TLAA evaluated in accordance with 10 CFR 54.21(c) in LRA Section 4.6.1.

The evaluation of this TLAA is documented in SER Section 4.6.

3.5.2.2.3 Quality Assurance for Aging Management of Nonsafety-Related Components

SER Section 3.0.4 provides the staff's evaluation of the applicant's quality assurance program for safety-related and nonsafety-related components.

Conclusion. On the basis of its review, for component groups evaluated in the GALL Report, for which the applicant had claimed consistency with the GALL Report and for which the GALL Report recommends further evaluation, the staff determines that the applicant has adequately addressed the issues that were further evaluated, except for the primary containment (drywell). Five OIs were identified and are documented in SER Section 4.7.2. Based upon this review and evaluation of the containment corrosion history and the applicant's proposed aging management activities for the period of extended operation, the staff ~~fins~~, contingent upon resolution of the OIs, that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained during the period of extended operation, as required by 10 CFR 54.21(a)(3).

203) finds

3.5.2.3 AMR Results That Are Not Consistent with or Not Addressed in the GALL Report

Summary of Technical Information in the Application. In LRA Tables 3.5.2.1.1 through 3.5.2.1.19, the staff reviewed additional details concerning the results of the AMRs for material, environment, AERM, and AMP combinations not consistent with or not addressed in the GALL Report.

In LRA Tables 3.5.2.1.1 through 3.5.2.1.19, the applicant indicated, via Notes F through J, that the combination of component type, material, environment, and AERM does not correspond to a line item in the GALL Report. The applicant provided further information concerning how the aging effects will be managed. Specifically, Note F indicates that the material for the AMR line item component is not evaluated in the GALL Report. Note G indicates that the environment for the AMR line item component and material is not evaluated in the GALL Report. Note H indicates that the aging effect for the AMR line item component, material, and environment combination is not evaluated in the GALL Report. Note I indicates that the aging effect identified in the GALL Report for the line item component, material, and environment combination is not applicable. Note J indicates that neither the component nor the material and environment combination for the line item is evaluated in the GALL Report.

Staff Evaluation. For component type, material, and environment combinations not evaluated in the GALL Report, the staff reviewed the applicant's evaluation to determine whether the

(a) The exception to the GALL Report referred to in the Bolting Integrity Program is that coverage of NSSS component support and structural bolting in the GALL Report is by the Bolting Integrity Program but that instead coverage is by the Structures Monitoring Program for structural bolting, ASME Section XI, Subsection IWE Program for primary containment pressure bolting, and ASME Section XI, Subsection IWF Program for ASME Code Section XI Classes 1, 2, and 3 and Class MC support members. The same procurement and installation procedures credited in the Bolting Integrity Program are also applicable to the structural bolting.

(b) Structural bolting applications at OCGS do not require any specific predetermined bolting preload to assure that structural intended functions are maintained. Structural bolting is assembled by approved bolting materials and lubricants. Bolted connections are assembled by vendor-recommended methods, turn-of-the-nut methods, or standard torque values for the applicable bolt size and material. For structural bolting, loss of preload will not impact the bolted connection intended function unless the bolts become so loose that they affect the integrity and geometry of the bolted connection. This aging effect is managed by visual inspection for loose or missing nuts and bolts.

(c) The same procurement and installation procedures credited in the Bolting Integrity Program are also applicable to the structural bolting. The Structures Monitoring Program is credited because it provides for visual inspections of the structural bolted connections.

(d) Structural bolts with yield strength greater than or equal to 150 ksi are used in limited structural applications, but those bolts are not subject to significant preload stress; therefore, cracking would not be expected. The Structures Monitoring Program includes structural bolting inspections for loss of material due to corrosion and visual inspections for loose nuts, missing bolts, or other indications of loss of preload.

The applicant clarified that the aging effect of structural bolts in managed by visual inspection for loose or missing bolts as specified in the Structures Monitoring Program and that there is no physical check on the preload loss in the bolts or bolt connections. The issue of structural bolts that have yield strength greater than or equal to 150 ksi was resolved in the Audit and Review Report. The staff's concern described in RAI 3.5-8 is resolved.

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the EDG building components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.5.2.3.7 Exhaust Tunnel Summary of Aging Management Evaluation – LRA Table 3.5.2.1.7

The staff reviewed LRA Table 3.5.2.1.7, which summarizes the results of AMR evaluations for the exhaust tunnel component groups.

~~The staff's review of LRA Table 3.5.2.1.7 identified an area in which additional information was necessary to complete the review of the applicant's AMR results. The applicant responded to the staff's RAI as discussed below.~~

204) Move this discussion to SER Section 3.5.2.3.17

204) Move this discussion to SER Section 3.5.2.3.17 (DSER page 3-452)

~~In RAI 3.5-10 dated March 20, 2006, the staff noted that LRA Table 3.5.2.1.7 lists aluminum material embedded in concrete and states that there is no aging effect and that no AMP is required. The staff stated that the ACI Building Code prohibits the use of aluminum in structural concrete unless coated or covered to prevent aluminum-concrete reaction or electrolytic action between aluminum and steel. The staff requested that the applicant justify the use of aluminum material in concrete and explain why there is no aging effect and why no AMP is required.~~

~~In its response dated April 18, 2006, the applicant stated that, as required by ACI, the concrete is not in direct contact with aluminum. The OCGS specification for placement of concrete requires that where aluminum will contact concrete the contact surface of the metal shall have not less than one coat of zinc chromate primer and one heavy coat of aluminum-pigmented asphalt paint.~~

~~The applicant's response indicated that it complied with the ACI Code requirement that aluminum not be in direct contact with concrete. The staff's concern described in RAI 3.5-10 is resolved.~~

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the exhaust tunnel components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.5.2.3.8 Fire Pond Dam Summary of Aging Management Evaluation – LRA Table 3.5.2.1.8

The staff reviewed LRA Table 3.5.2.1.8, which summarizes the results of AMR evaluations for the fire pond dam component groups.

LRA Table 3.5.2.1.8 states that the AMRs for the fire pond dam either are consistent with the GALL Report or have no AERM. The staff confirmed that the AMR results presented in this table are consistent with the GALL Report. The staff's evaluation for AMR items that are consistent with the GALL Report is documented in SER Sections 3.5.2.1 and 3.5.2.2.

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the fire pond dam components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.5.2.3.9 Fire Pumphouses Summary of Aging Management Evaluation – LRA Table 3.5.2.1.9

The staff reviewed LRA Table 3.5.2.1.9, which summarizes the results of AMR evaluations for the fire pumphouses component groups.

LRA Table 3.5.2.1.9 states that the AMRs for the fire pumphouses either are consistent with the GALL Report or have no AERM. The staff confirmed that the AMR results presented in this table are consistent with the GALL Report. The staff's evaluation for AMR items that are consistent with the GALL Report is documented in SER Sections 3.5.2.1 and 3.5.2.2.

3.5.2.3.19 Piping and Component Insulation Commodity Group Summary of Aging Management Evaluation – LRA Table 3.5.2.1.19

The staff reviewed LRA Table 3.5.2.1.19, which summarizes the results of AMR evaluations for the piping and component insulation commodity group component groups.

The applicant stated that no aging effects are considered applicable to insulations fabricated from asbestos, calcium silicate, fiberglass, and NUKON. Based on the available information, the staff agreed that these insulations will not cause aging of concern during the period of extended operation. Therefore, the staff concludes that there are no applicable AERMs for these insulations.

On the basis of its review, as discussed above, the staff concludes that the applicant has demonstrated that the aging effects associated with the piping and component insulation commodity group components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

Conclusion. On the basis of its review, the staff finds that the applicant appropriately evaluated the AMR results involving material, environment, AERMs, and AMP combinations that are not evaluated in the GALL Report. The staff finds that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.5.3 Conclusion

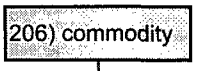
The staff concludes that, pending resolution of the OIs, the applicant has provided sufficient information to demonstrate that the effects of aging for the containment, structures, component supports, and piping and component insulation components, that are within the scope of license renewal and subject to an AMR, will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.

3.6 Aging Management of Electrical Components

This section of the SER documents the staff's review of the applicant's AMR results for the electrical components and ~~component~~ groups of the following:

205) commodity

- insulated cables and connections
- electrical penetrations
- high voltage insulators
- transmission conductors and connections
- fuse holders
- wooden utility poles
- cable connections (metallic parts)
- uninsulated ground conductors



3.6.1 Summary of Technical Information in the Application

In LRA Section 3.6, the applicant provided AMR results for the electrical components and component groups. In LRA Table 3.6.1, "Summary of Aging Management Programs for the Electrical Components Evaluated in Chapter VI of NUREG-1801," the applicant provided a summary comparison of its AMRs with the AMRs evaluated in the GALL Report for the electrical components and ~~component~~ groups.

The applicant's AMRs incorporated applicable operating experience in the determination of AERMs. These reviews included evaluation of plant-specific and industry operating experience. The plant-specific evaluation included reviews of condition reports and discussions with appropriate site personnel to identify AERMs. The applicant's review of industry operating experience included a review of the GALL Report and operating experience issues identified since the issuance of the GALL Report.

3.6.2 Staff Evaluation

The staff reviewed LRA Section 3.6 to determine whether the applicant had provided sufficient information to demonstrate that the effects of aging for the electrical components within the scope of license renewal and subject to an AMR will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

The staff conducted an onsite audit of AMRs, during the weeks of October 3-5, 2005, January 23-27, 2006, and February 13-17, 2006, to confirm the applicant's claim that certain identified AMRs were consistent with the GALL Report. The staff did not repeat its review of the matters described in the GALL Report; however, the staff did verify that the material presented in the LRA was applicable and that the applicant had identified the appropriate GALL AMRs. The staff's evaluations of the AMPs are documented in SER Section 3.0.3. Details of the staff's audit evaluation are documented in the Audit and Review Report and summarized in SER Section 3.6.2.1.

In the onsite audit, the staff also selected AMRs that were consistent with the GALL Report and for which further evaluation is recommended. The staff confirmed that the applicant's further evaluations were consistent with the acceptance criteria in SRP-LR Section 3.6.2.2. The staff's audit evaluations are documented in the Audit and Review Report and summarized in SER Section 3.6.2.2.

The staff also conducted a technical review of the remaining AMRs not consistent with or not addressed in the GALL Report. The technical review included evaluating whether all plausible aging effects had been identified and whether the aging effects listed were appropriate for the combination of materials and environments specified. The staff's evaluations are documented in SER Section 3.6.2.3.

For AMRs that the applicant identified as not applicable, or not requiring aging management, the staff conducted a review of the AMR line items, and the plant's operating experience, to verify the applicant's claims. Details of these reviews are documented in the Audit and Review Report.

Finally, the staff reviewed the AMP summary descriptions in the UFSAR supplement to ensure that they provided an adequate description of the programs credited with managing or monitoring aging for the electrical components.

Table 3.6-1, provided below, includes a summary of the staff's evaluation of components, aging effects and mechanisms, and AMPs listed in LRA Section 3.6 and addressed in the GALL Report.

Table 3.6-1 Staff Evaluation for Electrical Components in the GALL Report

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Electrical equipment subject to 10 CFR 50.49 environmental qualification (EQ) requirements (Item 3.6.1-1)	Degradation due to various aging mechanisms	Environmental Qualification of Electrical Components	TLAA Environmental Qualification (B.3.2) 207) 3.6.2.2 and	Consistent with GALL, which recommends further evaluation (See SER Section 4.4)
Electrical cables, connections and fuse holders (insulation) not subject to 10 CFR 50.49 EQ requirements (Item 3.6.1-2)	Reduced insulation resistance and electrical failure due to various physical, thermal, radiolytic, photolytic, and chemical mechanisms	Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program, (B.1.34).	Consistent with GALL. (See SER Section 3.6.2.1)
Conductor insulation for electrical cables and connections used in instrumentation circuits not subject to 10 CFR 50.49 EQ requirements that are sensitive to reduction in conductor insulation resistance (IR) (Item 3.6.1-3)	Reduced insulation resistance and electrical failure due to various physical, thermal, radiolytic, photolytic, and chemical mechanisms	Electrical Cables And Connections Used In Instrumentation Circuits Not Subject To 10 CFR 50.49 EQ Requirements	Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used In Instrumentation Circuits program, (B.1.35)	Consistent with GALL. (See SER Section 3.6.2.1)

circuits need to be de-energized, power is removed at the safety-related power supplies. When manipulated an inspection would identify any abnormal indication like loose or corroded fuse clips. Fatigue also may be caused by frequent cycling of fuses when subject to significant loading which could cause the clips to expand and contract and result in fatigue failure. By design, the subject fuses do not experience operational cycling during normal service and are lightly loaded. Therefore, fatigue is not an aging concern.

The staff's review of LRA Section 3.6.2.3.1 identified an area in which additional information was necessary to complete the review of the applicant's AMR results. The applicant responded to the staff's RAI as discussed below.

In RAI 3.6.2.3.1-3 dated April 20, 2006, the staff requested that the applicant discuss the disconnection means at the SR power supplies and how often the fuses are manipulated and the reasons for manipulation.

208) powered by

In its response dated May 9, 2006, the applicant stated that these circuits are the reactor protection system power supplies. The reactor protection system power is supplied through two independent buses. Each panel supplies power to one logic channel and its pilot and backup scram valve solenoids, one half of the in-core flux amplifiers, one half of the steam line radiation monitors, and one half of the flux amplifiers. A single breaker on each panel powers the scram solenoids and logic system. Routine reactor protection system testing does not include de-energization of scram solenoid circuits. Isolation is accomplished via the valve air supply. The scram solenoid fuses are removed only when corrective maintenance is required (estimated at once in a 15-year span). Manipulation of these fuses would occur only during required corrective maintenance or replacement of a blown fuse. Fuse Control Procedure CC-AA-206 provides instruction for fuse replacements to ensure continuity, tightness and condition (no cracks) of end caps, no corrosion, proper installation, tightness of clips, and firm contact with fuse end caps.

On the basis of its review, the staff finds that mechanical stresses, electrical transients, vibration, thermal cycling, and fatigue do not cause AERMs for a fuse holder metallic parts. The staff's concern described in RAI 3.6.2.3.1-3 is resolved.

On the basis of its review, the staff finds that the applicant has demonstrated that the effects of aging for fuse holders will be adequately managed so that the intended functions will be maintained during the period of extended operation, as required by 10 CFR 54.21(a)(3).

Non-Class 1E Electrical Penetration. The electrical penetration assemblies are comprised of insulated electrical conductors and seals for the passage of the conductors through a sleeve in the primary containment to provide a pressure barrier between the containment and outside areas. The penetrations are pressurized with nitrogen during normal plant operation. Epoxy potting provides sealing and various insulating materials provide electrical insulation. As demonstrated by the applicant's environmental qualification files, all components of the electrical penetration assemblies have been evaluated for the effects of heat, radiation, moisture, and oxygen and determined to have a qualified life greater than or equal to 60 years.

Uninsulated Ground Conductors. The plant grounding and lightning protection system is designed to provide a low-impedance path to ground for fault currents and lightning strokes. The applicant stated that based on industry and plant-specific experiences, no AERMs were identified for uninsulated ground conductors.

Aging Effects. LRA Section 3.6.2.1.8 lists the material of construction for uninsulated ground conductors as copper.

The applicant stated that uninsulated ground conductors are exposed to containment atmosphere, indoor air, and outdoor air environments. The applicant also stated that the uninsulated ground conductors have no AERMs. Copper is a good choice for this application because of its high electrical conductivity, high fusing temperature, and high corrosion resistance. Copper is also relatively strong and easy to join by welding, compression, or clamping. Ground connections are commonly made with welds or mechanical-type connectors, including compression-, bolted-, and wedge-type devices.

Review of available industry technical information on material aging revealed no AERMs for copper grounding materials. In addition, a review of industry and plant operating experiences identified no failures of copper ground systems due to aging effects. A complete survey of OCGS grounding systems in 1988 in accordance with IEEE STD 81-1983 showed adequate grounding and routine inspections of the lightning protection system have identified no degradation due to aging effects.

The staff's review of LRA Section 3.6.2.3.4 identified an area in which additional information was necessary to complete the review of the applicant's AMR results. The applicant responded to the staff's RAI as discussed below.

The staff's review found that torque relaxation for bolted connections is a concern for ground connections. An electrical connection must be designed to remain tight and maintain good conductivity through a wide temperature range. This design requirement is difficult to meet if the materials specified for the bolt and conductor differ and therefore have different rates of thermal expansion. For example, copper or aluminum conductor materials expand faster than most bolting materials. If thermal stress is added to stresses inherent at assembly, the joint members or fasteners can yield. If plastic deformation occurs during thermal loading (i.e., heatup) the joint will be loose when the connection cools. EPRI TR-104213, "Bolted Joint Maintenance & Application Guide," recommends inspection of bolted joints for evidence of overheating, signs of burning or discoloration, and indications of loose bolts.

In RAI 3.6.2.3.4 dated April 20, 2006, the staff requested that the applicant discuss why torque relaxation for bolted connection was not a concern. In its response dated May 9, 2006, the applicant stated that its ground connections do not experience thermal stresses from the environment or operating ~~conditions that extremely~~ gradual environmental temperature changes experienced by ground conductors and connections reflect gradual weather or environmentally-induced temperature changes. Ground conductors and connections normally see no current. Under fault conditions, current would flow for a brief period of time and would not cause ohmic heating or related current-induced thermal stresses. As such, these connections do not experience thermal stresses necessary to affect the bolted ground connections. The material

209) conditions. Extremely

component type included the intended function, material, environment, AERM, AMPs, the GALL Report Volume 2 item cross-referenced to Table 3.6.1A (Table 1), and generic and plant-specific notes on consistency with the GALL Report.

3.7.1.2 Mechanical Components

In Appendix C of its supplemental response to RAI 2.5.1.19-1 dated November 11, 2005, and its response to RAI 2.5.1.15-1 dated December 9, 2005, the applicant provided the results of its AMRs for the FRCT and radio communications mechanical system components and component groups, respectively.

In Table 3.6.1B of the November letter and Table 3.6.1D of the December letter, the applicant provided a summary comparison of its AMR line-items with those evaluated in the GALL Report for the mechanical system components and component groups. The applicant also identified, for each component type, AMRs consistent with the GALL Report and those for which the GALL Report recommends further evaluation.

In Tables 3.6.2.1.2B of the November letter and 3.6.2.1.3 of the December letter, the applicant provided the AMR results for mechanical component types of the FRCT and the radio communications system, respectively. Specifically, the information for each component type included the intended function, material, environment, AERM, AMPs, the GALL Report Volume 2 item cross-referenced to Table 3.6.1B or 3.6.1D (Table 1), and generic and plant-specific notes on consistency with the GALL Report.

3.7.1.3 Structural Components

The applicant provided the results of its AMRs for the structural components of the FRCT in its October letter. For the FRCT structural components, the Table 1 entries and the Table 2 entries are in Appendix C of the applicant's response: Supplemental Table 3.6.1C, "Summary of Aging Management Evaluations for the Station Blackout System-Structural," and Supplemental Table 3.6.2.1.2C, "Station Blackout System Structural Components, Summary of Aging Management Evaluation."

The applicant provided the results of its AMRs for the Met Tower structural components in its December letter. For the meteorological tower structural components, the applicant included a summary of LRA Section 3.5.2.1.20, "Meteorological Tower Structures," and the following new tables:

210) delete text

210) new bullet - > Table 3.6.2.1.3, "Radio Communications System"

- ~~LRA Table 1~~
- ~~LRA Table 2~~
- Table 3.6.1D, "Summary of Aging Management Evaluations"
- ~~Table~~ 3.5.2.1.20, "Meteorological Tower Structures"

The applicant's AMRs incorporated applicable operating experience in determining the AERMs. These reviews included the evaluation of both plant-specific and industry operating experience. The plant-specific evaluation included reviews of condition reports and discussions with appropriate site personnel to identify AERMs. The applicant's review of industry operating

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Metal enclosed bus - Insulation/insulators (Item 3.6.1-8)	Reduced insulation resistance and electrical failure due to various physical, thermal, radiolytic, photolytic, and chemical mechanisms	Metal Enclosed Bus	Periodic Monitoring of Combustion Turbine Power Plant Electrical (B.1.37)	Consistent with GALL. (See SER Section 3.7.2.1)
Metal enclosed bus - Enclosure assemblies (Item 3.6.1-9)	Loss of material due to general corrosion	Structures Monitoring Program	Structures Monitoring Program (B.1.31)	Consistent with GALL. (See SER Section 3.7.2.1)
Metal enclosed bus - Enclosure assemblies (Item 3.6.1-10)	Hardening and loss of strength due to elastomers degradation	Structures Monitoring Program	Structures Monitoring Program (B.1.31)	Consistent with GALL. (See SER Section 3.7.2.1)
High voltage insulators (Item 3.6.1-11)	Degradation of insulation quality due to presence of any salt deposits and surface contamination; Loss of material caused by mechanical wear due to wind blowing on transmission conductors	A plant-specific aging management program is to be evaluated	Periodic Monitoring of Combustion Turbine Power Plant Electrical (B.1.37) 211) Consistent with	GALL ~~aging effect is not applicable to OCGS.~~ (See SER Section 3.6.2.2.2)
Transmission conductors and connections; switchyard bus and connections (Item 3.6.1-12)	Loss of material due to wind induced abrasion and fatigue; loss of conductor strength due to corrosion; increased resistance of connection due to oxidation or loss of preload	A plant-specific aging management program is to be evaluated	None 212) Consistent with	GALL aging effect is not applicable to OCGS. (See SER Section 3.6.2.2.3)
Cable Connections - Metallic parts (Item 3.6.1-13)	Loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation	Electrical Cable Connections Not Subject To 10 CFR 50.49 Environmental Qualification Requirements	Electrical Cable Connections - Metallic Parts - Not subject to 10 CFR 50.49 Environmental Requirements (B.1.40)	GALL ~~aging effect is not applicable to OCGS.~~ (See SER Section ~~3.7.2.3~~) 213) 3.6.2.3.1

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Fuse Holders (Not Part of a Larger Assembly) Insulation material (Item 3.6.1-14)	None	None	None	Consistent with GALL. (See SER Section 3.7.2.1)
Stainless steel and copper alloy piping, piping components, and piping elements exposed to lubricating oil (Item 3.2.1-6)	Loss of material due to pitting and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Lubricating Oil Analysis - FRCT (B.1.39) and One-Time Inspection - FRCT (B.1.24A)	Consistent with GALL, which recommends further evaluation. (See SER Section ~~3.7.2.2.4~~) 214) 3.7.2.2.3
Steel, stainless steel, and copper alloy heat exchanger tubes exposed to lubricating oil (Item 3.2.1-9)	Reduction of heat transfer due to fouling	Lubricating Oil Analysis and One-Time Inspection	Lubricating Oil Analysis - FRCT (B.1.39) and One-Time Inspection - FRCT (B.1.24A)	Consistent with GALL, which recommends further evaluation (See SER Section ~~3.7.2.2.5~~) 215) 3.7.2.2.4
Copper alloy > 15% Zn piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water (Item 3.2.1-41)	Loss of material due to selective leaching	Selective Leaching of Materials	Selective Leaching of Materials - FRCT (B.1.25A)	Consistent with GALL. (See SER Section 3.7.2.1)
Aluminum piping, piping components, and piping elements exposed to air - indoor uncontrolled (internal/external) (Item 3.2.1-50)	None	None	None	Consistent with GALL. (See SER Section 3.7.2.1)
Stainless steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust (Item 3.3.1-6)	Cracking due to stress corrosion cracking	A plant specific aging management program is to be evaluated.	Periodic Inspection - FRCT (B.2.5A)	Consistent with GALL, which recommends further evaluation (See SER Section ~~3.7.2.2.6~~) 216) 3.7.2.2.5

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Elastomer seals and components exposed to air - indoor uncontrolled (internal/external) (Item 3.3.1-11)	Hardening and loss of strength due to elastomer degradation	A plant specific aging management program is to be evaluated	Periodic Inspection - FRCT (B.2.5A)	Consistent with GALL, which recommends further evaluation (See SER Section ~~3.7.2.2.7~~) 217) 3.7.2.2.6
Steel piping, piping component, and piping elements exposed to lubricating oil (Item 3.3.1-14)	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis and One-Time Inspection	Lubricating Oil Analysis - FRCT (B.1.39) and One-Time Inspection - FRCT (B.1.24A)	Consistent with GALL, which recommends further evaluation (See SER Section ~~3.7.2.2.8~~)
Stainless steel and steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust (Item 3.3.1-18)	Loss of material/general (steel only), pitting and crevice corrosion	A plant specific aging management program is to be evaluated	Periodic Inspection - FRCT (B.2.5A)	Consistent with GALL, which recommends further evaluation (See SER Section ~~3.7.2.2.8~~) 218) 3.7.2.2.7
Steel (with or without coating or wrapping) piping, piping components, and piping elements exposed to soil (Item 3.3.1-19)	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion	Buried Piping and Tanks Surveillance or Buried Piping and Tanks Inspection	Buried Piping Inspection - FRCT (B.1.26A) and Aboveground Outdoor Tanks - FRCT (B.1.21A)	Consistent with GALL, which recommends further evaluation (See SER Section ~~3.7.2.2.9~~) 219) 3.7.2.2.8
Steel piping, piping components, piping elements, and tanks exposed to fuel oil (Item 3.3.1-20)	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Fuel Oil Chemistry and One-Time Inspection	Fuel Oil Chemistry - FRCT (B.1.22A) and One-Time Inspection - FRCT (B.1.24A)	Consistent with GALL, which recommends further evaluation (See SER Section ~~3.7.2.2.10~~) 220) 3.7.2.2.9
Steel heat exchanger components exposed to lubricating oil (Item 3.3.1-21)	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Lubricating Oil Analysis and One-Time Inspection	Lubricating Oil Analysis - FRCT (B.1.39) and One-Time Inspection - FRCT (B.1.24A)	Consistent with GALL, which recommends further evaluation (See SER Section ~~3.7.2.2.10~~)

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Copper alloy HVAC piping, piping components, piping elements exposed to condensation (external) (Item 3.3.1-25)	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Periodic Inspection - FRCT (B.2.5A)	Consistent with GALL, which recommends further evaluation (See SER Section ~~3.7.2.2.11~~ 3.7.2.2.10)
Stainless steel, aluminum and copper alloy piping, piping components, and piping elements exposed to fuel oil (Item 3.3.1-32)	Loss of material due to pitting, crevice, and microbiologically influenced corrosion	Fuel Oil Chemistry and One-Time Inspection	Fuel Oil Chemistry - FRCT (B.1.22A) and One-Time Inspection - FRCT (B.1.24A)	Consistent with GALL (aluminum and copper alloy), which recommends further evaluation (See SER Section ~~3.7.2.2.12~~ 3.7.2.2.11)
Stainless steel piping, piping components, and piping elements exposed to lubricating oil (Item 3.3.1-33)	Loss of material due to pitting, crevice, and microbiologically influenced corrosion	Lubricating Oil Analysis and One-Time Inspection	Lubricating Oil Analysis - FRCT (B.1.39) and One-Time Inspection - FRCT (B.1.24A)	Consistent with GALL, which recommends further evaluation (See SER Section ~~3.7.2.2.12~~ 3.7.2.2.11)
Steel closure bolting exposed to air – indoor uncontrolled (external) (Item 3.3.1-35)	Loss of material due to general, pitting and crevice corrosion, loss of preload due to stress relaxation	Bolting Integrity	Structures Monitoring (B.1.31)	Acceptable since the OCGS Structures Monitoring Program is consistent with the recommendations in the GALL bolting integrity program for this component group/aging effect combination. (See SER Section 3.7.2.1.3)
Steel bolting exposed to air – outdoor (external) (Item 3.3.1-36)	Loss of material due to general, pitting and crevice corrosion	Bolting Integrity	Structures Monitoring (B.1.31)	Acceptable since the OCGS Structures Monitoring Program is consistent with the recommendations in the GALL bolting integrity program for this component group/aging effect combination. (See SER Section 3.7.2.1.3)

221) 3.7.2.2.10

222) 3.7.2.2.11

Component Group	Aging Effect/ Mechanism	AMP in GALL Report	AMP in LRA	Staff Evaluation
Steel, stainless steel, aluminum, and copper alloy piping, piping components, and piping elements exposed to gas (Item 3.3.1-97)	None	None	None	Consistent with GALL. (See SER Section 3.7.2.1)
Buried steel piping, piping components, piping elements, and tanks (with or without coating or wrapping) exposed to soil (Item 3.4.1-11)	Loss of material due to general, pitting, crevice, and microbiologically-influenced corrosion	Buried Piping and Tanks Surveillance or Buried Piping and Tanks Inspection	Buried Piping Inspection (B.1.26)	Consistent with GALL, which recommends further evaluation. (See SER Section ~~3.7.2.2.9~~ 223) 3.7.2.2.8
Steel heat exchanger components exposed to closed cycle cooling water (Item 3.4.1-24)	Loss of material due to general, pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System	Closed-Cycle Cooling Water - FRCT (B.1.14A)	Consistent with GALL. (See SER Section 3.7.2.1)
Groups B2, and B4: galvanized steel, aluminum, stainless steel support members; welds; bolted connections; support anchorage to building structure (Item 3.5.1-50)	Loss of material due to pitting and crevice corrosion	Structures Monitoring Program	Structures Monitoring Program (B.1.31)	Consistent with GALL. (See SER Section 3.7.2.1)
All Groups except Group 6: accessible and inaccessible interior/exterior concrete, steel and Lubrite components (Item 3.5.1-21)	All types of aging effects	Structures Monitoring	Structures Monitoring Program (B.1.31)	Consistent with GALL. (See SER Section 3.7.2.1)
All Groups except Group 6: interior and above grade exterior concrete (Item 3.5.1-23)	Cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel	Structures Monitoring Program	Structures Monitoring Program (B.1.31)	Consistent with GALL. (See SER Section 3.7.2.1)

The staff reviewed FRCT Table 3.6.1A, item 3.6.1-1, against the criteria in SRP-LR Section 3.6.2.2.1.

In FRCT Table 3.6.1A, item 3.6.1-1, the applicant addressed FRCT electrical equipment EQ.

SRP-LR Section 3.6.2.2.1 states that EQ is a TLAA as defined in 10 CFR 54.3. TLAAs are required to be evaluated in accordance with 10 CFR 54.21(c)(1). The evaluation of this TLAA is addressed separately in SRP-LR Section 4.4, "Environmental Qualification (EQ) of Electrical Equipment."

FRCT Table 3.6.1A, item 3.6.1-1 states that EQ is not applicable. FRCT contains no components subject to 10 CFR 50.49 EQ requirements. The staff verified that there are no components subject to 10 CFR 50.49 EQ requirements in the SBO system and found that the applicant has met the criteria of SRP-LR Section 3.3.2.2.5.1 for further evaluation.

3.7.2.2.2 Station Blackout System Summary of Aging Management Evaluation – LRA Table 3.6.2.1.2A

The staff reviewed LRA Table 3.6.2.1.2A, which summarizes the results of AMR evaluations for the SBO system component groups. 224) 3.6.2.3.1, 3.6.2.2.2, 3.6.2.2.3 and 3.6.2.3.1

The staff's evaluation of the cable connections (~~metallic~~ parts), high-voltage insulators, transmission conductors and connections, ~~and~~ uninsulated ground conductors is documented in SER Sections ~~3.6.2.3.1.1, 3.6.2.3.1.3, 3.6.2.3.1.3, and 3.6.2.3.1.4~~, respectively.

On the basis of its review the staff concludes that the applicant has demonstrated that the aging effects associated with the SBO system components will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3).

3.7.2.2.3 Loss of Material Due to Pitting and Crevice Corrosion - Mechanical Components

The staff reviewed FRCT Table 3.6.1B, item 3.2.1-6 against the criteria in SRP-LR Section 3.2.2.2.3.4.

In FRCT Table 3.6.1B, item 3.2.1-6, the applicant addressed loss of material due to pitting and crevice corrosion for FRCT mechanical components exposed to lubricating oil.

SRP-LR Section 3.2.2.2.3.4 states that loss of material from pitting and crevice corrosion could occur in stainless steel and copper alloy piping, piping components, and piping elements exposed to lubricating oil. The existing program relies on the periodic sampling and analysis of lubricating oil to maintain contaminants within acceptable limits, thereby preserving an environment not conducive to corrosion. However, control of lube oil contaminants may not always be adequate to preclude corrosion. Therefore, the effectiveness of lubricating oil control should be verified to ensure that no corrosion occurs. The GALL Report recommends further evaluation to verify the effectiveness of the lubricating oil program. A one-time inspection of selected components at susceptible locations is an acceptable method to ensure that no

3.7.2.2.8 Loss of Material Due to General, Pitting, Crevice, and Microbiologically-Influenced Corrosion - Mechanical Components

The staff reviewed FRCT Table 3.6.1B, items 3.3.1-19 and 3.4.1-11, against the criteria in SRP-LR Sections 3.3.2.2.8 and 3.3.2.2.5.1, respectively.

In FRCT Table 3.6.1B, item 3.3.1-19, the applicant addressed loss of material due to general, pitting, and crevice corrosion and MIC in steel (with or without coating or wrapping) piping, piping components, and piping elements buried in soil.

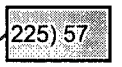
SRP-LR Section 3.3.2.2.8 states that loss of material due to general, pitting, and crevice corrosion and MIC could occur in steel (with or without coating or wrapping) piping, piping components, and piping elements buried in soil. The Buried Piping Inspection - FRCT Program relies on industry practice, frequency of pipe excavation, and operating experience to manage the effects of loss of material from general, pitting, and crevice corrosion and MIC. The effectiveness of the Buried Piping Inspection - FRCT Program should be verified to evaluate an applicant's inspection frequency and operating experience with buried components, ensuring that loss of material does not occur.

FRCT Table 3.6.1B, item 3.3.1-19, states that the Buried Piping Inspection - FRCT Program will manage the loss of material in carbon steel piping exposed to a soil environment. The Buried Piping Inspection - FRCT Program includes preventive measures to mitigate corrosion and periodic inspection of external surfaces for loss of material to manage the effects of corrosion on the pressure-retaining capacity of piping in a soil (external) environment. Preventive measures are in accordance with standard industry practices for maintaining external coatings and wrappings

The applicant further stated that the Aboveground Outdoor Tanks - FRCT Program will manage the loss of material in steel tank bottoms exposed to a soil environment. The Aboveground Outdoor Tanks - FRCT Program includes periodic internal UT inspections on the bottom of the outdoor steel main fuel oil tank supported by earthen/concrete foundations.

The staff reviewed the applicant's Buried Piping Inspection - FRCT Program and verified its adequacy to manage the loss of material of carbon steel piping. The applicant was asked to confirm that, in addition to inspections within the first 10 years of the period of extended operation, for each of the material and environment combinations for which the Buried Piping Inspection - FRCT Program will be credited at least one inspection will be during the 10-year period immediately prior to the period of extended operation.

The applicant stated that inspections will be during the 10-year period immediately prior to the period of extended operation for the buried piping for which this AMP is credited. There have been no inspections completed to date, and there have been no identified failures of this buried piping since the FRCT units went into operation.



The staff reviewed the applicant's response and Commitment No. ~~64~~ and determined that, in addition to a focused inspection within the first 10-year period of the period of extended operation, an inspection during the 10-year period immediately prior to the period of extended

SECTION 4

TIME-LIMITED AGING ANALYSES

4.1 Identification of Time-Limited Aging Analyses

This section of the safety evaluation report (SER) discusses the identification of time-limited aging analyses (TLAAs). In license renewal application (LRA) Sections 4.2 through 4.7, AmerGen Energy Company, LLC (AmerGen or the applicant) discussed the TLAAs for Oyster Creek Generating Station (OCGS). SER Sections 4.2 through 4.7 document the review of the TLAAs, as conducted by the staff of the U.S. Nuclear Regulatory Commission (NRC or the staff).

TLAAs are certain plant-specific safety analyses that involve time-limited assumptions defined by the current operating term. Pursuant to Title 10, Section 54.21(c)(1), of the *Code of Federal Regulations* (10 CFR 54.21(c)(1)), the applicant must provide a list of TLAAs, as defined in 10 CFR 54.3, "Interpretations."

In addition, pursuant to 10 CFR 54.21(c)(2), an applicant must provide a list of plant-specific exemptions, granted under 10 CFR 50.12, "Specific Exemptions," that are based on TLAAs. For any such exemptions, the applicant must provide an evaluation that justifies the continuation of the exemptions for the period of extended operation.

4.1.1 Summary of Technical Information in the Application

To identify the TLAAs, the applicant evaluated calculations for OCGS against the six criteria specified in 10 CFR 54.3. The applicant indicated that it had identified the calculations that met the six criteria by searching the current licensing basis (CLB). The CLB includes the updated final safety analysis report (UFSAR), engineering calculations, technical reports, engineering work requests, licensing correspondence, and applicable vendor reports. In LRA Table 4.1-1, "Time-Limited Aging Analyses Applicable to Oyster Creek," the applicant listed the applicable TLAAs:

- neutron embrittlement of reactor vessel and internals
- metal fatigue of the reactor vessel, internals, and reactor coolant pressure boundary (RCPB) piping and components
- environmental qualification (EQ) of electrical equipment
- ~~loss of prestress in concrete containment tendon~~ ← 226) delete text
- fatigue analysis of primary containment, attached piping, and components
- reactor building crane, turbine building crane, heater bay crane load cycles
- drywell corrosion
- equipment pool and reactor cavity walls rebar corrosion

The staff's review of LRA Section 4.3.1 identified areas in which additional information was necessary to complete the review of the reactor vessel fatigue analyses. The applicant responded to the staff's RAI as discussed below. 227) original

The LRA indicated that the fatigue usage (based on the use of projected cycles for 60 years) for the reactor vessel closure studs, support skirt, and the basin seal skirt to vessel flange junction was predicted to exceed the OCGS acceptance limit of 0.8. The application also indicated that the fatigue usage of these components was shown to be acceptable by using more refined analysis methods.

In RAI 4.3-1 dated March 30, 2006, the staff requested that the applicant describe the more refined analyses that it performed for these components.

In its response dated May 1, 2006, the applicant described the analyses used to demonstrate that these components met the design allowable limit. The applicant indicated that revised analyses of the RPV closure studs and support skirt were performed using methodology from the 1995 Edition through 1996 Addenda of Section III of the ASME Code. The 1995 edition through 1996 Addenda of Section III of the ASME Code contains design criteria that are acceptable to the staff for performing a fatigue analysis of RPV components because they are referenced in 10 CFR 50.55a. The applicant's projected fatigue usage for these components is less than 0.8 for 60 years of plant operation.

The applicant also indicated that the RPV basin seal skirt was evaluated using a finite element model to obtain a more accurate stress. The applicant stated that the original stress and fatigue evaluations were updated using the stresses obtained from the finite element analysis. The applicant indicated that the resulting fatigue usage factors were all less than the OCGS acceptance limit of 0.8.

The staff finds the use of a finite element model to be an acceptable method to evaluate the stresses in the RPV basin seal. The staff's concern described in RAI 4.3-1 is resolved.

The LRA indicated that the reactor vessel feedwater nozzles were reanalyzed to account for the effects of rapid thermal cycling. The application also indicated that the analysis satisfied the original reactor vessel design limits. However, LRA Table 4.3.1-2 indicates that the 40-year fatigue usage of the feedwater nozzle is projected to be 0.952.

In RAI 4.3-2 dated March 30, 2006, the staff requested that the applicant clarify whether the reanalysis of the feedwater nozzle for the rapid thermal cycling satisfied the original OCGS reactor vessel design fatigue limit of 0.8. The staff also requested that the applicant indicate when the analysis that calculated the fatigue usage of 0.952 was performed and provide the basis for its acceptance.

In its response dated May 1, 2006, the applicant indicated that the original RPV stress report predicted a fatigue usage of 0.1 for the feedwater nozzle blend radius region. The applicant also stated that the feedwater nozzles were reanalyzed as a result of crack indications found in 1977. The applicant indicated that the analysis used a conservative number of cycles for on/off feedwater flow at low power conditions. The reanalysis used a fatigue usage factor limit of 1.0 as

vibration fatigue analysis of the core shroud and repair hardware TLAA, the analyses will remain valid for the period of extended operation. The staff also concludes that the UFSAR supplement contains an appropriate summary description of the activities for managing the effects of aging and the TLAA evaluation, as required by 10 CFR 54.21(d).

4.3.3 Reactor Coolant Pressure Boundary Piping and Component Fatigue Analysis

4.3.3.1 Reactor Coolant Pressure Boundary Piping and Components

4.3.3.1.1 Summary of Technical Information in the Application

228) 1955

228) (1955)

In LRA Section 4.3.3.1, the applicant summarized the evaluation of RCPB piping and components for the period of extended operation. The RCPB piping was designed to ASME Code, Section I, as stated in UFSAR Section 3.1.26. ASME Code, Section I, refers to American Standards Association (ASA) B31.1 of ~~1955~~ for design requirements except for materials. In addition, the reactor recirculation pumps were designed to ASA B31.1 and ASME Code, Section VIII. All remaining non-RCPB piping was analyzed based on ASA B31.1 or the ASME Code. In a few instances, piping was designed to ASME Code, Section II, Class 2 or 3. In addition, all 11 Class I (seismic) piping systems were evaluated based on USAS B31.1 of 1983, Winter 1984 Addenda.

229) space

The thermal cycles used in the reactor vessel fatigue analysis conservatively approximate the assumed thermal cycle count for the analyses used in the codes associated with piping and components. UFSAR Table 5.2-2 lists some of these thermal cycles. Based on a detailed review of components and assessments performed as a part of the Metal Fatigue of Reactor Coolant Pressure Boundary Program, the applicant identified additional thermal cycles. When combined, the total count of the thermal cycles in LRA Table 4.3.1-1 is less than 2,700 for a 40-year plant operating period. For the 60-year extended operating period, the number of thermal cycles for piping analyses would be proportionally increased to less than 3,500, a fraction of the 7,000-cycle threshold. Therefore, the applicant determined that the existing piping analyses within the scope of license renewal containing assumed thermal cycle counts are valid for the period of extended operation.

4.3.3.1.2 Staff Evaluation

The applicant indicated that RCPB piping was originally designed in accordance with ASA B31.1, which did not require explicit fatigue analyses of piping components. Instead, ASA B31.1 contained a limit of 7,000 for equivalent full-range thermal cycles. The same 7,000 cycle limit applies to B31.1 and ASME Code, Class 2 and 3 piping. The applicant used the total number of design thermal cycles listed in LRA Table 4.3.1-1 to estimate the maximum number of thermal cycles for 40 years of plant operation. The applicant then multiplied the 40-year number by 1.5 to estimate the maximum number of cycles for 60 years of plant operation. The applicant's evaluation applied to both the RCPB piping and the non-RCPB piping. The staff concludes that the applicant performed a conservative estimate of the maximum number of full-range thermal cycles because most of the transients listed in LRA Table 4.3.1-1 do not result in full-range thermal bending stresses at the maximum allowable ASA B31.1 thermal expansion stress range. Therefore, the staff finds that the applicant performed an acceptable evaluation to demonstrate that the piping analyses remain valid for the period of extended operation.

requirements are therefore imposed by the SRP-LR and do not depend on the individual plant licensing basis.

The applicant further stated that the staff assessed the impact of reactor water environment on fatigue life at high-fatigue usage locations and presented the results in NUREG/CR-6260, "Application of NUREG/CR-5999 Interim Fatigue Curves to Selected Nuclear Power Plant Components," dated March 1995. To comply with the requirements of GSI-190, OCGS would be required to perform plant-specific calculations for the locations identified in NUREG/CR-6260 for the older vintage BWR plants. For license renewal, plant-specific calculations have been performed for the following locations identified in NUREG/CR 6260 for older vintage BWR:

- reactor vessel (lower head to shell transition),
- feedwater nozzle ~~recirculation system (residual heat removal (RHR) return line tee or the shutdown cooling return line tee at OCGS and the RPV inlet and outlet nozzles),~~
- ~~core spray~~ system (nozzle and safe end),
- RHR line (tapered ~~transition~~); OCGS does not have an RHR system (location is bounded by the isolation condenser return ~~line tee~~), and
- limiting Class 1 location in a feedwater line

230) delete text

230) recirculation system (residual heat removal (RHR) return line tee, or the shutdown cooling return line tee at OCGS, and the RPV inlet and outlet nozzles),

For each location, detailed environmental fatigue calculations were performed using the appropriate environmental factor (F_{en}) relationships from NUREG/CR 6583, "Effects of LWR Coolant Environments on Fatigue Design Curves of Carbon and Low-Alloy Steel," dated February 1998, for carbon and low-alloy steels and from NUREG/CR 5704, "Effects of LWR Coolant Environment on Fatigue Design Curves of Austenitic Stainless Steels," dated April 1999, for stainless steels, as appropriate for the material at each of the above locations.

4.3.4.2 Staff Evaluation

The applicant indicated that the Metal Fatigue of Reactor Coolant Pressure Boundary Program will be enhanced before the period of extended operation to assure that the design cycle limits are not exceeded. The applicant's program will track transients and cycles of critical reactor coolant system components that have explicit design transient cycles to assure that these components remain within their design basis. GSI-166, "Adequacy of the Fatigue Life of Metal Components," raised concerns regarding the conservatism of the fatigue curves used in the design of the RCS components. Although GSI-166 was resolved for the current 40-year design life of operating components, the staff identified GSI-190 to address license renewal. The staff closed GSI-190 in December, 1999, and concluded the following:

> The results of the probabilistic analyses, along with the sensitivity studies performed, the iterations with industry (NEI and EPRI), and the different approaches available to the licensees to manage the effects of aging, lead to the conclusion that no generic regulatory action is required, and that GSI-190 is closed. This conclusion is based primarily on the negligible calculated increases in core damage frequency in going from 40 to 60 year lives. However, the calculations supporting resolution of this issue, which included consideration of

AmerGen concluded that corrosion monitoring of the sand bed region of the drywell shell is bounding with respect to corrosion that may have occurred on the drywell embedded shell prior to 1992. After 1992 and through the period of extended operation, corrosion of the embedded shell has not been significant because of the mitigative measures implemented and the robust drywell corrosion AMP.

The staff understands AmerGen's technical reasons to support the applicant's view that the inaccessible portion of the drywell shell (i.e. embedded between the concrete floor inside, and concrete outside) is not likely to be subject to the same type of severe corrosion as experienced in the sand bed area. However, the experience of general corrosion in the liner plates embedded in concrete of a number of PWR and BWR containments suggests that certain irregularities during the construction (i.e. foreign objects or voids in the concrete) could trigger corrosion that is not arrested later by the concrete environment. This is particularly significant for the plates potentially subject to water seepage. The applicant's position that the uniformly reduced thickness used in the GE analysis compensates for any corrosion that may have occurred before the area was sealed in 1992 has some validity. The staff is still evaluating this item; therefore, this has been identified as OI 4.7.2-1.2.

231) UT data

(ii) A review of ~~Table 2~~ indicates that the UT measurements taken from inside the drywell after 1992 show a general increase in the metal thickness. In some cases, the average increase is as much as 40 mils in a 2-year timeframe. In general, it appears that the UT measurements taken after 1992 require proper calibration, considering the coatings on both sides of the drywell shell. The staff requested that the applicant address this issue.

In its response dated June 20, 2006, the applicant provided the following discussion of sensitivities involved with the UT measurement process and how they will be minimized in the future:

> UT Instrumentation Uncertainties. The UT instrumentation, which includes the transducer, cable and ultrasonic unit, will be calibrated to within approximately +/- 0.010 inches. Exelon Procedure (ER-AA-335-004) step 4.1.3 requires that he UT instruments must be checked within 2% of the calibration standard (block) prior to use. For the sand bed region, which is nominally 1" thick, a 1-inch thick calibration standard block is used. This results in checking the UT instrument to within 0.020" inches or +/- 0.010". UT instrumentation accuracy is verified under controlled conditions where UT thickness readings are performed on calibration blocks. The calibration blocks have been precisely machined to prescribed thicknesses, which are then verified by micrometer readings.
>
> Actual Drywell Surface Roughness and UT Probe Location Repeatability. Due to the corrosion, the outside surface of the Drywell Vessel is not smooth and uniform. The surface condition is indicative of general corrosion, which is rough with high and low points spaced very closely together. This profile was verified when the sand was removed in 1992. The UT Instrumentation probes are 7/16" in diameter and are dual element transducers (i.e. half transmits sound and the

In its response dated April 16, 2006, the applicant stated that the refueling seals at OCGS consist of stainless steel bellows. In the mid-to-late 1980s, GPU conducted extensive visual and NDE inspections to determine the source of water intrusion into the seismic gap between the drywell concrete shield wall and the drywell shell and its accumulation in the sand bed region. The inspections concluded that the refueling bellows (seals) were not the source of water leakage. The bellows were repeatedly tested using helium (external) and air (internal) without any indication of leakage. Furthermore, any minor leakage from the refueling bellows would be collected in a concrete trough below the bellows. The concrete trough is equipped with a drain line that would direct any leakage to the reactor building equipment drain tank and prevent it from entering the seismic gap. The drain line has been checked before refueling outages to confirm that it is not blocked. The only other seal is the gasket for the reactor cavity steel trough drain line. This gasket was replaced after the tests showed that it was leaking. However, the gasket leak was ruled out as the primary source of water observed in the sand bed drains because there is no clear leakage path to the seismic gap. Minor gasket leaks would be collected in the concrete trough below the gasket and would be removed by the drain line similar to leaks from the refueling bellows.

In addition, the applicant noted that additional visual and NDE (dye penetrant) inspections on the reactor cavity stainless steel liner had identified a significant number of cracks, some of which were throughwall cracks. Engineering analysis concluded that the cracks were most probably caused by mechanical impact or thermal fatigue, and not IGSCC. These cracks were determined to be the source of refueling water that passed through the seismic gap. To prevent leakage through the cracks, GPU installed an adhesive-type stainless steel tape to bridge any observed large cracks and subsequently applied a strippable coating. This repair greatly reduced leakage and was implemented every refueling outage while the reactor cavity was flooded.

The applicant noted that it has committed to monitor the sand bed region drains for water leakage. A review of plant documentation did not provide objective evidence that the commitment has been implemented since 1998. Issue Report No. 348545 was issued in accordance with the OGCS corrective action process to document the lapse in implementing the commitment and to reinforce strict compliance with commitment implementation in the future, including during the period of extended operation.

232) 27

The applicant also committed (Commitment No. ~~33~~) to performing augmented inspections of the drywell in accordance with ASME Code Section XI, Subsection IWE. These inspections consist of UT examinations of the upper region of the drywell and visual examinations of the protective coating on the exterior of the drywell shell in the sand bed region. UT measurements will supplement the visual inspection of the coating measurements from inside the drywell once before entering the period of operation and every 10 years thereafter during the period of extended operation.

The staff's review of the applicant's response determined that:

(1) The epoxy coating applied in the sand-bed region of the shell has a limited life and water leakage from the air gap has not been prevented. In view of these observations, the staff requested that the applicant provide a systematic program of examination of the coating

In response to item (2), the applicant asserts that the corrosion rate used to evaluate rebar corrosion is conservative and the rebar yield stress of 40 ksi will not be exceeded during the period of extended operation. The applicant stated:

> First, the estimated corrosion of 0.020 inches for the current term is based on carbon steel in a slightly corrosive environment. The rebar is not subject to a corrosive environment as shown by concrete test samples. The assumed 0.010 inches for the period of extended operation is also conservative because there is no evidence of ongoing corrosion based on the existing monitoring activities in accordance with the Structures Monitoring Program (B.1.31).
>
> Secondly, rebar embedded in concrete is passivated by the alkalinity of the concrete mix by forming a protective hydrous ferrous oxide on their exposed surfaces. Even when portions of the reinforcements are exposed via cracks in the concrete, which acts as a passageway for environmental contact, the rate of corrosion is generally low due to the barrier effect of the pre-existing oxide film. The limited corrosivity under these conditions within a crack annulus is a product of the alkaline leachant from the concrete and the slow diffusion of oxygen within the annulus and through the protective oxide layer. This type of condition would promote a weak electrochemical corrosion cell, precluding dissolution of the protective film.
>
> Thirdly, the cause of corrosion was attributed to water leakage from the reactor cavity and equipment pool during refueling outages. The source of leakage has been investigated extensively and determined to be due to cracks in the stainless liner of the wall. The cracks are now sealed with a strippable coating prior to filling the reactor cavity and the equipment pool with water. The strippable coating has been found effective in minimizing water leakage. AmerGen has made a commitment (see AmerGen letter to NRC dated April 4, 2006) to continue applying the strippable coating during the period of extended operation.
>
> Fourth, the water used to fill the reactor cavity and the equipment pool is treated in accordance with BWRVIP-130 guidance as described in Oyster Creek Water Chemistry aging management program (B.1.02). The treated water maintains an environment that is non-aggressive consistent with concrete sample test results described in item (1) above. Also as discussed in NUREG-1801 Rev. 1, and [Electric Power Research Institute] Report #1002950, corrosion of embedded steel in concrete is not significant if the steel is not exposed to an aggressive environment defined as concrete pH~~<1 1.5~~ or chlorides >500 ppm. Oyster Creek concrete samples test, described in response to RAI 4.7.3-2 (1) above, indicate that concrete ~~pH=1 1.6,~~ and chlorides=10 ppm. Thus the reinforcement is exposed to a non-aggressive environment and the corrosion is expected to be insignificant.

233) 11.5

233) pH<11.6

On the technical basis described above, the applicant asserted that the estimated total corrosion of 0.020 inch all around the rebar diameter and the assumed corrosion of 0.010 inch during the

APPENDIX A

COMMITMENTS FOR LICENSE RENEWAL OF OCGS

During the review of the Oyster Creek Generating Station (OCGS) license renewal application (LRA) by the staff of the U.S. Nuclear Regulatory Commission (NRC) (the staff), AmerGen Energy Company, LLC (the applicant) made commitments related to aging management programs (AMPs) to manage the aging effects of structures and components (SCs) ~~prior to the period of extended operation~~. The following table lists these commitments along with the implementation schedules and the sources for each commitment.

234) delete text

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
1) ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD	Existing program is credited. For the isolation condensers this program also includes enhancement activities identified in NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," lines IV.C1-5 and IV.C1-6. These enhancement activities consist of: (1) Temperature and radioactivity monitoring of the shell-side (cooling) water, which will be implemented prior to the period of extended operation. (2) Eddy current testing of the tubes, with inspection (VT or UT) of the tubesheet and channel head, which will be performed during the first ten years of the extended period of operation.	A.1.1	Prior to the period of extended operation.	Section B.1.1
2) Water Chemistry	Existing program is credited.	A.1.2	Ongoing	Section B.1.2
3) Reactor Head Closure Studs	Existing program is credited.	A.1.3	Ongoing	Section B.1.3
4) BWR Vessel ID Attachment Welds	Existing program is credited.	A.1.4	Ongoing	Section B.1.4
5) BWR Feedwater Nozzle	Existing program is credited. The Oyster Creek Feedwater Nozzle Program will be enhanced to implement the recommendations of the BWR Owners Group Licensing Topical Report General Electric (GE) NE-523-A71-0594-A, Revision 1.	A.1.5	Prior to the period of extended operation.	Section B.1.5 ~~Letter 2130-06-20291 RAI 3.1.1-4~~

235) Letter 2130-06-20354

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
6) BWR Control Rod Drive Return Line Nozzle	Existing program is credited.	A.1.6	Ongoing	Section B.1.6
7) BWR Stress Corrosion Cracking	Existing program is credited. The program will be enhanced to add the following requirement to the Line Specifications for all applicable license renewal systems: "All new and replacement SS materials be low-carbon grades of SS with carbon content limited to 0.035 wt. % maximum and ferrite content limited to 7.5% minimum."	A.1.7	Prior to the period of extended operation 236) Letter 2130-06-20354	Section B.1.7 ~~NRC Audit AMP 197~~
8) BWR Penetrations	Existing program is credited.	A.1.8	Ongoing	Section B.1.8
9) BWR Vessel Internals	Existing program is credited. The program will be enhanced to include: (1) Inspection of the steam dryer in accordance with BWRVIP-139. (2) Inspection of the top guide as recommended in NUREG-1801. (3) Rolling of the CRD stub tubes as a permanent repair, once the NRC approves the ASME code case (Code Case N-730). If Code Case N-730 is not approved, Oyster Creek will develop a permanent ASME code repair plan. This permanent ASME code repair could be performed in accordance with BWRVIP-58-A, which has	A.1.9	Prior to the period of extended operation	Section B.1.9 ~~Letter 2130-06-20291 RAI B.1.9-3~~ 237) Letter 2130-06-20354

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
	been approved by the NRC, or an alternate ASME code repair plan that would be submitted for prior NRC approval. If it is determined that the repair plan needs prior NRC approval, Oyster Creek will submit the repair plan two years before entering the period of extended operation. After the implementation of an approved permanent roll repair, if there is a leak in a CRD stub tube, Oyster Creek will weld repair any leaking CRD stub tubes during the extended period of operation by implementing a permanent NRC approved ASME Code repair for leaking stub tubes that cannot be made leak tight using a roll expansion method, prior to restarting the plant. (4) Oyster Creek will revise its Reactor internals program to also manage the aging effect of loss of material due to the aging mechanisms of pitting and crevice corrosion for Reactor Internals. (5) Oyster Creek will comply with all the applicable requirements that will be specified in the staff's final safety evaluations (SEs) of the BWRVIP-76 and BWRVIP-104 reports, and that it will complete all the license renewal action items in the final SE applicable to Oyster Creek, when they are issued. (6) The Reactor Internals program will be enhanced to include inspection for loss of material for the feedwater		238) delete text	~~Letter 2130-06-20291 RAI 3.1.2.1-2~~ ~~Letter 2130-06-20291 RAI B.1.9-2~~ ~~Letter 2130-06-20291 RAI B.1.9-8~~

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
	sparger, steam separator, RPV surveillance capsule holders and baffle plate. (7) The Reactor Internals Program will be enhanced to include and document the condition of the CRD and Feedwater Nozzle thermal sleeves to ensure future inspections look for thermal sleeve bypass flow. (8) AmerGen/Exelon is committed to following BWRVIP guidelines: • Oyster Creek will inform the (NRC) staff of any decision to not fully implement a BWRVIP guidelines approved by the staff within 45 days of the report • Oyster Creek will notify the staff if changes are made to the RPV and its internals' programs that affect the implementation of the BWRVIP report. • Oyster Creek will submit any deviation from the existing flaw evaluation guidelines that are specified in the BWRVIP report.		239) delete text	~~NRC Audit AMP-055~~ ~~Letter 2130-06-20291 RAI B.1.9-1~~
10) Thermal Aging and Neutron Irradiation Embrittlement of	Program is new. The program will include a component specific evaluation of the loss of fracture toughness in accordance with the criteria specified in NUREG-1801, XI.M13. At least one year prior to the period of extended operation, the following	A.1.10	Prior to the period of extended operation	Section B.1.10 240) Letter 2130-06-20358

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
Cast Austenitic Stainless Steel (CASS) 241) Corrosion	information will be submitted to the NRC: 1) the type and composition of CASS reactor internal components within the scope of license renewal; and 2) the results of evaluations performed to determine susceptibility to thermal aging and neutron irradiation embrittlement. For those components where loss of fracture toughness may affect the intended function of the component, a supplemental inspection will be performed. This inspection will ensure the integrity of the CASS components exposed to the high temperature and neutron fluence present in the reactor environment.			
11) Flow-Accelerated	Existing program is credited.	A.1.11	Ongoing	Section B.1.11
12) Bolting Integrity	Existing program is credited. Program site implementing documents will be enhanced to include reference to EPRI TR-104213, Bolted Joint Maintenance & Application Guide, December 1995.	A.1.12	Prior to the period of extended operation	Section B.1.12 ~~NRC Audit AMP-361~~

242) Letter 2130-06-20354

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
18) BWR Reactor Water Cleanup System	Existing program is credited. Based on Generic Letter 89-10 containment isolation valve upgrades/enhancements, an effective Hydrogen Water Chemistry program, and the complete lack of cracking found during any of the RWCU piping weld inspections performed under Generic Letter 88-01, all inspection requirements for the portion of the RWCU System outboard of the second containment isolation valves have been eliminated.	A.1.18	Ongoing	Section B.1.18
19) Fire Protection	Existing program is credited. The program will be enhanced to include: (1) Specific fuel supply inspection criteria for fire pumps during tests. (2) Inspection of external surfaces of the halon and carbon dioxide fire suppression systems. (3) Additional inspection criteria for degradation of fire barrier walls, ceilings, and floors. (4) Clearance inspection of in-scope fire doors every two years.	A.1.19	Prior to the period of extended operation	Section B.1.19 ~~NRC Audit~~ ~~AMP 105~~ ~~LRCR 219~~

243) Letter 2130-06-20354

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20) Fire Water System	Existing program is credited. The program will be enhanced to include: (1) Sprinkler head testing in accordance with NFPA 25, "Inspection, Testing and Maintenance of Water- Based Fire Protection Systems." Samples will be submitted to a testing laboratory prior to being in service 50 years. This testing will be repeated at intervals not exceeding 10 years. (2) Water sampling for the presence of MIC at an interval not to exceed 5 years. (3) Periodic non-intrusive wall thickness measurements of selected portions of the fire water system at an interval not to exceed every 10 years. (4) Visual inspection of the redundant fire water storage tank heater during tank internal inspections.	A.1.20	Prior to the period of extended operation	Section B.1.20
21) Aboveground Outdoor Tanks	Program is new. The program will manage the corrosion of outdoor carbon steel and aluminum tanks. The program credits the application of paint, sealant, and coatings as a corrosion preventive measure and performs periodic visual inspections to monitor degradation of the paint, sealant, and coatings and any resulting metal degradation of carbon steel or of the unpainted aluminum tank. Bottom UTs are performed on tank bottoms supported by soil or concrete.	A.1.21	Prior to the period of extended operation	Section B.1.21 ~~LRCR-231~~ 244) Letter 2130-06-20354

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22) Fuel Oil Chemistry	Existing program is credited. The program will be enhanced to include: (1) Routine analysis for particulate contamination using modified ASTM D 2276-00 Method A on fuel oil samples from the Emergency Diesel Generator Fuel Storage Tank, the Fire Pond Diesel Fuel Tanks, and the Main Fuel Oil Tank. (2) Analysis for particulate contamination using modified ASTM D 2276-00 Method A on new fuel oil. (3) Analysis for water and sediment using ASTM D 2709-96 for Fire Pond Diesel Fuel Tank bottom samples. (4) Analysis for bacteria to verify the effectiveness of biocide addition in the Emergency Diesel Generator Fuel Storage Tank, the Fire Pond Diesel Fuel Tanks, and the Main Fuel Oil Tank. (5) Periodic draining, cleaning, and inspection of the Fire Pond Diesel Fuel Tanks and the Main Fuel Oil Tank. Inspection activities will include the use of ultrasonic techniques for determining tank bottom thicknesses should there be any evidence of corrosion or pitting. (6) One time internal inspection of the Emergency Diesel Generator fuel oil day tanks prior to the period of extended operation to confirm the absence of aging effects.	A.1.22	Prior to the period of extended operation	Section B.1.22 ~~NRC Audit~~ ~~AMP-192~~ ~~LRCR-256~~

245) Letter 2130-06-20354

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23) Reactor Vessel Surveillance	Existing program is credited. The program will be enhanced to implement BWRVIP-116 "BWR Vessel and Internals Project Integrated Surveillance Program (ISP) Implementation for License Renewal," including the conditions specified by the NRC in its Safety Evaluation Dated February 24, 2006. ~~if approved by the NRC. If BWRVIP-116 is not approved, Exelon will provide a plant-specific surveillance plan for the license renewal period in accordance with 10 CFR 50, Appendices G and H prior to entering the period of extended operation.~~ ~~BWRVIP ISP as specified in BWRVIP-116, "BWR Vessel Internals Project Integrated Surveillance Program Implementation for License Renewal" and approved by the staff will be implemented. If the ISP is not approved two years prior to the commencement of the extended period of operation, a plant-specific surveillance program for Oyster Creek will be submitted.~~ If the Oyster Creek standby capsule is removed from the RPV without the intent to test it, the capsule will be stored in a manner that maintains it in a condition which would permit its future use, including during the period of extended operation, if necessary.	A.1.23	Prior to the period of extended operation	Section B.1.23 ~~Letter 2130-06-20291 RAI B.1.23-1~~ ~~Letter 2130-06-20291 RAI B.1.23-2~~

246) delete text

247) Letter 2130-06-20358

248) delete text

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24) One-Time Inspection	Program is new. The One-Time Inspection program will provide reasonable assurance that an aging effect is not occurring, or that the aging effect is occurring slowly enough to not affect the component or structure intended function during the period of extended operation, and therefore will not require additional aging management. This program will be used for the following: (1) To confirm crack initiation and growth due to stress corrosion cracking (SCC), intergranular stress corrosion cracking (IGSCC), or thermal and mechanical loading is not occurring in Class 1 piping less than four-inch nominal pipe size (NPS) exposed to reactor coolant. Inspections will include UT examination of 10% of the total small bore Class I butt welds and destructive or non- destructive examination of a single small bore Class I socket welded connection. (2) To confirm the effectiveness of the Water Chemistry program to manage the loss of material and crack initiation and growth aging effects. Included in the scope of this activity, a one-time UT inspection of the "B" Isolation Condenser shell below the waterline will be conducted looking for pitting corrosion. (3) To confirm the effectiveness of the Closed Cycle Cooling Water System program to manage the loss of material aging effect. (4) To confirm the effectiveness of the Fuel Oil Chemistry	A.1.24	Prior to the period of extended operation 250) Letter 2130-06-20354 Perform prior to the period of extended operation. Perform prior to the period of extended operation. 251) delete text	Section B.1.24 ~~NRC Audit AMP 265 2130-06-20328 LRCR-276~~ ~~NRC Region I Inspection Item 94 RAI 3.1.1-1 LRCR-294~~

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	program and Lubricating Oil Monitoring Activities program to manage the loss of material aging effect. (5) To confirm loss of material in stainless steel piping, piping components, and piping elements is insignificant in an intermittent condensation (internal) environment. (6) To confirm loss of material in steel piping, piping components, and piping elements is insignificant in an indoor air (internal) environment. (7) To confirm loss of material is insignificant for nonsafety related (NSR) piping, piping components, and piping elements of vents and drains, floor and equipment drains, and other systems and components that could contain a fluid, and, are in scope for 10CFR54.4(a)(2) for spatial interaction. The scope of the program consists of only those systems not covered by other aging management activities. (8) Two stainless steel pipe sections in a stagnant or low flow area in the Reactor Water Cleanup System, and two stainless steel pipe sections in a stagnant or low flow area in the Isolation Condenser System will be included in the one-time inspection samples for stress corrosion cracking.		Incorporate into program prior to period of extended operation	252) delete text ~~NRC Audit~~ ~~AMP 265~~ ~~LRCR 259~~

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25) Selective Leaching of Materials	Program is new. The Selective Leaching of Materials Program will consist of inspections of a representative selection of components of the different susceptible materials to determine if loss of material due to selective leaching is occurring. Visual inspections will be consistent with ASME Section XI VT-1 visual inspection requirements and supplemented by hardness tests and other examinations of the selected set of components. If selective leaching is found, the condition will be evaluated to determine the need to expand inspections.	A.1.25	Prior to the period of extended operation.	Section B.1.25
26) Buried Piping Inspection	Existing program is credited. The program will be enhanced to include: (1) Inspection of buried piping within ten years of entering the period of extended operation, unless an opportunistic inspection occurs within this ten year period. The inspections will include at least one carbon steel, one aluminum and one cast iron pipe or component. In addition, for each of these materials, the locations selected for inspection will include at least one location where the pipe or component has not been previously replaced or recoated, if any such locations remain. (2) Fire protection components in the scope of the program. (3) Piping located inside the vault in the scope of the	A.1.26	Prior to the period of extended operation. 253) Letter 2130-06-20354	Section B.1.26 ~~NRC Audit AMR 349 (LRCR 275)~~

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	program. The vault is considered a manhole that is located between the reactor building and the exhaust tunnel.			
27) ASME Section XI, Subsection IWE	Existing program is credited. The program will be enhanced to include: (1) Ultrasonic Testing (UT) thickness measurements of the drywell shell in the sand bed region will be performed on a frequency of every 10 years , except that the initial inspection will occur prior to the period of extended operation and the subsequent inspection will occur two refueling outages after the initial inspection, to provide early confirmation that corrosion has been arrested. The UT measurements will be taken from the inside of the drywell at the same locations where UT measurements were performed in 1996. The inspection results will be compared to previous results. Statistically significant deviations from the 1992, 1994, and 1996 UT results will result in corrective actions that include the following: • Perform additional UT measurements to confirm the readings. • Notify NRC within 48 hours of confirmation of the identified condition. • Conduct visual inspection of the external surface in the sand bed region in areas where any	A.1.27	Prior to the period of extended operation. Prior to the period of extended operation, and then two refueling outages after that. Subsequent inspection frequency will be extablished as appropriate, not to exceed 10-year intervals.	Section B.1.27 ~~NRC Audit~~ ~~AMP-141~~ ~~AMP-209~~ ~~AMP-118~~ ~~AMP-072~~ ~~Letter 2130-06-20284~~ ~~Letter 2130-06-20328~~ ~~Letter 2130-06-20353~~ ~~NRC Region I Inspection Item 95~~

254) Letter 2130-06-20354
Letter 2130-06-20358

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	unexpected corrosion may be detected. • Perform engineering evaluation to assess the extent of condition and to determine if additional inspections are required to assure drywell integrity. • Perform operability determination and justification for operation until next inspection. These actions will be completed prior to restart from the associated outage. 255) A (2) ~~Consistent with current practice, a~~ strippable coating will be applied to the reactor cavity liner to prevent water intrusion into the gap between the drywell shield wall and the drywell shell during periods when the reactor cavity is flooded. (3) The reactor cavity seal leakage trough drains and the drywell sand bed region drains will be monitored for leakage. • The sand bed region drains will be monitored daily during refueling outages. If leakage is detected, procedures will be in place to determine the source of leakage and investigate and address the impact of leakage on the drywell shell, including verification of the condition of the drywell shell coating and moisture barrier (seal) in the sand bed region and performance of UT examinations of the shell in the upper regions.		Refueling outages prior to and during the period of extended operation Periodically Daily during refueling outages	

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256) indent text	UTs will also be performed on any areas in the sand bed region where visual inspection indicates the coating is damaged and corrosion has occurred. UT results will be evaluated per the existing program. Any degraded coating or moisture barrier will be repaired. These actions will be completed prior to exiting the associated outage. • The sand bed region drains will be monitored quarterly during the plant operating cycle. If leakage is identified, the source of water will be investigated, corrective actions taken or planned as appropriate. In addition, if leakage is detected, the following items will be performed during the next refueling outage: • Inspection of the drywell shell coating and moisture barrier (seal) in the affected bays in the sand bed region • UTs of the upper drywell region consistent with the existing program • UTs will be performed on any areas in the sand bed region where visual inspection indicates the coating is damaged and corrosion has occurred • UT results will be evaluated per the existing program.		Quarterly during non-outage periods	

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256) Indent text	Any degraded coating or moisture barrier will be repaired. (4) Prior to the period of extended operation, AmerGen will perform additional visual inspections of the epoxy coating that was applied to the exterior surface of the Drywell shell in the sand bed region, such that the coated surfaces in all 10 Drywell bays will have been inspected at least once. In addition, the Inservice Inspection (ISI) Program will be enhanced to require inspection of 100% of the epoxy coating every 10 years during the period of extended operation. These inspections will be performed in accordance with ASME Section XI, Subsection IWE. Performance of the inspections will be staggered such that at least three bays will be examined every other refueling outage. (5) A visual examination of the drywell shell in the drywell floor inspection access trenches will be performed to assure that the drywell shell remains intact. If degradation is identified, the drywell shell condition will be evaluated and corrective actions taken as necessary. In addition, one-time ultrasonic testing (UT) measurements will be taken to confirm the adequacy of the shell thickness in these areas. Beyond these examinations, these surfaces will either be inspected as part of the scope of the ASME Section XI, Subsection		Prior to the period of extended operation and every ten years during the period of extended operation. Prior to the period of extended operation.	

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	methodology with existing shell paint in place. The UT thickness measurements for these locally thinned areas may be taken from either inside the drywell or outside the drywell (sand bed region) to limit radiation dose to as low as reasonably achievable (ALARA).			
	(10) AmerGen will conduct UT thickness measurements on the 0.770 inch thick plate at the junction between the 0.770 inch thick and 1.154 inch thick plates, in the lower portion of the spherical region of the drywell shell. These measurements will be taken at one location using the 6"x6" grid. These measurements will be performed prior to the period of extended operation and repeated at the second refueling outage after the initial inspection, at the same location. If corrosion in this transition area is greater than areas monitored in the upper drywell, UT inspections in the transition area will be upper drywell (every other refueling outage).		Prior to the period of extended operation and two refueling outages later.	
	(11) AmerGen will conduct UT thickness measurements in the drywell shell "knuckle" area, on the 0.640 inch thick plate above the weld to the 2.625 inch thick plate. These measurements will be taken at one location using the 6"x6" grid. These measurements will be performed prior to the period of extended operation and repeated at the second refueling outage after the initial inspection, at the same location. If corrosion in this transition area is		Prior to the period of extended operation and two refueling outages later.	

257) performed on the same frequency as those in the

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31) Structures Monitoring Program	Existing program is credited. The program includes elements of the Masonry Wall Program and the RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plants Program. The Structures Monitoring Program will be enhanced to include: (1) Buildings, structural components and commodities that are not in scope of maintenance rule but have been determined to be in the scope of license renewal. These include miscellaneous platforms, flood and secondary containment doors, penetration seals, sump liners, structural seals, and anchors and embedment. (2) Component supports, other than those in scope of ASME XI, Subsection IWF. (3) Inspection of Oyster Creek external surfaces of mechanical components that are not covered by other programs, HVAC duct, damper housings, and HVAC closure bolting. The scope of this enhancement includes the Reactor Building Closed Cooling Water System carbon steel piping and piping elements located inside the Drywell since operating experience has shown an exposure to an environment conducive to corrosion during outages. Also, to confirm that there is no significant age related degradation occurring on the external carbon steel surfaces of the feedwater and main steam system located inside containment, one-time visual inspections of	A.1.31	Prior to the period of extended operation. 258) Letter 2130-06-20354	Section B.1.31 ~~RAI 2.5.2.19-1~~ ~~NRC Audit AMR-302~~ ~~Letter 2130-06-20299 RAIs 3.4-4, 3.4-5, 3.4-7, & 3.4-8~~

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	component supports other than those covered by ASME XI, Subsection IWF, for reduction or loss of isolation function. (10) The current inspection criteria will be revised to add loss of material, due to corrosion for steel components, and change in material properties, due to leaching of calcium hydroxide and aggressive chemical attack for reinforced concrete. Wooden piles and sheeting will be inspected for loss of material and change in material properties. (11) Periodic inspection of the Fire Pond Dam for loss of material and loss of form. (12) Inspection of Station Blackout System structures, structural components, and phase bus enclosure assemblies. (13) Inspection of Forked River Combustion Turbine power plant external surfaces of mechanical components that are not covered by other programs, HVAC duct, damper housings, and HVAC closure bolting. Inspection and acceptance criteria of the external surfaces will be the same as those specified for structural steel components and structural bolting. (14) The program will be enhanced to include inspection of Meteorological Tower Structures. Inspection and acceptance criteria will be the same as those specified for other structures in the scope of the program.		259) delete text	~~Letter 2130-05-20214 RAI 2.5.1-19-1~~ ~~Letter 2130-05-20214 RAI 2.5.1-19-1~~ ~~Letter 2130-05-20239 NRC Audit AMP-235~~

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	(15) The program will be enhanced to include inspection of exterior surfaces of piping and piping components associated with the Radio Communications system, located at the meteorological tower site, for loss of material due to corrosion. Inspection and acceptance criteria will be the same as those specified for other external surfaces of mechanical components. (16) The program will be enhanced to require visual inspection of external surfaces of mechanical steel components that are not covered by other programs for leakage from or onto external surfaces, worn, flaking, or oxide-coated surfaces, corrosion stains on thermal insulation, and protective coating degradation (cracking and flaking). (17) The program will be enhanced to require performing a baseline inspection of submerged water control structures prior to entering the period of extended operation. A second inspection will be performed six years after this baseline inspection and a third inspection eight years after the second inspection. After each inspection, an evaluation will be performed to determine if identified degradation warrant more frequent inspections or corrective actions.		260) delete text	~~Letter 2130-05-20239 NRC Audit AMP-235~~ ~~GALL Reconciliation Letter 2130-06-20293~~ ~~NRC Audit AMP-075~~
32) RG 1.127, Inspection of Water-	Existing program is credited. The program is part of the Structures Monitoring Program. The RG 1.127, Inspection of	A.1.32	Prior to the period of extended operation.	Section B.1.32

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Control Structures Associated with Nuclear Power Plants	Water-Control Structures Associated with Nuclear Power Plants Program will be enhanced to include: (1) Monitoring of submerged structural components and trash racks. (2) Periodic inspection of components submerged in salt water (Intake Structure and Canal, Dilution structure) and in the water of the fire pond dam. (3) Periodic inspection of the Fire Pond Dam for loss of material and loss of form. (4) Inspection of steel components for loss of material, due to corrosion. (5) Inspection of wooden piles and sheeting for loss of material and change in material properties. (6) Parameters monitored will be enhanced to include change in material properties, due to leaching of calcium hydroxide, and aggressive chemical attack. Submerged water control structures will be inspected under the Structural Monitoring Program as follows: A baseline inspection of submerged water control structures will be performed prior to entering the period of extended operation. A second inspection will be performed six years after this baseline inspection and a third inspection eight years after the second inspection. After each inspection, an evaluation will be performed to determine if identified degradation warrants more frequent inspection or corrective actions.		~~NRC Audit~~ ~~AMR 236~~ 261) Letter 2130-06-20354 ~~AMP 075~~ ~~AMP 077~~ 261) delete text	

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33) Protective Coating Monitoring and Maintenance Program	Existing program is credited. The Oyster Creek Protective Coating Monitoring and Maintenance Program provides for aging management of Service Level I coatings inside the primary containment and Service Level II coatings for the external drywell shell in the area of the sand bed region. The program will be enhanced to include: (1) The inspection of Service Level I and Service Level II protective coatings that are credited for mitigating corrosion on interior surfaces of the Torus shell and vent system, and, on exterior surfaces of the Drywell shell in the area of the sandbed region, will be consistent with ASME Section XI, Subsection IWE requirements. (2) Additional visual inspections of the epoxy coating that was applied to the exterior surface of the drywell shell in the sand bed region, such that the coated surfaces in all 10 drywell bays will have been inspected at least once prior to entering the period of extended operation. (3) The inspection of 100% of the sandbed region epoxy coating every 10 years during the period of extended operation. Inspections will be staggered such that at least three bays will be examined every other refueling outage. (4) The inspection of all 20 torus bays at a frequency of every other refueling outage for the current coating system. Should the current coating system be replaced, the inspection frequency and scope will be re-evaluated.	A.1.33	Prior to the period of extended operation. ~~NRC Audit~~ ~~AMP 071~~ ~~AMP 072~~ 262) Letter 2130-06-20354	Section B.1.33

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36) Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Program is new. The program manages the aging of inaccessible medium-voltage cables (2.4 kV, 4.16 kV, 13.8 kV and 34.5 kV) that feed equipment performing license renewal intended functions. These cables may at times be exposed to moisture and are subjected to system voltage for more than 25% of the time. Manholes, conduits and sumps associated with these cables will be inspected for water collection every 2 years and drained as required. In addition, the cable circuits will be tested using a proven test for detecting deterioration of the insulation system due to wetting, such as power factor or partial discharge, as described in EPRI TR-103834-P1-2, or other testing that is state of- the-art at the time the test is performed. The cable circuits will be tested at an initial frequency of six years, after which the frequency will be evaluated and adjusted, based on test results; the period between tests shall not exceed 10 years. Results of cable tests will be trended. Trending will occur at the same frequency as cable testing. Inclusion of the 13.8 kV system circuits in this program reflects the scope expansion of the Station Blackout System electrical commodities. Inclusion of the 34.5 kV system circuits in this program reflects the scope enhancement for reconciliation of this aging management program from the draft January 2005 GALL to the approved September 2005 GALL.	A.1.36	Prior to the period of extended operation. 263) Letter 2130-06-20354 263) Delete text	Section B.1.36 ~~NRC Audit~~ ~~AMP-338~~ ~~AMP-224~~ ~~AMR-325~~ ~~AMR-341~~ ~~RAI 2.5.1-19~~ ~~GALL Reconciliation Letter 2.130-06-20293~~ ~~Region I Inspection Item 81~~

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37) Periodic Testing of Containment Spray Nozzles	Existing plant specific program is credited. Carbon steel piping upstream of the drywell and torus spray nozzles is subject to possible general corrosion. The periodic flow tests of drywell and torus spray nozzles address a concern that rust from the possible general corrosion may plug the spray nozzles. These periodic tests verify that the drywell and torus spray nozzles are free from plugging that could result from corrosion product buildup from upstream sources.	A.2.1	Ongoing	Section B.2.1
38) Lubricating Oil Monitoring Activities	Existing plant specific program is credited. The program manages loss of material, cracking, and fouling in lubricating oil heat exchangers, systems, and components in the scope of license renewal by monitoring physical and chemical properties in lubricating oil. Sampling, testing, and monitoring verify lubricating oil properties. Oil analysis permits identification of specific wear mechanisms, contamination, and oil degradation within operating machinery, and components of systems in scope for license renewal. The program will be enhanced to add surveillance for verification of flow through the Fire Protection System diesel driven pump gearbox lubricating oil cooler. AmerGen will enhance Oyster Creek Program B.2.2 to include sampling and measurement of flash point of diesel engine lubricating oil to detect contamination of lubricating oil by fuel oil.	A.2.2	Prior to the period of extended operation.	Section B.2.2 ~~NRC Audit AMP 360 Letter 2130-06-20293~~

264) Letter 2130-06-20354

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	are condition monitoring examinations intended to assure that existing environmental conditions are not causing material degradation that could result in a loss of system intended functions.			
42) Wooden Utility Pole Program	Plant specific program is new. The program is used to manage loss of material and change of material properties for wooden utility poles in or near the Oyster Creek Substation that provide structural support for the conductors connecting the Offsite Power System and the 480/208/120V Utility (JCP&L) Non-Vital Power System to the Oyster Creek plant. The program consists of inspection on a 10-year interval by a qualified inspector. The wooden poles are inspected for loss of material due to ant, insect, and moisture damage and for change in material properties due to moisture damage.	A.2.6	Prior to the period of extended operation.	Section B.2.6
43) Periodic Monitoring of Combustion Turbine Power Plant - Electrical	A new plant specific program is credited. The program will be used in conjunction with the existing Structures Monitoring Program, the new Inaccessible Medium Voltage Cables Not Subject to 10CFR50.49 Environmental Qualification Requirements program and the new Electrical Cable Connections Not Subject to 10CFR 50.49 Environmental Qualification Requirements program to manage aging effects for the electrical commodities that support FRCT operation. The Program consists of visual inspections of accessible electrical	A.1.37	Prior to the period of extended operation. 265) delete text	Section B.1.37 ~~RAI 2.5.1-19-1~~ ~~Letter 2130-06-20345~~ ~~RAI 3.6.2~~ ~~Supplement~~

265) Letter 2130-06-20354

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ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
	cables and connections exposed in enclosures, pits, manholes and pipe trench; visual inspection for water collection in manholes, pits, and trenches, located on the FRCT site, for inaccessible medium voltage cables; and visual inspection of accessible phase bus and connections and phase bus insulators/supports; and visual inspection of high voltage insulators above 34.5 kV for salt build-up. The new program will be performed on a twice per year frequency for high voltage insulator inspections; on a 2- year interval for manhole, pit and trench inspections, on a 5-year frequency for phase bus inspections, and on a 10-year interval for cable and connection inspections.		266) delete text	~~Letter 2130-06-20327 RAI 3.6.2.2.5~~
44) Metal Fatigue of Reactor Coolant Pressure Boundary	Existing program is credited. The program will be enhanced to use the EPRI-licensed FatiguePro cycle counting and fatigue usage factor tracking computer program. The computer program provides for calculation of stress cycles and fatigue usage factors from operating cycles, automated counting of fatigue stress cycles and automated calculation and tracking of fatigue cumulative usage factors. The program will also be enhanced to provide for calculating and tracking of the cumulative usage factors for bounding locations for the reactor pressure vessel, Class I piping, the torus, torus vents, torus attached piping and penetrations, and the isolation condenser.	A.3.1	Prior to the period of extended operation.	Section B.3.1

267) Letter 2130-06-20354

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
	AmerGen will revise the Oyster Creek UFSAR to update the current licensing basis to reflect that a cumulative usage factor of 1.0 will be used in fatigue analysis for reactor coolant pressure boundary components, as endorsed by the NRC in 10 CFR 50.55a. Certification by a Professional Engineer of the reactor vessel design specification and design reports prepared for the fatigue activities associated with the Oyster Creek License Renewal Application will be performed.		Prior to the period of extended operation. 268) delete text Prior to the period of extended operation.	~~Letter 2130-06-20238~~ ~~Letter 2130-06-20328~~
45) Environmental Qualification (EQ) Program	Existing program is credited. EQ components that cannot be qualified for 60-years will be replaced before the end of their qualified life.	A.3.2	Ongoing	Section B.3.2
46) New P-T curves	Revised pressure-temperature (P-T) limits for a 60-year licensed operating life have been prepared and will be submitted to the NRC for approval.	A.4.1.3	Prior to the period of extended operation.	Section 4.2.3
47) Circumferential Weld Exam Relief	Apply for extension Reactor Vessel Circumferential Weld Examination Relief for 60-year operation	A.4.1.4	Prior to the period of extended operation.	Section 4.2.4
48) Axial weld Exam Relief	Apply for extension Reactor Vessel Axial Weld Examination Relief for 60-year operation	A.4.1.5	Prior to the period of extended operation.	Section 4.2.5

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
49) Measure Drywell wall thickness	Drywell wall thickness will be monitored to ensure minimum wall thickness is maintained. The ASME Section XI, Subsection IWE Program, will manage the aging effects.	A.4.5.2	Ongoing	Section 4.7.2
50) Fluence Methodology	The NRC has issued a SER for RAMA approving RAMA for reactor vessel fluence calculations. Oyster Creek will comply with the applicable requirements of the SER.	A.4.1.1	Prior to the period of extended operation.	Section 4.2.1
51) Bolting Integrity - FRCT	The Bolting Integrity - FRCT Program is a new program that provides for condition monitoring of bolts and bolted joints within the scope of license renewal at the Forked River Combustion Turbine power plant. This program is based on the General Electric recommendations for proper bolting material selection, lubrication, preload application, installation and maintenance associated with the combustion turbine units and auxiliary systems. The program also includes periodic walkdown inspections for bolting degradation or bolted joint leakage at a frequency of at least once every four years. The program manages the loss of material and loss of preload aging effects. This new program will be implemented prior to entering the period of extended operation.	A.1.12A	Prior to the period of extended operation.	Section B.1.12A Letter 2130-05-20228 ~~RAI 2.5.1.19-1~~ 269) delete text
52) Closed-Cycle Cooling Water System - FRCT	The Closed-Cycle Cooling Water System – FRCT Program is a new program that manages aging of piping, piping components, piping elements and heat exchangers that are included in the scope of license renewal for loss of material and cracking, and	A.1.14A	Prior to the period of extended operation.	Section B.1.14A Letter 2130-05-20228

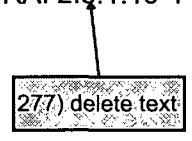
APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
	are exposed to a closed cooling water environment at the Forked River Combustion Turbine power plant. The Closed-Cycle Cooling Water System – FRCT Program relies on preventive measures to minimize corrosion by maintaining water chemistry control parameters and by performing system monitoring and maintenance inspection activities to confirm that the aging effects are adequately managed. Chemistry control, performance monitoring and inspection activities are based on industry-recognized guidelines of EPRI TR-107396, "Closed Cooling Water Chemistry Guidelines," for closed-cycle cooling water systems. Chemical control parameters will be monitored by annual water chemistry sampling. System operational monitoring activities will be performed at a frequency of at least once every six months. This new program will be implemented prior to entering the period of extended operation.			~~RAI 2.5.1.19-1~~ 270) delete text
53) Aboveground Steel Tanks - FRCT	The Above ground Steel Tanks - FRCT Program is a new program that will manage corrosion of aboveground outdoor steel tanks. Paint coating is a corrosion preventive measure, and periodic visual inspections will monitor degradation of the paint coating and any resulting metal degradation of tank external surfaces. The aboveground tanks external surfaces will be visually inspected for coating degradation by walkdown at	A.1.21A	Prior to the period of extended operation.	Section B.1.21A Letter 2130-05-20228 ~~RAI 2.5.1.19-1~~ 271) delete text

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
	least once every two years. The Main Fuel Oil tank bottom is in contact with concrete and soil, and is inaccessible for visual inspection. Therefore, the program includes periodic Non-destructive wall-thickness examinations of the Main Fuel Oil tank bottom to verify that significant corrosion is not occurring. This program, including the initial tank external paint inspections, will be implemented prior to the period of extended operation. The recommended UT inspection of the Main Fuel Oil tank bottom was performed in October 2000, so it is not necessary to perform this inspection again prior to entering the period of extended operation. Based on the results of the October 2000 inspections, and subsequent repairs to the tank floor, the tank was certified to be suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years from October 2000, before the next internal inspection would be necessary. Therefore, additional UT inspections will be performed prior to October 2020.			
54) Fuel Oil Chemistry – FRCT	The Fuel Oil Chemistry - FRCT Program is a new program that provides assurance that contaminants are maintained at acceptable levels in new and stored fuel oil for systems and components within the scope of ~~Licensing~~ Renewal. The Fuel	A.1.22A	Prior to the period of extended operation.	Section B.1.22A Letter 2130-05-20228

272) License

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	COMMITMENT	UFSAR SUPPLEMENT LOCATION (LRA APP. A)	ENHANCEMENT OR IMPLEMENTATION SCHEDULE	SOURCE
	Oil Storage Tank will be maintained by monitoring and controlling fuel oil contaminants in accordance with the guidelines of the American Society for Testing Materials (ASTM). Fuel oil sampling activities will be in accordance with ASTM D 4057 for multilevel and tank bottom sampling. Fuel oil will be periodically sampled and analyzed for particulate contamination in accordance with modified ASTM Standard D 2276 Method A or ASTM Standard D 6217, and, for the presence of water and sediment in accordance with ASTM Standard D 2709 or ASTM Standard D 1796. The Fuel Oil Storage Tank will be periodically drained of accumulated water and sediment and will be periodically drained, cleaned, and internally inspected. These activities effectively manage the effects of aging by providing reasonable assurance that potentially harmful contaminants are maintained at low concentrations. This new program will be implemented prior to entering the period of extended operation. The internal inspection of the Main Fuel Oil tank was performed in October 2000, so it is not necessary to perform this inspection again prior to entering the period of extended operation. Based on the results of the October 2000 inspections and repairs, the tank was certified to be suitable for the storage of number 2 fuel oil for a period of time not to exceed 20 years from October 2000, before the next			~~RAI 2.5.1.19-1~~ 273) delete text

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
	internal inspection would be necessary. Therefore, additional internal inspections of the tank floor are not necessary prior to entering the period of extended operation and will be performed prior to October 2020.			
55) One-Time Inspection - FRCT	The One-Time Inspection – FRCT program will provide measures to verify that an aging management program is not needed, confirms the effectiveness of existing activities, or determines that degradation is occurring which will require evaluation and corrective action. The program will be implemented prior to the period of extended operation. Inspection methods will include visual examination or volumetric examinations. Should aging effects be detected, the program will initiate actions to characterize the nature and extent of the aging effect and determines what subsequent monitoring is needed to ensure intended functions are maintained during the period of extended operation.	A.1.24A	Prior to the period of extended operation.	Section B.1.24A Letter 2130-05-20228 ~~RAI 2.5.1.19-1~~ 274) delete text
56) Selective Leaching of Materials -FRCT	The Selective Leaching of Materials - FRCT Program is a new program that will consist of inspections of components constructed of susceptible materials to determine if loss of material due to selective leaching is occurring. For the FRCT power plant, these are limited to copper alloy materials exposed to a closed cooling water environment. Onetime inspections will	A.1.25A	~~Prior to the period of extended operation.~~ 275) This new program will be implemented in the time period after January 2018 and prior to January 2028.	Section B.1.25A Letter 2130-05-20228 ~~RAI 2.5.1.19-1~~ 276) delete text

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
	consist of visual inspections supplemented by hardness tests. If selective leaching is found, the condition will be evaluated to determine the ability of the component to perform its intended function until the end of the period of extended operation and for the need to expand inspections. This new program will be implemented in the time period after January 2018 and prior to January 2028.			
57) Buried Piping Inspection – FRCT	The Buried Piping Inspection - FRCT Program is a new program that manages the external surface aging effects of loss of material for carbon steel piping and piping system components in a soil (external) environment. The program activities consist of preventive and condition-monitoring measures to manage the loss of material due to external corrosion for piping and piping system components in the scope of license renewal that are in a soil (external) environment. The program scope includes buried portions of glycol cooling water piping located at the Forked River Combustion Turbine station. External inspections of buried components will occur opportunistically when they are excavated during maintenance. Within 10 years prior to entering the period of extended operation, inspection of buried piping will be performed unless an opportunistic inspection occurs within this ten-year period.	A.1.26A	Prior to the period of extended operation.	Section B.1.26A Letter 2130-05-20228 ~~RAI 2.5.1.19-1~~ 

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
	Upon entering the period of extended operation, inspection of buried piping will again be performed within the next ten years, unless an opportunistic inspection occurs during this ten-year period. This program will be implemented prior to entering the period of extended operation.			
58) Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components- FRCT	The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components - FRCT Program is a new program that consists of visual inspections of the internal surfaces of steel piping, valve bodies, ductwork, filter housings, fan housings, damper housings, mufflers and heat exchanger shells in the scope of license renewal at the Forked River Combustion Turbine power plant that are not covered by other aging management programs. Internal inspections will be performed during scheduled maintenance activities when the surfaces are made accessible for visual inspection. The program includes visual inspections to assure that existing environmental conditions are not causing material degradation that could result in a loss of component intended functions. These inspections will be performed during the major combustion turbine inspection outages and will be performed on a frequency of at least once every 10 years. The initial inspections associated with this program will be performed at the next major inspection outage for each unit.	A.1.38	Inspection for CT Unit 1 will be performed by May 2014, and inspection for CT Unit 2 will be performed by November 2015.	Section B.1.38 Letter 2130-05-20228 ~~RAI 2.5.1.19-1~~ 278) delete text

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
	Based on an inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.			
59) Lubricating Oil Analysis Program – FRCT	The Lubricating Oil Analysis Program – FRCT is a new program that includes measures to verify the oil environment in mechanical equipment is maintained to the required quality. The Lubricating Oil Analysis Program – FRCT maintains oil systems contaminants (primarily water and particulates) within acceptable limits, thereby preserving an environment that is not conducive to loss of material, cracking, or reduction in heat transfer. Lubricating oil testing activities include sampling and analysis of lubricating oil for detrimental contaminants. The presence of water or particulates may also be indicative of inleakage and corrosion product buildup. The program will also include the measurement of flash point. This program is augmented by the One Time Inspection – FRCT (B.1.24A) program, to verify the effectiveness of the Lubricating Oil Analysis Program - FRCT. This new program will be implemented prior to the period of extended operation.	A.1.39	Prior to the period of extended operation	Section B.1.39 Letter 2130-05-20228 ~~RAI 2.5.1.19-1~~ ~~NRC Audit AMR 359~~

279) delete text

280) Letter 2130-06-20354

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
60) Periodic Inspection Program - FRCT	The Periodic Inspection Program - FRCT is a new program that will consist of periodic inspections of selected components to verify the integrity of the system and confirm the absence of identified aging effects. Inspections will be scheduled to coincide with major combustion turbine maintenance inspections, when the subject components are made accessible. These inspections will be performed on a frequency not to exceed once every 10 years. The purpose of the inspection is to determine if a specified aging effect is occurring. If the aging effect is occurring, an evaluation will be performed to determine the effect it will have on the ability of affected components to perform their intended functions for the period of extended operation, and appropriate corrective action is taken. Inspection methods may include visual examination, surface or volumetric examinations. When inspection results fail to meet established acceptance criteria, an evaluation will be conducted to identify actions or measures necessary to provide reasonable assurance that the component intended function is maintained during the period of extended operation. The initial inspections associated with this program will be performed at the next major inspection outage for each unit. Based on an inspection frequency of 10 years, the next inspection for CT Unit 1 will be performed by May 2014, and the next inspection for CT Unit 2 will be performed by November 2015.	A.2.5A	Inspection for CT Unit 1 will be performed by May 2014, and inspection for CT Unit 2 will be performed by November 2015.	Section B.2.5A Letter 2130-05-20228 ~~RAI 2.5.1.19-1~~ 281) delete text

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
61) Buried Piping and Tank Inspection – Met Tower Repeater Engine Fuel Supply	The Buried Piping and Tank Inspection – Met Tower Repeater Engine Fuel Supply Program is a new program that manages the external surface aging effects of loss of material for copper and carbon steel piping, and carbon steel tanks in a soil (external) environment. The program activities consist of preventive and condition-monitoring measures to manage the loss of material due to external corrosion for piping and tanks in the scope of license renewal that are in a soil (external) environment. The program scope includes buried portions of the Met Tower based radio communications system repeater backup engine generator fuel (propane) supply piping and the associated buried fuel supply tank, located at the Meteorological Tower. External inspections of buried components will occur opportunistically when they are excavated during maintenance. Within 10 years prior to entering the period of extended operation, inspection of buried piping will be performed unless an opportunistic inspection occurs within this ten-year period. Upon entering the period of extended operation, inspection of buried piping will again be performed within the next ten years, unless an opportunistic inspection occurs during this ten-year period. This program will be implemented prior to entering the period of extended operation.	A.1.26B	Prior to the period of extended operation	Section B.1.26B Letter 2130-05-20239 ~~RAI 2.5.1.15-1~~ 282) delete text

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
62)	AmerGen will commit to perform monitoring of any leakage from the spent fuel pool liner via the pool leak chase piping.		Prior to the period of extended operation 283) 328	GALL Reconciliation Letter 2130-06-20293
63)	AmerGen will replace the previously un-replaced, buried safety-related ESW piping prior to the period of extended operation.		Prior to the period of extended operation	Letter 2130-06-20~~288~~
64) Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program is a new program that will be used to manage the aging effects of metallic parts of non-EQ electrical cable connections within the scope of license renewal during the period of extended operation. A representative sample of non-EQ electrical cable connections will be selected for testing considering application (high, medium and low voltage), circuit loading and location, with respect to connection stressors. The type of test to be performed, i.e., thermography, is a proven test for detecting loose connections. A representative sample of non-EQ cable connections will be tested at least once every 10 years. This new program will be implemented prior to the period of extended operation.	A.1.40	Prior to the period of extended operation 284) Letter 2130-06-20354 284) delete text	Section B.1.40 ~~Letter 2130-06-20237 RAI 3.6.2.3.3~~ ~~Letter 2130-06-20345~~ ~~Region I Inspection Item 39~~

APPENDIX A: COMMITMENTS FOR LICENSE RENEWAL OF OCGS				
ITEM NUMBER	**COMMITMENT**	**UFSAR SUPPLEMENT LOCATION (LRA APP. A)**	**ENHANCEMENT OR IMPLEMENTATION SCHEDULE**	**SOURCE**
65) Corrective Action, Confirmation and Administrative Controls for Forked River Combustion Turbine activities	Prior to the period of extended operation, AmerGen will ensure that procedures are established to implement the program elements of Corrective Action, Confirmation, and Administrative Controls, as described in Sections A.0.5 and B.0.3 of Enclosure 1 of AmerGen letter 2130-06-20334, for the Forked River Combustion Turbine aging management activities.	A.0.5	Prior to the period of extended operation 285) delete text	B.0.3 ~~Supplement~~ Letter 2130-06-20334

APPENDIX B: CHRONOLOGY

This appendix contains a chronological listing of routine licensing correspondence between the U.S. Nuclear Regulatory Commission (NRC) staff and AmerGen Energy Company, LLC (AmerGen). This appendix also contains other correspondence regarding the staff's review of Oyster Creek Generating Station (OCGS) (under Docket No. 50-219).

APPENDIX B: CHRONOLOGY	
Date	**Subject**
August 10, 2004	Letter from J.A. Benjamin, AmerGen to the NRC, Requesting Exemption from the Requirements of 10CFR2.109(b) - Regarding Effect of Timely License Renewal Application (Accession No ML042250155)
December 22, 2004	Letter from P.S. Tam, NRC to AmerGen, Approving Request for Exemption from the Requirements of ~~Section~~ 286) Section 109(b) of 10 CFR Part 2, Regarding Effect of Timely License Renewal Application (Accession No ML042960164)
July 22, 2005	Letter from C.N. Swenson, AmerGen to the NRC, Submitting Application for Renewed Operating License No. DPR-16 (Accession No. ML053050477)
July 22, 2005	Letter from C.N. Swenson, AmerGen to the NRC, Submitting License Renewal Drawings to Support the Review of the Application for Renewed Operation License (Accession No. ML052200523)
July 22, 2005	Letter from C.N. Swenson, AmerGen to the NRC, Submitting License Renewal Drawings to Support the Review of the Application for Renewed Operation License (Accession No. ML052200509)
July 26, 2005	Letter from P.B. Cowan, AmerGen to D.J. Ashley, NRC, Submitting Additional Information to Support the Review of the Application for Renewed Operation License (Accession No. ML052200511)
July 26, 2005	Letter from AmerGen to the NRC, Submitting the Environmental Report - Operating License Renewal Stage, Appendices A-F (Accession No. ML052080193)
July 26, 2005	Letter from AmerGen to the NRC, Submitting the Environmental Report - Operating License Renewal Stage, Cover through Section 9 (Accession No. ML052080189)
July 26, 2005	Letter from AmerGen to the NRC, Submitting the AmerGen Application for License Renewal (Accession No. 052080185)

APPENDIX B: CHRONOLOGY	
Date	**Subject**
July 26, 2005	Letter from AmerGen to the NRC, Transmittal of Application for Renewed Operating License - Reformatted CD-ROM (Accession No. ML052080174)
July 28, 2005	NRC Press Release-05-107: NRC Announces Availability of License renewal Application for Oyster Creek (Accession No. ML052090318)
July 29, 2005	Letter from S.S. Lee, NRC to C.N. Swenson, AmerGen, Stating the Receipt and Availability of LRA for AmerGen (Accession No. ML052100022)
August 2, 2005	Letter from D.J. Ashley, NRC to J. Hufnagel, OCGS, Information for the Scoping Audit (Accession No. ML060740367)
August 3, 2005	In a memorandum (signed by J.H. Eads) to S.S. Lee, NRC, A Notice of Public Information Session for NRC to Describe its License Renewal Process was submitted (Accession No. ML052160042)
August 17, 2005	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC, Long Range Planning Question (Accession No. ML060740354)
August 17, 2005	NRC Press Release-I-05-043: Public Meeting August 24 in Lacey Township, NJ On License Renewal Application for Oyster Creek Nuclear Plant (Accession No. ML052290259)
August 18, 2005	Letter from D.J. Ashley, NRC to J. Hufnagel, OCGS, Long Range Planning Question (Accession No. ML060740508)
August 24, 2005	NRC Press Release-I-05-043: NRC Updates Public on License Renewal Process at Oyster Creek (Accession No. ML052360494)
September 8, 2005	Letter from AmerGen to the NRC, Transmittal of License Renewal Scoping and Screening Procedures (From CD-Rom) (Accession No. ML060790273)
September 9, 2005 287) Application →	Letter from P.T Kuo, NRC to C.N. Swenson, AmerGen, Regarding the Determination of Acceptability & Sufficiency for Docketing, Proposed Review Schedule, & Opportunity for Hearing regarding the ~~appliactions~~ from AmerGen for renewal of Operating License for AmerGen (Accession No 052520034)
September 12, 2005	Letter from R. Benson, OCGS to M.T. Masnik, NRC, Communicating Notice of September 13, 2005 Oyster Creek Community Advisory Panel Meeting (Accession No. ML060810075)

288) This ML number is not correct for this reference.

APPENDIX B: CHRONOLOGY	
Date	**Subject**
September 12, 2005	NRC Press Release-05-128: NRC Announces Opportunity for Hearing on Application to Renew Operating License for AmerGen (Accession No. ML052550182)
September 13, 2005	Letter from D.J. Ashley, NRC to J. Hufnagel, OCGS, Communication of Draft RAIs (Accession No. ML060740508)
September 16, 2005	Letter from P.T Kuo, NRC to C.N. Swenson, AmerGen, Communicating Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process for License Renewal for AmerGen (Accession No. ML052590296)
September 20, 2005	Letter from AmerGen to NRC, Transmittal of License Renewal Audit and Inspection Handbook (Accession No. ML052770239)
September 23, 2005	Letter from Brookhaven National Lab to the NRC, Communicating an Outline of the Audit and Review Plan for Plant Aging Management Reviews and Programs at AmerGen (Accession No. ML052690388)
September 28, 2005	In a memorandum (Signed by D.J. Ashley) to S.S. Lee, NRC, A Notice of Forthcoiming Exit Meeting with AmerGen on License Renewal Scoping and Screening Methodology Audit for AmerGen was communicated (Accession No. ML052720556)
September 28, 2005	Letter from D.J. Ashley, NRC to C.N. Swenson, AmerGen, Forwarding Request for Additional Information for the review of the AmerGen LRA (Accession No. ML052710157)
October 5, 2005	In a memorandum (signed by G V Cranston), to D.J. Ashley, NRC, The Audit and Review Plan for Plant Aging Management Reviews and Programs at AmerGen was forwarded (Accession No. ML052850300)
October 12, 2005	Letter from AmerGen to the NRC, Transmitting the OCGS 6 mile Vicinity Map, and OCGS Site Boundary (Accession No. ML052280187)
October 12, 2005	Letter from P.T Kuo, NRC to B. Obermeyer, Emporia State University, Response to Request for Comments Concerning the OCGS Application for Operating License Renewal (Accession No. ML052870572)
October 12, 2005	Letter from P.T Kuo, NRC to M. Gould, Nanticoke Lenni-Lenape Indians of New Jersey, Response to Request for Comments Concerning the OCGS Application for Operating License Renewal (Accession No. ML052870563)

APPENDIX B: CHRONOLOGY	
Date	**Subject**
October 12, 2005	Letter from P.T. Kuo, NRC to T. Francis, Delaware Tribe of Western OK, Response to Request for Comments Concerning the OCGS Application for Operating License Renewal (Accession No. ML052870571)
October 12, 2005	Letter from P.T Kuo, NRC to J. Brooks, Delaware Tribe of Indians ,Response to Request for Comments Concerning the OCGS Application for Operating License Renewal (Accession No. ML052870553)
October 12, 2005	Letter from P.T. Kuo to D.L. Klima, US Advisory Council on Historic Preservation, Regarding Oyster Creek License Renewal Review (Accession No. ML052870543)
October 12, 2005	Letter from P.T. Kuo to D. Guzzo, State of NJ, Historic Preservation Office, regarding Oyster Creek License Renewal Review (Accession No. ML052870531)
October 12, 2005	Letter from P.T. Kuo, NRC to R. Chicks, Stockbridge Munsee Community of Wisconsin, Response to Request for Comments Concerning the AmerGen Application for Operating License Renewal (Accession No. ML052900227)
October 12, 2005	Letter from C.N. Swenson, AmerGen to NRC, Response to NRC Request for Additional Information related to OCGS LRA (Accession No. ML052910091)
October 18, 2005	Letter from D.J. Ashley, NRC to J. Hufnagel, OCGS, Forwarding AMR Questions (Accession No. ML060740444)
October 20, 2005	Letter from D.J. Ashley, NRC to J. Hufnagel, OCGS, Forwarding More AMR Questions (Accession No. ML060740475)
October 24, 2005	Letter from K.E. LaGory, Argonne National Lab to W. Maher, OCGS, Forwarding OCGS Site Audit Docs 10-24 (Accession No. ML060800457)
October 26, 2005	Letter from D.J. Ashley, NRC to J. Hufnagel, OCGS, Forwarding Additional Information from the AMP/AMR Team Leader (Accession No. ML060740455)
October 31, 2005	Letter from D.J. Ashley, NRC to J. Hufnagel, OCGS, Forwarding AMR Questions for ~~the~~ OC (Accession No. ML060740441)
October 31, 2005	Letter from D.J. Ashley, NRC to J. Hufnagel, OCGS, OC Pre-Audit AMR Questions- Structures, LRA3.5 (Accession No. ML060740442)

289) delete text

APPENDIX B: CHRONOLOGY	
Date	**Subject**
February 9, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC Discussing Database Report - In Progress Q&As (Accession No. ML060760036)
February 10, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC Forwarding New RAI on Bolting B.1.12 (Accession No. ML060760038)
February 10, 2006	Letter from KC Chang, NRC to L.A. Lund, NRC, Discussing Audit and Review Plan for Plant Aging Management Programs and Reviews at OGCS (Accession No. ML060410649)
February 13, 2006	Letter from W. Maher, OCGS to M.T. Masnik, NRC Forwarding Draft SAMA RAI Clarification Response (Accession No. ML060810084)
February 17, 2006	Letter from G. Beck, OCGS to V.M. Rodriguez, NRC, Forwarding Status of Oyster Creek LRA Draft RAIs (Accession No. ML060750402)
February 23, 2006	Letter from AmerGen to NRC: Clarification write-up on the Press Article Discussion (Accession No. ML060750342)
February 24, 2006	Letter from K.E. LaGory, Argonne National Lab to W. Maher, OCGS, Discussing Permits file (Accession No. ML061070398)
February 24, 2006	In a memorandum (Signed by D.J. Ashley), the NRC Summarizes a January 26, 2006 Conference Call Between NRC and AmerGen concerning Draft Request for Additional Information, Pertaining to the AmerGen (Accession No. ML060580345)
February 27, 2006	Letter from G. Beck, OCGS to D.J. Ashley, NRC, Forwarding Oyster Creek License Renewal AMP-AMR Audit Questions - Set 1 (Accession No. ML060600122)
~~March 2, 2006~~	~~Letter from S.J. Collins, NRC to C.M. Crane, AmerGen, Forwarding of Annual AmerGen Assessment Letter (Accession No. ML060620130)~~
March 2, 2006	Letter from M.P. Gallagher, AmerGen to the NRC Forwarding Correction of Minor Errors in the AmerGen LRA (Accession No. ML060660177)
March 2, 2006	Letter from AmerGen to NRC, Transmittal of Determination of Cooling Tower Availability for AmerGen, Final Report (Accession No. ML060720130)

APPENDIX B: CHRONOLOGY	
Date	**Subject**
March 5, 2006	In a memorandum (Signed by M.T. Masnik) the NRC Summarizes a January 31, 2006 Conference Call with AmerGen to Discuss Requests for Additional Information Pertaining to NRC Staff's Review of the SAMA Analysis in the AmerGen LRA (Accession No. ML060670480)
March 8, 2006	Letter from G. Beck, OCGS, to D.J. Ashley, NRC, Forwarding of OC LRA - Ventilation PBD (Accession No. ML060790283)
March 8, 2006	Letter from G. Beck, OCGS to D.J. Ashley, NRC, Forwarding of Oyster Creek Program Basis Document B.2.04 Inspection of Ventilation Systems (Accession No. ML060690026)
March 8, 2006	Letter from M.P. Gallagher, AmerGen to the NRC, Forwarding AmerGen Response to NRC Request for Additional Information Regarding the Environmental License Renewal Review for AmerGen (Accession No. ML060720126)
March 9, 2006	Letter From J. Hufnagel, OCGS to D.J. Ashley, NRC Forwarding Oyster Creek, License Renewal AMP-AMR Audit Questions - Set 2 (Accession No. ML060690130)
March 10, 2006	Letter from D.J. Ashley, NRC to C.N. Swenson, AmerGen, Forwarding NRC Request for Additional Information for the review of the AmerGen LRA (Accession No. ML060550317)
March 10, 2006	Letter from D.J. Ashley, NRC to C.N. Swenson, AmerGen, Forwarding NRC Request for Additional Information for the Review of the AmerGen LRA (Accession No. ML060550452)
~~March 13, 2006~~	~~Letter from S.J. Collins, NRC to C.J. Connors, State of NJ Forwarding NRC Response to State of New Jersey Regarding Oyster Creek (Accession No. ML060720453)~~
March 14, 2006	Letter from D.J. Ashley, NRC to G. Beck, OCGS, Discussing Oyster Creek - Draft RAI-AMP (Accession No. ML060970494)
March 15, 2006	Letter from W. Maher, OCGS to M.T. Masnik, NRC Forwarding AmerGen to NRC: SAMA Clarification Response (Accession No. ML060810080)
March 15, 2006	Letter from M.P. Gallagher, AmerGen to the NRC Forwarding AmerGen Response to NRC Request for Additional Information Related to Severe Accident Management Alternatives (Accession No. ML060760379)

APPENDIX B: CHRONOLOGY	
Date	**Subject**
March 30, 2006	Letter from M.P. Gallagher, AmerGen, to the NRC, Forwarding Reconciliation for Oyster Creek License Renewal Application with September 2005 Revision 1 NUREG-1800 and NUREG-1801 (Accession No. ML060950408)
March 30, 2006	Letter from D.J. Ashley, NRC to C.N. Swenson, AmerGen, Forwarding NRC Request for Additional Information for the Review of the AmerGen LRA - Application Sections 3.2, 3.4, 4.7, and B.2 (Accession No. ML060890412)
March 30, 2006	Letter from D.J. Ashley, NRC to C.N. Swenson, AmerGen, Forwarding NRC Request for Additional Information for the Review of the AmerGen LRA - Application Sections 4.3 and 4.7 (Accession No. ML060890395)
March 30, 2006	Letter from D.J. Ashley, NRC to C.N. Swenson, AmerGen, Forwarding NRC Request for Additional Information for the Review of the AmerGen LRA - Application Sections 4.2 and 4.7 (Accession No. ML060890660)
March 31, 2006	Letter from K.E. Watkins, TransWare Enterprises to the NRC Forwarding Fluence Evaluation for Oyster Creek Reactor Pressure Vessel (Accession No. ML060830567)
~~March 31, 2006~~	~~Letter from P.B. Cowan, AmerGen to the NRC Forwarding Proposed Alternative Repair of Control rod Drive Housing Interface with Reactor Vessel - Draft Code Case - 730, "Roll Expansion of Class 1 Control Rod Drive Bottom Head Penetrations in BWRs, Section XI, Division 1" (Accession No. ML060970356)~~
March 31, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC, Forwarding Oyster Creek, License Renewal AMP-AMR Audit Questions AMP-359, AMP-360, and AMP-362 (Accession No. ML060930255)
April 1, 2006	Letter from NRC Chairman Nils Diaz to New Jersey Governor John S. Corzine: Independent Safety Review of Oyster Creek (Accession No. ML060580601)
~~April 3, 2006~~	~~Letter from K.R. Jury, AmerGen to the NRC, Forwarding 60 Day Response to NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power" (Accession No. ML060940024)~~
April 3, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC, Forwarding Oyster Creek License Renewal AMP-AMR Audit Questions AMP-072, 141, 209, 357, 164 (Accession No. ML060940146)

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APPENDIX B: CHRONOLOGY	
Date	**Subject**
April 12, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC Discussing AmerGen License Renewal AMP-AMR Audit Questions update to AMP Question AMP-141 (Accession No. ML061030419)
April 13, 2006	Letter from D.J. Ashley, NRC to J. Hufnagel, OCGS, Discussing Request to add to Database (Accession No. ML061510245)
April 17, 2006	Letter from J. ~~Hufnagle~~, OCGS to D.J. Ashley, NRC, Discussing the Audit Follow up Letter (Accession No. ML061510243)
April 17, 2006	Letter from M.P. Gallagher to the NRC, Forwarding AmerGen Responses to Action Items Associated with Plant License Renewal Audits (Accession No. ML061150320)
~~April 18, 2006~~	~~Letter from P.B. Cowan, AmerGen, to the NRC, Forwarding AmerGen Response to Request for Additional Information - Application to Use Weighting Factors for External Exposure (Accession No. ML061110339)~~
April 18, 2006	Letter from G. Beck, OCGS, to the NRC, Forwarding AmerGen Transmittal of 2130-06-20298 Response to RAI on 2.5.2 (Accession No. ML061510254)
April 18, 2006	Letter from G. Beck, OCGS, to the NRC, Forwarding AmerGen Transmittal of 2130-06-20298 Response to RAI on 2.4, 3.5 (Accession No. ML061510236)
April 18, 2006	Letter from G. Beck, OCGS, to the NRC, Forwarding AmerGen Transmittal of 2130-06-20298 Response to RAI on 3.1, & B.1-23 (Accession No. ML061510240)
April 18, 2006	Letter from M.P. Gallagher, AmerGen, to the NRC, Forwarding AmerGen Response to NRC Request for Additional Information dated March 20, 2006, related to AmerGen LRA (Accession No. ML061100129)
April 18, 2006	Letter from M.P. Gallagher, AmerGen, to the NRC, Forwarding AmerGen Response to NRC Request for Additional Information dated March 20, 2006, related to AmerGen LRA (Accession No. ML061100127)
April 18, 2006	Letter from M.P. Gallagher, AmerGen, to the NRC, Forwarding AmerGen Response to NRC Request for Additional Information for the dated March 20, 2006, related to AmerGen LRA (Accession No. ML061100138)

APPENDIX B: CHRONOLOGY	
Date	**Subject**
April 20, 2006	Letter from D.J. Ashley, NRC to C.N. Swenson, AmerGen Forwarding NRC Request for Additional Information for the Review of the AmerGen LRA (Accession No. ML061100131)
April 24, 2006	Letter from R.K. Mathew, NRC to D.J. Wrona, NRC Discussing Highlights from RLRC (Accession No. ML061420106)
April 24, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC Forwarding Questions to go over tomorrow (Accession No. ML061500442)
April 24, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC Forwarding AmerGen License Renewal AMP-AMR Audit Questions update AMP-071, 204, 072, and others (Accession No. ML061150330)
April 25, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC Forwarding AmerGen License Renewal AMP-AMR Audit Questions Update AMP-072 and AMP-358 (Accession No. ML061160161)
April 26, 2006	Letter from G. Beck, OCGS to D.J. Ashley, NRC Forwarding AmerGen Transmittal of 2130-06-20298 Response to Rai on 4.2 & 4.7 (Accession No. ML061510249)
April 26, 2006	Letter from M.P. Gallagher, AmerGen, to the NRC, Forwarding AmerGen Response to NRC Request for Additional Information, dated March 30, 2006, Related to Plant LRA (Accession No. ML061210114)
April 28, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC Discussing Response to "Mechanical" RAI set (NRC Letter March 30, 2006) (Accession No. ML061510239)
April 28, 2006	Letter from M.P. Gallagher, AmerGen, to the NRC, Forwarding AmerGen Response to NRC Request for Additional Information, dated March 30, 2006 related to ~~Planet~~ LRA (Accession No. ML061220306)
May 1, 2006	Letter from K.I. Parczewski, NRC to D.J. Ashley, NRC Forwarding a Question to the Applicant (Accession No. ML061500449)
May 1, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC, Discussing RAI Response on Fatigue or Rebar Corrosion (Accession No. ML061510224)
May 1, 2006	Letter from M.P. Gallagher, AmerGen, to the NRC, Forwarding AmerGen Transmittal of Supplemental Commitments Associated with AmerGen Application for Renewed Operating License (Accession No. ML061240171)

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APPENDIX B: CHRONOLOGY	
Date	**Subject**
June 2, 2006	Letter from M.P. Gallagher, AmerGen to the NRC Forwarding Supplemental Information Releated to AmerGen LRA (Accession No. ML061570333)
June 2, 2006	Letter from M. Young, NRC to ASLB Administrative Judges Forwarding Supplement 2 to the Hearing File Index, updated Privilege Logs, a Declaration of Frank Gillespie, and Affidavit of Donnie Ashley (Accession No ML061560055)
June 5, 2006	In a Memorandum and Order (Signed by ASLB judges) the ASLB Denies NIRS's Motion to Apply Subpart G Procedures) (Accession No. ML061560374)
June 5, 2006	Letter from NRC EDO L.A. Reyes to Rep. Robert Andrews Discussing License Renewal Application of Oyster Creek (Accession No. ML061420240)
June 6, 2006	In a Memorandum and Order (Signed by ASLB Judges) the ASLB states the Contention of Omission is Moot, and Motions Concerning mandatory Disclosure are Moot (Accession No. ML061570288)
~~June 6, 2006~~	~~Letter from M.D. Sykes, NRC to C.M. Crane, AmerGen, Discussing Senior Reactor and Reactor Operator initial Examinations - (AmerGen) (Accession No. ML061580342)~~
June 7, 2006	Letter from D.J. Ashley, NRC to L.A. Lund, NRC Forwarding Notice of Forthcoming Meeting with AmerGen on Licensing Renewal for AmerGen (Accession No. ML061580543)
June 7, 2006	Letter from M.P. Gallagher, AmerGen to the NRC Forwarding Supplemental Information Related to AmerGen LRA (Accession No. ML061600246)
June 7, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC Discussing Accession Number Request (Accession No ML061770478)
June 8, 2006	Letter from R.M. Schroll, NRC Transmittal of Commission Meetings Notice (Accession No. ML061590491)
~~June 8, 2006~~	~~Letter from D.P. Helker, AmerGen to the NRC Forwarding Oyster Creek Generating Station, 10 CFR 50.46 Annual Report (Accession No. ML061590524)~~
June 8, 2006	Letter from P. Gunter, NIRS to D.J. Ashley, NRC, Communication of Request for Inclusion on the AMR Service list for Docket 050219 (Accession No ML061770473)

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APPENDIX B: CHRONOLOGY	
Date	**Subject**
June 9, 2006	In a memorandum (Signed by D.J. Ashley) the NRC Summarizes a June 1, 2006 Meeting With AmerGen Representatioves to Discuss the Staff's Concerns on the Drywell Shell and the AmerGen LRA (Accession No. ML061600368)
June 9, 2006	Letter from F.P. Gillespie, NRC to P.A. Kurkul, Dept of Commerce, Communicating Request Initiation of a Section 7 Consultation Regarding License Renewal of Oyster Creek nuclear Generating Station (Accession No. ML061500192) 297) N
June 12, 2006	NRC Press Release-I-06-037: NRC Seeks Public Input on Draft Environmental Report for AmerGen LRA; Meetings July 12 (Accession No. ML061630287)
June 12, 2006	Letter from M.P. Gallagher, AmerGen to the NRC Forwarding Supplement to AmerGen Response to NRC Request for Additional Information RAI 4.3-4, Related to Oyster Creek LRA (Accession No. ML061660072)
June 13, 2006	Letter from B.E. Holian, NRC to C.M. Crane, AmerGen Communicating NRC Office of Investigations Case No. 1-2005-033 (Accession No. ML061660078)
~~June 13, 2006~~ 298) delete text	~~Letter from B.P. Cowan, AmerGen to the NRC Forwarding AmerGen Response to NRC Request to Revise Calculation C-1302-215-E320-063 for the Reactor Water Clean-up High energy Line Break Detection and Isolation and Instrumentation Setpoint. (Accession No. ML061650156)~~
June 13, 2006	Letter from R.L. Franovich, NRC to D. Guzzo, NJ Historic Preservation Office Discussing the Oyster Creek License Renewal Application Review (Accession No. ML061580022)
June 13, 2006	Letter from P. Gunter, NIRS to D.J. Ashley, NRC, Communicating Oyster Creek - Teledyne request (Accession No ML061770519)
June 14, 2006	Letter from P. Gunter, NIRS to D.J. Ashley, NRC: Communicating NRC/NEI meeting 6/22 Oyster Creek RAI (Accession No ML061770468)
June 15, 2006	Letter from J. Hufnagel, OCGS to D.J. Ashley, NRC Discussing June 22nd meeting (Accession No ML061770467)
June 16, 2006	Letter from B.M. Carle, Township of Berkeley, NJ to the NRC Discussing the Statement of Limited Appearance of Beverly Carle on behalf of the Township of Berkeley, NJ (Accession No ML062010480)

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APPENDIX B: CHRONOLOGY	
Date	**Subject**
June 20, 2006	Letter from J.E. Dyer, NRC to AmerGen Forwarding a General Notice, Letter B, Orders EA-06-137 (Accession No. ML061600034)
~~June 20, 2006~~	~~Letter from J.E. Dyer, NRC to AmerGen Forwarding a General Notice, EA-06-137 Enclosure, Order Modifying Licenses (Accession No. ML061600076)~~
~~June 20, 2006~~	~~Letter from J.E. Dyer, NRC to AmerGen Forwarding a General Notice, Letter B, Order EA-06-137 Attachment 1-B (Accession No. ML061600145)~~
June 20, 2006	Letter from D.J. Ashley, NRC to L.A. Lund, NRC Forwarding Meeting Notice - Cancelled Forthcoming Meeting with AmerGen on LRA for AmerGen (Accession No. ML061710405)
~~June 20, 2006~~	~~Letter from R.R. Bellamy, NRC to C.M. Crane, AmerGen Forwarding Oyster Creek; Biennial Baseline Inspection of the Identification and Resolution of Problems (Accession No. ML061740294)~~
June 20, 2006	Letter from M.P. Gallagher, AmerGen to the NRC Forwarding Supplemental Information Related to the Aging Management Program for the Oyster Creek Drywell Shell, Associated with AmerGen's LRA (Accession No. ML061740573)
June 22, 2006	Letter from F.P. Gillespie, NRC to A.W. Avery, Ocean Count, NJ: Discussing Oyster Creek Nuclear Generating Station Relicensing Lacey Township, New Jersey (Accession No. ML061650168)
June 23, 2006	Letter from R. Webster, Grandmothers, Mothers & More for Energy Safety, Jersey Shore Nuclear Watch, etc to ASLB Judges Filing Motion for Leave to Supplement the Petition to Add a New Contention, with Citizen's Exhibits NC1 to NC10 (Accession No ML061810167)
June 27, 2006	Letter from D.J. Silverman, AmerGen to the ASLB Judges, Forwarding AmerGen's Answer to Citizens' Motion for Leave to Supplement the Petition (Accession No ML061870359)
June 28, 2006	Letter from R. Zimmerman, NRC to GP Little, Ocean County, NJ, Board of Chosen Freeholders, Discussing Oyster Creek Nuclear Generating Station Airspace - EDATS: SECY-2006-0094 (Accession No ML061660475)
June 28, 2006	Letter from R. Zimmerman, NRC to J.H. Vicari, Ocean County, NJ, Board of Chosen Freeholders Discussing Oyster Creek Nuclear Generating Station Airspace - EDATS: SECY-2006-0094 (Accession No ML061660475)