From: Patricia Lougheed
To: James Davis
Date: 08/25/2006 11:06:53 AM
Subject: Pilgrim Audit Report Peer Review AMP Sections

Attached are redlined/strikeout versions of the four AMP Sections assigned to me. I am working on the AMR Section, but do not know if I will get it completed before I leave today. (I will be leaving at 11:30). As a result of my review, I have the following general comments: Section 3.0.3.x.x.2, "Consistency with GALL"

1. The third paragraph in this section normally contains a list of other documents that the project team reviewed. Sometimes these documents are ordered by document number and then title and, in other cases by title and then document number. This is very confusing. I have consistently redone this paragraph to list all documents by document number followed by the title in quotation marks. I recommend that this be done as a standard practice.

2. The concluding paragraph contains, as its second sentence, an overall conclusion on the aging management program. This sentence appears inappropriate in that the exceptions and enhancements have not yet been reviewed. As this is a boilerplate paragraph, the sentence needs to be removed from all AMP reviews.

3. During its review of the Oyster Creek audit report and SER, OGC objected to the phrase, "The project team found the applicant's [PROGRAM NAME] acceptable because it conforms to the recommended GALL AMP." They preferred the alternate wording, "The project team found that the applicant's [PROGRAM NAME] conforms to the recommended GALL AMP." As this is a boilerplate paragraph, the sentence needs to be revised in all AMP reviews.

3.0.3.2.x.3, "Exceptions" and 3.0.3.2.x.4, "Enhancements"

There is considerable inconsistency in how the GALL verbage is included. In some cases, the title of the GALL section is in plain text; in others, the title is omitted; and in still others it is bolded. I have chosen to replace all of these with a consistent title in plain text. I recommend that the remaining AMP sections be changed to use a consistent format. I also recommend the use of a left/right indent [In WordPerfect use: Shift-Ctrl-F.] to better distinguish that this paragraph is copied from the GALL.

3.0.3.2.x.4, "Enhancements"

The conclusion paragraph for the Enhancements seems more than a little clunky. I especially object to the words "will provide additional assurance that the effects of aging will be adequately managed" because it implies they are going above and beyond what GALL considered necessary. I also believe that saying that the program is "consistent with GALL" is technically inaccurate, since exceptions were discussed. Therefore, I recommend that all the enhancement conclusions be changed to, "The project team found this enhancement acceptable based on the discussion above and because, when the enhancement is implemented, [AMP Number] will be more consistent with GALL AMP [Number]."

3.0.3.2.x.5 "Operating Experience"

During its review of the Oyster Creek audit report and SER, OGC objected to the phrase, "above industry and plant-specific operating experience" as no industry experience was normally discussed. They preferred the alternate wording, "above operating experience." As this is a boilerplate paragraph, the sentence needs to be revised in all AMP reviews.

3.0.3.2.x.6, "UFSAR Supplement"

For those AMPS with enhancements, the conclusion paragraph is not supported by the preceding writeup. Specifically, the preceding writeup indicates that the UFSAR supplement does not include information

about the necessary enhancements. Therefore, I have made a slight modification to the sentence to incorporate the applicant's commitment that the UFSAR supplement would be revised to include the enhancement commitment numbers. If this change is appropriate, then a similar change should be made to all other UFSAR supplement conclusion paragraphs.

3.0.3.2.x.7 "Conclusion"

In the preceding sections, the term "audit and review" has been used. However, in the overall conclusion, the term was reversed to "review and audit." On Oyster Creek, OGC objected to the switch in terminology. As this is a boilerplate paragraph, the term needs to be revised in all AMP reviews.

Please let me know if my review comments were appropriate/acceptable (as this is the first time I have done one of these!). If I can be of further assistance, please let know that also. My HQ phone extension is 1082.

Thanks

Patricia

Mail Envelope Properties (44EF1203.8C8 : 22 : 35690)

Subject: Pilgrim Audit Report Peer Review AMP Sections
Creation Date 08/25/2006 11:06:43 AM
From: Patricia Lougheed

Created By: VPL@nrc.gov

Recipients
nrc.gov
OWGWPO03.HQGWDO01
JAD (James Davis)

Post Office	**Route**
OWGWPO03.HQGWDO01	nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	5582	08/25/2006 11:06:43 AM
TEXT.htm	5252	
3.0.3.2.16 Service Water Integrity Compare Version.wpd	25456	08/25/2006 10:55:34 AM
3.0.3.2.1 Buried Piping Compare Version.wpd	30521	08/25/2006 10:20:30 AM
3.0.3.2.8 Diesel Fuel Monitoring Compare Version.wpd	62403	08/25/2006 10:43:10 AM
3.0.3.2.13 Oil Analsys Program Compare Version.wpd	32588	08/25/2006 10:48:30 AM

Options

Expiration Date:	None
Priority:	Standard
ReplyRequested:	No
Return Notification:	None
Concealed Subject:	No
Security:	Standard

Junk Mail Handling Evaluation Results
Message is not eligible for Junk Mail handling
Message is from an internal sender

Junk Mail settings when this message was delivered
Junk Mail handling disabled by User
Junk Mail handling disabled by Administrator

Junk List is not enabled
Junk Mail using personal address books is not enabled
Block List is not enabled

WordPerfect Document Compare Summary

Original document: E:\License Renewal\Pilgrim\3.0.3.2.16 Service Water Integrity Original.wpd
Revised document: @PFDesktop\:MyComputer\E:\License Renewal\Pilgrim\3.0.3.2.16 Service Water Integrity.wpd
Deletions are shown with the following attributes and color:
~~Strikeout~~, Blue RGB(0,0,255).
Deleted text is shown as full text.
Insertions are shown with the following attributes and color:
Double Underline, Redline, Red RGB(255,0,0).

The document was marked with 17 Deletions, 42 Insertions, 0 Moves.

3.0.3.2.16 SERVICE WATER INTEGRITY PROGRAM (PNPS AMP B.1.28)

In PNPS LRA, Appendix B, Section B.1.28, the applicant stated that PNPS AMP B.1.28, "Service Water Integrity Program," is an existing plant program that is consistent with GALL AMP XI.M20, "Open-Cycle Cooling Water System," with exceptions.

3.0.3.2.16.1 Program Description

The applicant stated, in the PNPS LRA, that this program relies on implementation of the recommendations of GL 89-13 to ensure that the effects of aging on the SSW system are managed for the period of extended operation. The program includes surveillance and control techniques to manage aging effects caused by biofouling, corrosion, erosion, protective coating failures, and silting in the SSW system or structures and components serviced by the SSW system.

3.0.3.2.16.2 Consistency with the GALL Report

In the PNPS LRA, the applicant stated that PNPS AMP B.1.28 is consistent with GALL AMP XI.M20, with exceptions.

The project team interviewed the applicant's technical staff and reviewed, in whole or in part, the documents listed in Attachment 5 of this audit and review report for PNPS AMP B.1.28, including LRPD-02, "Evaluation of Aging Management Programs, ~~LRPD-02,~~" Revision 1, Section 4.2, "Service Water Integrity Program," which provides an assessment of the AMP elements' consistency with GALL AMP XI.M20. Specifically, the project team reviewed the program elements (see Section 3.0.2.1 of this audit and review report) contained in PNPS AMP B.1.28 and associated bases documents to determine consistency with GALL AMP XI.M20.

The project team also reviewed LRPD-05, "PNPS Operating Experience Review Report," ~~LRPD-05,~~ Revision 0, Section 4.2, "Service Water Integrity Program;" Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety Related Equipment," ~~Generic Letter 89-13, USNRC,~~ July 18, 1989; GL 89-13, Supplement 1, "Service Water System Problems Affecting Safety Related Equipment," ~~Generic Letter 89-13, Supplement 1, USNRC,~~ April 4, 1990~~.~~; Piping and Instrumentation Drawing M591, Rev. E7; PNPS 1, "Specification for SSW & Reactor Building Closed Cooling Water (RBCCW) Safety-Related Piping & Heat Exchanger Inspection, Maintenance & Test Requirements in Response to Generic Letter 89-13"; and NOP02E1, ~~Rev. 01,~~ "Service Water Inspections, Maintenance and Testing in Response to Generic Letter 89-13," Rev. 01.

The project team reviewed those portions of the Service Water Integrity Program for which the applicant claims consistency with GALL AMP XI.M20 and found that they are consistent with the GALL Report AMP. ~~Furthermore, t~~The project team ~~concluded~~found that the applicant's Service Water Integrity Program ~~provides reasonable assurance that effects of aging will be managed so that components crediting this program can perform their intended function consistent with the current licensing basis during the period of extended operation. The project team found the applicant's Service Water Integrity Program acceptable because it~~ conforms to the recommended GALL AMP XI.M20, "Service Water Integrity," with exceptions as described below.

3.0.3.2.16.3 Exceptions to the GALL Report

Exception 1

The applicant stated, in the PNPS LRA, that the exception to the GALL Report program elements is as follows:

Element: 2: Preventive Actions
Exception: NUREG-1801 states that system components are lined or coated. Components are lined or coated only where necessary to protect the underlying metal surfaces.

The GALL Report identified the following recommendation for the "Preventive Actions" program element associated with the exception taken:

> Preventive Actions: The system components are constructed of appropriate materials and lined or coated to protect the underlying metal surfaces from being exposed to aggressive cooling water environments. Implementation of NRC GL 89-13 includes a condition and performance monitoring program; control or preventive measures, such as chemical treatment, whenever the potential for biological fouling species exists; or flushing of infrequently used systems. Treatment with chemicals mitigates microbiologically influenced corrosion (MIC) and buildup of macroscopic biological fouling species, such as blue mussels, oysters, or clams. Periodic flushing of the system removes accumulations of biofouling agents, corrosion products, and silt.

The applicant stated, in the PNPS LRA, that NUREG-1801 states that system components are constructed of appropriate materials and lined or coated to protect the underlying metal surfaces from being exposed to aggressive cooling water environments. Not all PNPS system components are lined or coated. Components are lined or coated only where necessary to protect the underlying metal surfaces.

During the audit and review, the project team asked the applicant to identify applications where components are not coated or lined and the materials of construction because not all PNPS system components are lined or coated. In response to this request, the applicant stated that the SSW supply piping is constructed of titanium, a material which has shown excellent corrosion resistance in this environment. The other components in the SSW supply are small bore piping for vents and drains, pump and valve bodies, and heat exchanger tubes. All of these components are constructed of copper alloys that have demonstrated good corrosion resistance in this environment. Also, operating experiences show that loss of material is managed by the Service Water Integrity Program such that corrective action is taken before loss of intended functions of components. On this basis, the project team found this exception acceptable.

Exception 2

The applicant stated, in the PNPS LRA, that the exception to the GALL Report program elements is as follows:

Element: 5: Monitoring and Trending
Exception: NUREG-1801 states that testing and inspections are performed annually and during refueling outages. The PNPS program requires tests and inspections during each refueling outage.

The GALL Report identified the following recommendation for the "Monitoring and Trending" program element associated with the exception taken:

> Monitoring and Trending: Inspection scope, method (e.g., visual or nondestructive examination [NDE]), and testing frequencies are in accordance with the utility commitments under NRC GL 89-13. Testing and inspections are done annually and during refueling outages. Inspections or nondestructive testing will determine the extent of biofouling, the condition of the surface coating, the magnitude of localized pitting, and the mount of MIC, if applicable. Heat transfer testing results are documented in plant test procedures and are trended and reviewed by the appropriate group.

The applicant stated, in the PNPS LRA, that the NUREG-1801 program entails testing and inspections performed annually and during refueling outages. The PNPS program requires tests and inspections during each refueling outage, but not annually. Since aging effects are typically manifested over several years, the difference in inspection and testing frequency is insignificant.

During the audit and review, the project team evaluated the PNPS inspection interval and agreed that adverse conditions caused by the aging effects in the service water systems manifest over several years. Also, operating experience demonstrates that a 2-year interval has not led to adverse operating conditions of the Service Water System. Therefore, the difference between a 1-year and 2-year inspection and testing frequency is insignificant. On this basis, the project team found this exception acceptable.

3.0.3.2.16.4 Enhancements

None.

3.0.3.2.16.5 Operating Experience

The applicant stated, in the PNPS LRA, that results of heat transfer capability testing of the RBCCW heat exchangers from 2001 through 2004 show that the heat exchangers are capable of removing the required amount of heat. Confirmation of adequate thermal performance provides evidence that the program is effective for managing fouling of SSW cooled heat exchangers.

Results of SSW visual inspections, eddy current testing, ultrasonic testing, and radiography testing from 1998 through 2004 revealed areas of erosion and areas of corrosion on internal and external surfaces. SSW butterfly valves, pump discharge check valves, air removal valves, and pipe spools have been replaced with components made of corrosion resistant materials. ~~Also, RBCCW heat exchanger channel assemblies have been replaced and tubes have been sleeved to address erosion and corrosion.~~ Identification of degradation and corrective action

prior to loss of intended function provide evidence that the program is effective for managing loss of material for SSW system components.

Visual inspections of SSW piping revealed degradation of the lining in original SSW carbon steel rubber lined piping. Pipe lining is intended to protect pipe internal surfaces from erosion and corrosion. Therefore, SSW piping has been replaced with carbon steel pipe with cured-in-place rubber lining, relined with a ceramic epoxy compound, or replaced with titanium pipe. Identification of degradation and corrective action prior to loss of intended function provide evidence that the program is effective for managing loss of material for SSW system components.

The project team reviewed the operating experience provided in the PNPS LRA and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. In addition, the project team reviewed PNPS operating experience as documented in the PNPS Operating Experience Review Report for the Service Water Integrity Program and did not find any evidence of PNPS component degradation or failures that are outside the envelope of industry experience.

On the basis of its review of the above ~~industry and plant-specific~~ operating experience and discussions with the applicant's technical staff, the project team concluded that the applicant's Service Water Integrity Program will adequately manage the aging effects that are identified in the PNPS LRA for which this AMP is credited.

3.0.3.2.16.6 UFSAR Supplement

The applicant provided its UFSAR Supplement for the Service Water Integrity Program in PNPS LRA, Appendix A, Section A.2.1.30, which states that the Service Water Integrity Program relies on implementation of the recommendations of NRC GL 89-13 to ensure that the effects of aging on the SSW system are managed for the period of extended operation. The program includes component inspections for erosion, corrosion, and blockage and performance monitoring to verify the heat transfer capability of the safety-related heat exchangers cooled by SSW. Chemical treatment using biocides and chlorine and periodic cleaning and flushing of redundant or infrequently used loops are the methods used to control or prevent fouling within the heat exchangers and loss of material in SSW components.

The project team reviewed the UFSAR Supplement for PNPS AMP B.1.28, found that it was consistent with the GALL Report, and determined that it provides an adequate summary description of the program, as identified in the SRP-LR FSAR Supplement table and as required by 10 CFR 54.21(d).

3.0.3.2.16.7 Conclusion

On the basis of its audit and review ~~and audit~~ of the applicant's program, the project team found that those program elements, for which the applicant claims consistency with the GALL Report, are consistent with the GALL Report. In addition, the project team has reviewed the exceptions and the associated justifications and determined that the AMP, with the exceptions, is adequate to manage the aging effects for which it is credited. The project team found that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained for the period of extended operation, as required by 10 CFR 54.21(a)(3). The project team 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).

WordPerfect Document Compare Summary

Original document: E:\License Renewal\Pilgrim\3.0.3.2.1 Buried Piping Original.wpd
Revised document: @PFDesktop\:MyComputer\E:\License Renewal\Pilgrim\3.0.3.2.1 Buried Piping.wpd
Deletions are shown with the following attributes and color:
~~Strikeout~~, Blue RGB(0,0,255).
Deleted text is shown as full text.
Insertions are shown with the following attributes and color:
Double Underline, Redline, Red RGB(255,0,0).

The document was marked with 17 Deletions, 29 Insertions, 0 Moves.

3.0.3.2.1 BURIED PIPING AND TANKS INSPECTION PROGRAM (PNPS AMP (B.1.2)

In PNPS LRA, Appendix B, Section B.1.2, the applicant stated that PNPS AMP B.1.2, "Buried Piping and Tanks Inspection Program," is a new plant program that is consistent with GALL AMP XI.M34, "Buried Piping and Tanks Inspection," with an exception.

3.0.3.2.1.1 Program Description

The applicant stated, in the PNPS LRA, that this program includes (a) preventive measures to mitigate corrosion and (b) inspections to manage the effects of corrosion on the pressure-retaining capability of buried carbon steel, stainless steel, and titanium components. Preventive measures are in accordance with standard industry practice for maintaining external coatings and wrappings. Buried components are inspected when excavated during maintenance.

A focused inspection will be performed within the ~~last 10 years and within the~~ first 10 years of the period of extended operation unless an opportunistic inspection (or an inspection via a method that allows assessment of pipe condition without excavation) occurs within this 10-year period.

3.0.3.2.1.2 Consistency with the GALL Report

In the PNPS LRA, the applicant stated that PNPS AMP B.1.2 is consistent with GALL AMP XI.M34 with an exception.

The project team interviewed the applicant's technical staff and reviewed, in whole or in part, the documents listed in Attachment 5 of this audit and review report for PNPS AMP B.1.2, including AMPER~~,~~ 3.1, "Buried Piping and Tanks Inspection Program," which provides an assessment of the AMP elements' consistency with GALL AMP XI.M34. Specifically, the project team reviewed the program elements (see Section 3.0.2.1 of this audit and review report) contained in PNPS AMP B.1.2 and associated bases documents to determine consistency with GALL AMP XI.M34.

The project team reviewed those portions of the Buried Piping and Tanks Inspection Program for which the applicant claims consistency with GALL AMP XI.M34 and found that they are consistent with the GALL Report AMP. The project team found that the applicant's Buried Piping and Tanks Inspection conforms to the recommended GALL AMP XI.M34, with the exception as described below.

3.0.3.2.1.3 Exceptions to the GALL Report

The applicant stated, in the PNPS LRA, that the exception to the GALL Report program elements is as follows:

Exception

Element: 4: Detection of Aging Effects
Exception: For cases of excavation solely for the purpose of inspection — methods such as "phased array ultrasonic thickness (UT)" will be used to determine wall thickness.

The GALL Report identified the following recommendation for the "Detection of Aging Effects" program element associated with the exception taken:

> Inspections performed to confirm that coating and wrapping are intact are an effective method to ensure that corrosion of external surfaces has not occurred and the intended function is maintained. Buried piping and tanks are opportunistically inspected whenever they are excavated during maintenance. When opportunistic, the inspections are performed in areas with the highest likelihood of corrosion problems, and in areas with a history of corrosion problems, within the areas made accessible to support the maintenance activity.

The applicant stated, in the PNPS LRA, that for cases of excavation solely for the purpose of inspection, methods such as "phased array UT" will be used to determine wall thickness. This is considered preferable by PNPS since excavation could result in damage to coatings or wrappings.

The proposed exception eliminates the possibility of inadvertent damage during inspection, while still being able to assess the target component. On this basis, the project team found this exception acceptable.

3.0.3.2.1.4 Operating Experience

The applicant stated, in the PNPS LRA, that the Buried Piping and Tanks Inspection Program at PNPS is a new program for which there is no operating experience.

~~I~~According to the applicant, in the past 5 years, there has been limited experience with the inspection of buried piping at PNPS. This experience has occurred mainly on the fire water underground distribution system. This system is approximately 35 years old and consists of cement-lined malleable iron pipe with mechanical joints. There has been no history of significant leaks other than during two ~~instances—one~~instances – one in 2001 and one in 2005.–

In the first event, the 8-inch underground line downstream of 8-L-22 failed. ~~T~~According to the applicant, the probable cause of failure was most likely induced by minor fabrication anomalies compounded by marginal installation techniques. When this piping was examined, it was found to be overall in very good condition externally except for a small area of surface corrosion attributed to marginal installation techniques.- In the second event, the 8-inch underground pipe failed in the area of the N2 tank adjacent to the EDG building. Due to congestion and the presence of the tank (which was installed subsequently to the installation of the piping), it was not possible to dig up the piping to examine it and determine the cause of the failure (which may be related to the tank installation). In addition to these two instances, the excavation of a number of valves during maintenance found the valves and piping to be in remarkably good condition.

From an additional historical perspective, the SSW system at PNPS has experienced leaks on the buried inlet (~~screenhouse~~screen house to auxiliary bays) piping as a result of internal corrosion. The original piping material was rubber-lined carbon steel wrapped with reinforced fiberglass wrapping and coal tar saturated felt and heavy Kraft paper. The leaks were determined to be the result of the degraded rubber lining being in contact with sea water.

These pipes have since been replaced with the same external coating as the original pipe. The pipe replacement occurred in 1995 and 1997.

In addition, the SSW buried discharge piping (also rubber-lined carbon steel with external pipe wrapping, same as inlet piping) from the auxiliary bays to the discharge canal experienced severe internal corrosion due to failure of the rubber lining. Two 40-foot lengths of 22-inch diameter pipes (one on each loop) were replaced in 1999 as a result of the failed rubber lining and internal corrosion. These spools were replaced with carbon steel coated internally and externally with an epoxy coating. The piping that was removed was examined after its wrapping was removed and its external surface was found to be in good condition. Since that time, the entire length of both SSW buried discharge loops have been lined internally with cured-in-place pipe ~~linings—"B"~~linings – the "B" Loop was modified in 2001 and the "A" Loop in 2003.

The phased array inspection technique was provided merely as an example of a potential future examination technique. It and other remote techniques will potentially be able to assess the condition of extensive portions of buried piping without the need for excavation. This exception was taken to allow the potential use of this technique or others in lieu of excavating piping to provide a more effective assessment of overall piping conditions while eliminating the potential for damaging the piping during excavation.——

The project team reviewed the operating experience provided in the PNPS LRA and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience.

On the basis of its review of the above ~~industry and plant-specific~~ operating experience and discussions with the applicant's technical staff, the project team concluded that the applicant's Buried Piping and Tanks Inspection Program will adequately manage the aging effects that are identified in the PNPS LRA for which this AMP is credited.

3.0.3.2.1.5 UFSAR Supplement

The applicant provided its UFSAR Supplement for the Buried Piping and Tanks Inspection Program in PNPS LRA, Appendix A, Section A.2.1.2, which states that the Buried Piping and Tanks Inspection Program includes (a) preventive measures to mitigate corrosion and (b) inspections to manage the effects of corrosion on the pressure-retaining capability of buried carbon steel, stainless steel, and titanium components. Preventive measures are in accordance with standard industry practice for maintaining external coatings and wrappings. Buried components are inspected when excavated during maintenance. If trending within the corrective action program identifies susceptible locations, the areas with a history of corrosion problems are evaluated for the need for additional inspection, alternate coating, or replacement.

A focused inspection will be performed within the first 10 years of the period of extended operation, unless an opportunistic inspection (or an inspection via a method that allows assessment of pipe condition without excavation) occurs within this 10-year period.

The project team reviewed the UFSAR Supplement for PNPS AMP B.1.2, found that it was consistent with the GALL Report, and determined that it provides an adequate summary description of the program, as identified in the SRP-LR FSAR Supplement table and as required by 10 CFR 54.21(d).

3.0.3.2.1.6 Conclusion

On the basis of its audit and review ~~and audit~~ of the applicant's program, the project team found that those program elements, for which the applicant claims consistency with the GALL Report, are consistent with the GALL Report. In addition, the project team has reviewed the exception and the associated justifications and determined that the AMP, with the exception, is adequate to manage the aging effects for which it is credited. The project team found that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained for the period of extended operation, as required by 10 CFR 54.21(a)(3). The project team 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).

WordPerfect Document Compare Summary

Original document: E:\License Renewal\Pilgrim\3.0.3.2.8 Diesel Fuel Monitoring Original.wpd
Revised document: @PFDesktop\:MyComputer\E:\License Renewal\Pilgrim\3.0.3.2.8 Diesel Fuel Monitoring.wpd
Deletions are shown with the following attributes and color:
~~Strikeout~~, Blue RGB(0,0,255).
Deleted text is shown as full text.
Insertions are shown with the following attributes and color:
Double Underline, Redline, Red RGB(255,0,0).

The document was marked with 52 Deletions, 91 Insertions, 0 Moves.

3.0.3.2.8 DIESEL FUEL MONITORING PROGRAM (PNPS AMP B.1.10)

In PNPS LRA, Appendix B, Section B.1.10, the applicant stated that PNPS AMP B.1.10, "Diesel Fuel Monitoring Program," is an existing plant program that is consistent with GALL AMP XI.M30, "Fuel Oil Chemistry," with exceptions and enhancements.

3.0.3.2.8.1 Program Description

The applicant stated, in the PNPS LRA, that the program entails sampling to ensure that adequate diesel fuel quality is maintained to prevent plugging of filters, fouling of injectors, and corrosion of fuel systems. Exposure to fuel oil contaminants such as water and microbiological organisms is minimized by periodic draining and cleaning of tanks and by verifying the quality of new oil before its introduction into the storage tanks. Sampling and analysis activities are in accordance with technical specifications on fuel oil purity and the guidelines of ASTM Standards D4057-81 and D975-81 (or later revisions of these standards).

3.0.3.2.8.2 Consistency with the GALL Report

In the PNPS LRA, the applicant stated that PNPS AMP B.1.10 is consistent with GALL AMP XI.M30 with exceptions and enhancements.

The project team interviewed the applicant's technical staff and reviewed, in whole or in part, the documents listed in Attachment 5 of this audit and review report for PNPS AMP B.1.10, including Aging Management Program Evaluation Report, LRPD-02, Revision 1, Section 4.9, "Diesel Fuel Monitoring Program," which provides an assessment of the AMP elements' consistency with GALL AMP XI.M30. Specifically, the project team reviewed the program elements (see Section 3.0.2.1 of this audit and review report) contained in PNPS AMP B.1.10 and associated bases documents to determine consistency with GALL AMP XI.M30.

The project team also reviewed PNPS Operating Experience Review Report, LRPD-05, Revision 0, Section 4.9, "Diesel Fuel Monitoring ~~Program;" Standard~~Program"; ASTM D 975, "Standard Specification for Diesel Fuel Oils"; ASTM D 1796, "Standard Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method (Laboratory Procedure)~~,~~"; ASTM D ~~1796; Standard~~2276, "Standard Test Method for Particulate Contaminant in Aviation Fuel by Line Sampling~~,~~"; ASTM ~~D 2276; Standard~~D 2709, "Standard Method for Water and Sediment in Middle Distillate Fuels by Centrifuge"; ASTM D 4075, "Standard Practice for Manual Sampling of Petroleum and Petroleum Products," and ASTM D 6217, "Standard Test Method for Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration~~, ASTM D 6217; Standard Specification for Diesel Fuel Oils, ASTM D 975; Standard Practice for Manual Sampling of Petroleum and Petroleum Products, ASTM D 4057; Standard Method for Water and Sediment in Middle Distillate Fuels by Centrifuge, ASTM D 2709; Standard Test Method for Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration, ASTM D 6217.~~"

The project team reviewed those portions of the Diesel Fuel Monitoring Program for which the applicant claims consistency with GALL AMP XI.M30 and found that they are consistent with the GALL Report AMP. ~~Furthermore, t~~The project team ~~concluded~~found that the applicant's Diesel Fuel Monitoring Program ~~provides reasonable assurance that effects of aging will be managed so that components crediting this program can perform their intended function consistent with the current licensing basis during the period of extended operation. The project team found the applicant's Diesel Fuel Monitoring Program acceptable because it~~ conforms to

the recommended GALL AMP XI.M30, "Fuel Oil Chemistry," with the exceptions and enhancements as described below.

3.0.3.2.8.3 Exceptions to the GALL Report

The applicant stated, in the PNPS LRA, that the exceptions to the GALL Report program elements are as follows:

Exception 1

Elements: 1: Scope of Program
6: Acceptance Criteria

Exception: PNPS indicated in the LRA that sampling and analysis activities are in accordance with technical specifications on fuel oil purity and the guidelines of ASTM Standards D 4057-81 and D 975-81. ~~However, NUREG-1801, Rev. 1 specifies ASTM Standards D 1796, D 2276, D 2709, and D 6217.~~

The GALL Report identified the following recommendations for the "Scope of Program" and "Acceptance Criteria" program elements associated with the exception taken:

> Scope of Program: The program is focused on managing the conditions that cause general, pitting, and microbiologically-influenced corrosion (MIC) of the diesel fuel tank internal surfaces in accordance with the plant's technical specifications (i.e., NUREG-1430, NUREG-1431, NUREG-1432, NUREG-1433) on fuel oil purity and the guidelines of ASTM Standards D 1796, D 2276, D 2709, D 6217, and D 4057. The program serves to reduce the potential of exposure of the tank internal surface to fuel oil contaminated with water and microbiological organisms.
>
> Acceptance Criteria: The ASTM Standard D 4057 is used for guidance on oil sampling. The ASTM Standards D 1796 and D 2709 are used for guidance on the determination of water and sediment contamination in diesel fuel. ASTM D 6217 and Modified D 2276, Method A are used for guidance for determination of particulates. The modification to D-2276 consists of using a filter with a pore size of 3.0 mm, instead of 0.8 mm.

The applicant stated, in the PNPS LRA, that PNPS technical specifications specify use of ASTM D975-81, which recommends use of ASTM D2276. Therefore, the guidelines of D2276 are appropriate for determination of particulates.

During the audit and review, the project team asked the applicant to provide justification for not using all ASTM specifications as indicated in NUREG 1801, Rev. 1. In its response, the applicant stated that the Diesel Fuel Monitoring Program makes use of the guidelines of ASTM D-2276 for determination of particulates in lieu of ASTM D-6217. ASTM D-2276 provides guidance on determining particulate contamination using a field monitor. It provides for rapid assessment of changes in contamination level without the time delay required for rigorous laboratory procedures. It also provides a laboratory filtration method using a 0.8 micron filter.

ASTM D-6217 provides guidance on determining particulate contamination by sample filtration at an off-site laboratory. The acceptance criterion of D-2276 is 10 mg/liter while that of D-6217 is 24 mg/liter. Therefore, D-2276 criterion is more stringent than that of D-6217. Since ASTM D-2276 is an accepted method of determining particulates and is a method recommended by ASTM D-975, the D-2276 method is used at PNPS.

On this basis, the project team found this exception acceptable.

Exception 2

Elements: 2: Preventive Actions
Exception: The applicant indicated that no additives are used beyond those added by the refiner. The applicant does not add biocides, stabilizers, or corrosion inhibitors as required by NUREG 1801, Rev 1., XI.M30.

The GALL Report identified the following recommendation for the "Preventive Actions" program element associated with the exception taken:

> Preventive Action: The quality of fuel oil is maintained by additions of biocides to minimize biological activity, stabilizers to prevent biological breakdown of the diesel fuel, and corrosion inhibitors to mitigate corrosion. Periodic cleaning of a tank allows removal of sediments, and periodic draining of water collected at the bottom of a tank minimizes the amount of water and the length of contact time. Accordingly, these measures are effective in mitigating corrosion inside diesel fuel oil tanks. Coatings, if used, prevent or mitigate corrosion by protecting the internal surfaces of the tank from contact with water and microbiological organisms.

The applicant stated, in the PNPS LRA, that PNPS does not add biocides, stabilizers, or corrosion inhibitors to the diesel fuel. Plant-specific operating experience has not indicated significant problems related to MIC. Since water contamination in the diesel fuel storage tanks is minimized, the potential for MIC is limited.

During the audit and review, the project team found program documentation indicating that tanks, except the security diesel generator fuel storage tank, are periodically drained, cleaned, and inspected. The quality of new oil is verified before it is introduced to storage tanks. This exception to NUREG 1801, Rev. 1 is acceptable for all tanks, except the security diesel generator fuel storage tank, because no degradation of or water contamination in the fuel storage tanks has been detected to date and the Diesel Fuel Monitoring Program will be enhanced to include UT of the bottom of tanks (except the security diesel generator fuel storage tank). If indications of degradation or water contamination are found in the future, PNPS will consider additions of corrosion inhibitors and biocides during the corrective action process. On this basis, the project team found this exception acceptable.

Exception 3

Elements: 2: Preventive Actions
Exception: The security diesel generator fuel storage tank is not periodically

cleaned and inspected because the internals are inaccessible.

The GALL Report identified the following recommendation for the "Preventive Actions" program element associated with the exception taken:

> Preventive Action: The quality of fuel oil is maintained by additions of biocides to minimize biological activity, stabilizers to prevent biological breakdown of the diesel fuel, and corrosion inhibitors to mitigate corrosion. Periodic cleaning of a tank allows removal of sediments, and periodic draining of water collected at the bottom of a tank minimizes the amount of water and the length of contact time. Accordingly, these measures are effective in mitigating corrosion inside diesel fuel oil tanks. Coatings, if used, prevent or mitigate corrosion by protecting the internal surfaces of the tank from contact with water and microbiological organisms.

The applicant stated, in the PNPS LRA, that the security diesel fuel storage tank does not have manways or other means of access to the internals. Therefore, no preventative action is taken for the security diesel generator fuel storage tank because the internals are inaccessible (there are no manways or other means to access the internals).

During the audit and review, the project team asked the applicant to provide justification for not cleaning and visually inspecting the security diesel generator fuel storage tank on a periodic basis. In its response to this request, the applicant provided information with regard to how loss of material due to MIC and general corrosion will be managed. The security diesel generator fuel storage tank is a double-walled tank. Instrumentation will be added to monitor leakage between the two walls of the tank, and the fuel will be sampled for water contamination at the bottom of the tank. A modification to provide instrumentation will be installed prior to the period of extended operation. In a letter dated July 19, 2006 (ML062080142) the applicant stated that commitment 5 is added to enhance the Diesel Fuel Monitoring Program to install instrumentation to monitor for leakage between the two walls of the security diesel generator fuel storage tank to ensure that significant degradation is not occurring. Water is necessary for MIC and general corrosion in the fuel oil environment. Verification that water is not present at the tank bottom will ensure loss of material is not occurring. This exception to NUREG 1801, Rev. 1 is acceptable for the security diesel generator fuel storage tank because the two enhancements to the program will ensure corrective action before the tank is breached due to loss of material. On this basis, the project team found this exception acceptable.

Exception 4

Elements:	3: Parameters Monitored/Inspected 6: Acceptance Criteria
Exception:	Determination of particulates may be according to ASTM Standard D 2276 rather than modified ASTM D 2276 Method A.

The GALL Report identified the following recommendations for the "Parameters Monitored/Inspected" and Acceptance Criteria" program elements associated with the exception taken:

Parameters Monitored/Inspected: The AMP monitors fuel oil quality and the levels of water and microbiological organisms in the fuel oil, which cause the loss of material of the tank internal surfaces. The ASTM Standard D 4057 is used for guidance on oil sampling. The ASTM Standards D 1796 and D 2709 are used for determination of water and sediment contamination in diesel fuel. For determination of particulates, modified ASTM D 2276, Method A, is used. The modification consists of using a filter with a pore size of 3.0 mm, instead of 0.8 mm. These are the principal parameters relevant to tank structural integrity.

Acceptance Criteria: The ASTM Standard D 4057 is used for guidance on oil sampling. The ASTM Standards D 1796 and D 2709 are used for guidance on the determination of water and sediment contamination in diesel fuel. ASTM D 6217 and Modified D 2276, Method A are used for guidance for determination of particulates. The modification to D 2276 consists of using a filter with a pore size of 3.0 mm, instead of 0.8 mm.

The applicant stated, in the PNPS LRA, that determination of particulates may be according to ASTM Standard D2276 which conducts particulate analysis using a 0.8 micron filter, rather than the 3.0 micron filter specified in NUREG-1801. Use of a filter with a smaller pore size results in a larger sample of particulates because smaller particles are retained. Thus, use of a 0.8 micron filter is more conservative than use of the 3.0 micron filter specified in NUREG-1801.

During the audit and review, the project team determined that the procedure used by the applicant to conduct particulate levels is more conservative than that of NUREG-1801, Rev 1. ~~It was, t~~Therefore~~, concluded that~~ the testing methods adequately detect unacceptable levels of particulates. During the site audit and review the project team reviewed ASTM D 6217-~~98~~ and ASTM D 2276-~~00~~ and could not find the acceptance criteria in either of these standard tests methods. The project team asked the applicant to provide additional explanation as to the source of the acceptance criteria. In its response, the applicant indicated that there are no acceptance criteria in ASTM D 6217-~~98~~ and ASTM D 2276-~~00~~, and the sources of the acceptance criteria ~~is~~are in ASTM D 975, Table 1, for water and sediment, and VV-F-800D, "Federal Specification, Fuel Oil Diesel," for particulates. The project team reviewed ASTM D 975, Table 1 and VV-F-800D and found the acceptance criteria adequate to manage water, sediment and particulate contamination. On this basis, the project team found this exception acceptable.

3.0.3.2.8.4 Enhancements

The applicant stated, in the PNPS LRA, that the enhancements in meeting the GALL Report program element are as follows:

Enhancement 1

Element: 1: Scope of Program
Enhancement: The Diesel Fuel Monitoring Program will be enhanced to include periodic sampling of the security diesel generator fuel storage tank, near the bottom, to determine water content.

The GALL Report identified the following recommendation for the "Scope of Program" program element associated with the enhancement:

> Scope of Program: The program is focused on managing the conditions that cause general, pitting, and microbiologically-influenced corrosion (MIC) of the diesel fuel tank internal surfaces in accordance with the plant's technical specifications (i.e., NUREG-1430, NUREG-1431, NUREG-1432, NUREG-1433) on fuel oil purity and the guidelines of ASTM Standards D1796, D2276, D2709, D6217, and D4057. The program serves to reduce the potential of exposure of the tank internal surface to fuel oil contaminated with water and microbiological organisms.

The applicant stated, in the PNPS LRA, that the Diesel Fuel Monitoring Program will be enhanced to include sampling the bottom of security diesel generator fuel storage tank for water. Any indication of water contamination will be handled in the Corrective Action Program where additions of biocides and corrosion inhibitors will be considered. Since the effect of any water contamination is minimized, the potential for MIC and general corrosion will be limited providing additional assurance that loss of material will be adequately managed.

~~On this basis, t~~The project team found this enhancement acceptable ~~since~~based on the discussion above and because, when the enhancement is implemented, PNPS AMP B.1.10~~, "Diesel Fuel Monitoring Program,"~~ will be more consistent with GALL AMP XI.M30~~ and will provide additional assurance that the effects of aging will be adequately managed~~.

Enhancement 2

Element: 4: Detection of Aging Effects
Enhancement: The Diesel Fuel Monitoring Program will be enhanced to include periodic ultrasonic measurement of the bottom surface of the security diesel generator fuel storage tank to ensure that significant degradation is not occurring.

The GALL Report identified the following recommendation for the "Detection of Aging Effects" program element associated with the enhancement:

> Degradation of the diesel fuel oil tank cannot occur without exposure of the tank internal surfaces to contaminants in the fuel oil, such as water and microbiological organisms. Compliance with diesel fuel oil standards in item 3 above and periodic multi-level sampling provide assurance that fuel oil contaminants are below unacceptable levels. Internal surfaces of tanks that are drained for cleaning are visually inspected to detect potential degradation. However, corrosion may occur at locations in which contaminants may accumulate, such as a tank bottom, and an ultrasonic thickness measurement of the tank bottom surface ensures that significant degradation is not occurring.

-The applicant stated, in the PNPS LRA, that the Diesel Fuel Monitoring Program would be

enhanced to provide periodic ultrasonic inspection of the bottom surface of the security diesel generator fuel storage tank. However, during the site audit, the applicant indicated that UT is not possible at the bottom of the security diesel generator fuel storage tank because of tank geometry and installation configuration. Therefore, this enhancement was revised to add instrumentation to monitor leakage between the two walls of this double-walled tank. This enhancement to the Diesel Fuel Monitoring Program will ensure corrective action will be implemented before the outer tank wall is breached due to loss of material providing additional assurance that the effects of aging will be adequately managed. This enhancement is item #5 on the applicant's list of commitments for license renewal and will be completed prior to the period of extended operation.

~~On this basis, t~~The project team found this enhancement acceptable ~~since~~based on the discussion above and because, when the enhancement is implemented, PNPS AMP B.1.10~~,~~ ~~"Diesel Fuel Monitoring Program,"~~ will be more consistent with GALL AMP XI.M30~~ and will provide additional assurance that the effects of aging will be adequately managed~~.

Enhancement 3

Element: 6: Acceptance Criteria
Enhancement: UT measurements of tank bottom surfaces will have an acceptance criterion of > 60% ~~Tnom~~T_{nom}

The GALL Report identified the following recommendation for the "Acceptance Criteria" program element associated with the enhancement:

> The ASTM Standard D 4057 is used for guidance on oil sampling. The ASTM Standards D 1796 and D 2709 are used for guidance on the determination of water and sediment contamination in diesel fuel. ASTM D 6217 and Modified D 2276, Method A are used for guidance for determination of particulates. The modification to D 2276 consists of using a filter with a pore size of 3.0 mm, instead of 0.8 mm.

The applicant stated, in the PNPS LRA, that UT measurements of tank bottom surfaces will have an acceptance criterion of > 60 % ~~Tnom~~T_{nom}.

During the audit and review, the project team asked the applicant to provide justification for the "~~>=~~≥ 60% of nominal thickness" acceptance criterion. In its original response, the applicant stated that the acceptance criterion was based on one set of UT measurements where the minimum wall thickness found was 95 percent of the nominal wall thickness. During the site audit, the applicant stated although it is likely that this is due to normal variation of the wall thickness during fabrication, it was assumed that the difference in wall thickness was the result of aging degradation. Projection of this thinning rate indicated that the "~~>=~~≥60% of nominal thickness" acceptance criterion will not be exceeded during the period of extended operation even if the thinning rate was doubled. However, the project team indicated that there was no basis showing the tanks would perform their intended functions with wall thinning down to 60 percent of the nominal wall thickness. Therefore, the applicant revised this enhancement to specify acceptance criterion for UT measurements of the emergency diesel generator fuel storage tanks (T-126A&B). In a letter dated July 19, 2006 (ML062080142), the applicant stated in Appendix B Audit Item 320 that LRA Appendix A is revised to include Appendix A commitment number 6. The applicant committed~~-~~ to specify acceptance criterion for UT measurements of emergency diesel generator fuel storage tanks (T-126A&B) prior to the period

of extended operation.

During the audit and review, the project team asked two additional questions regarding UT measurements of the diesel fuel tanks:

(1) Will tank bottoms be subjected to 100-percent UT inspection?

In its response, the applicant stated that tank bottoms would not be 100-percent inspected. Rather, a periodic UT measurement is performed on the bottom surface of the underground emergency diesel fuel oil storage tanks. During these inspections, UT measurements are made at several random locations on the bottom of these tanks. This response is acceptable because random measurements will be able to trend any loss of material to the tank bottoms.

(2) If reduction of thickness is discovered during UT, will microbiological activity be monitored and biocide added in the future? If not, provide a justification for not doing so.

In its response, the applicant stated that in accordance with the Corrective Action Program, an engineering evaluation into the cause will be performed if test acceptance criteria are not met and corrective actions will be implemented to ensure that the intended function of the tanks can be maintained consistent with the current licensing basis for the period of extended operation. If appropriate to address the cause, biocide addition may be an element of the corrective action. This response is acceptable because no evidence of MIC in diesel fuel storage tanks has been discovered to date, and biocide addition will be considered during the corrective action if evidence of MIC is discovered (e.g., during UT measurements or visual examinations).

~~On this basis, the~~ The project team found this enhancement acceptable based on the discussion above and because, when the enhancement is implemented, PNPS AMP B.1.10~~, "Diesel Fuel Monitoring Program,"~~ will be more consistent with GALL AMP XI.M30~~ and will provide additional assurance that the effects of aging will be adequately managed~~.

3.0.3.2.8.5 Operating Experience

The applicant stated, in the PNPS LRA, that in 2001, two diesel fuel oil deliveries were rejected; one because the oil viscosity was too low and one because the oil had detectable visible particulate contamination. Rejection of inferior fuel shipments maintains diesel fuel quality to prevent loss of material and cracking of fuel system components.

Monthly sampling of the B EDG fuel oil tank and the B SBO fuel oil tank in August 2003 indicated a small amount of water was in the tanks. Gaskets were replaced although the indication of water was determined to be a false positive. The tanks were confirmed to be water-free during subsequent testing. Sampling of the B EDG fuel oil tank in January 2005 indicated a small amount of water was in the tank. However, subsequent testing confirmed the tank to be water-free. Other fuel oil sampling results from 2000 through August 2005 reveal that fuel oil quality is being maintained in compliance with acceptance criteria. A 1998 visual and ultrasonic inspection of A and B diesel fuel oil storage tank internals revealed no degradation. A 2002

visual inspection of A and B SBO fuel oil storage tank internals revealed no degradation. Continuous confirmation of diesel fuel quality, timely corrective actions, and absence of degradation in the fuel oil storage tanks provide evidence that the program is effective in managing loss of material and cracking of fuel system components.

The project team reviewed the operating experience provided in the PNPS LRA and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. In addition, the project team reviewed PNPS operating experience as documented in the PNPS Operating Experience Review Report for the Diesel Fuel Monitoring Program and did not find any evidence of PNPS component degradation or failures that are outside the envelope of industry experience.

On the basis of its review of the above ~~industry and plant-specific~~ operating experience and discussions with the applicant's technical staff, the project team concluded that the applicant's Diesel Fuel Monitoring Program will adequately manage the aging effects that are identified in the PNPS LRA for which this AMP is credited.

3.0.3.2.8.6 UFSAR Supplement

The applicant provided its UFSAR Supplement for the Diesel Fuel Monitoring Program in PNPS LRA, Appendix A, Section A.2.1.10, which states that the Diesel Fuel Monitoring Program entails sampling to ensure that adequate diesel fuel quality is maintained to prevent plugging of filters, fouling of injectors, and corrosion of fuel systems. Exposure to fuel oil contaminants such as water and microbiological organisms is minimized by periodic draining and cleaning of tanks and by verifying the quality of new oil before its introduction into the storage tanks.

During the audit and review, the project team noted that the applicant's description of the B.1.10 program in UFSAR Supplement in LRA, Appendix A, did not include, as a commitment, the enhancements described in LRA, Appendix B.1.10. The project team asked the applicant to include a description of the enhancements to PNPS' B.1.10 program in the UFSAR Supplement in LRA, Appendix A as recommended by NUREG-1800, Section 3.X.2.4. In response to this request, the applicant stated that the program description in Appendix A will be revised to identify the commitment number(s) associated with the enhancement(s) for that program as described in LRA Appendix B. In a letter dated July 19, 2006 (ML062080142), license renewal commitment numbers 4, 5, and 6 specify enhancements to this program.

The project team reviewed the UFSAR Supplement for PNPS AMP B.1.10, found that it was consistent with the GALL Report, and determined that, with the clarification above, it provides an adequate summary description of the program as identified in the SRP-LR FSAR Supplement table and as required by 10 CFR 54.21(d).

3.0.3.2.8.7 Conclusion

On the basis of its audit and review ~~and audit~~ of the applicant's program, the project team found that those program elements for which the applicant claims consistency with the GALL Report, are consistent with the GALL Report. In addition, the project team has reviewed the exceptions and the associated justifications and determined that the AMP, with the exceptions, is adequate to manage the aging effects for which it is credited. Also, the project team has reviewed the enhancements and determined that the implementation of the enhancements prior to the period of extended operation would result in the existing AMP being consistent with the GALL Report

AMP to which it was compared. The project team found that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained for the period of extended operation, as required by 10 CFR 54.21(a)(3). The project team 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).

WordPerfect Document Compare Summary

Original document: E:\License Renewal\Pilgrim\3.0.3.2.13 Oil Analsys Program Original.wpd
Revised document: @PFDesktop\:MyComputer\E:\License Renewal\Pilgrim\3.0.3.2.13 Oil Analsys Program.wpd
Deletions are shown with the following attributes and color:
~~Strikeout~~, Blue RGB(0,0,255).
Deleted text is shown as full text.
Insertions are shown with the following attributes and color:
Double Underline, Redline, Red RGB(255,0,0).

The document was marked with 31 Deletions, 51 Insertions, 0 Moves.

3.0.3.2.13 OIL ANALYSIS PROGRAM (PNPS AMP B.1.22)

In PNPS LRA, Appendix B, Section B.1.22, the applicant stated that PNPS AMP B.1.22, "Oil Analysis Program," is an existing plant program that is consistent with GALL AMP XI.M39, "Lubricating Oil Analysis," with an exception and enhancements.~~—~~

3.0.3.2.13.1 Program Description

The applicant stated, in the PNPS LRA, that this program maintains oil systems free of contaminants (primarily water and particulates) thereby preserving an environment that is not conducive to loss of material, cracking, or fouling. Sampling frequencies are based on vendor recommendations, accessibility during plant operation, equipment importance to plant operation, and previous test results.

3.0.3.2.13.2 Consistency with the GALL Report

In the PNPS LRA, the applicant stated that PNPS AMP B.1.22 is consistent with GALL AMP XI.M39, with an exception and enhancements.

The project team interviewed the applicant's technical staff and reviewed, in whole or in part, the documents listed in Attachment 5 of this audit and review report for PNPS AMP B.1.22, including PNPS AMP B.1.22, including Aging Management Program Evaluation Report, LRPD-02, Revision 1, Section 4.16, "Oil Analysis Program," which provides an assessment of the AMP elements' consistency with GALL AMP XI.M39. Specifically, the project team reviewed the program elements (see Section 3.0.2.1 of this audit and review report) contained in PNPS AMP B.1.22 and associated bases documents to determine consistency with GALL AMP XI.M39.

The project team also reviewed PNPS License Renewal Project Operating Experience Review Report, LRPD-05, Section 4.16, "Oil Analysis Program;" ~~Entergy~~and EN-DC-310, "Entergy Nuclear Management Manual, Predictive Maintenance Program, ~~EN-DC-310,~~ Rev. 0~~;~~ ~~CR-PNP-2003-02670, During Lube Oil Analysis Evaluation for RHR Pump B (P-203B) the Viscosity Was Noted to be Slightly Outside of the Acceptable Range; CR-PNP-2005-00116, Lube Oil Testing of the A Diesel X-107A Has Indicated a Step Change in the Wear Particle Count; CR-PNP-2005-00618, Lube Oil Testing of the B Diesel X-107B Has Indicated a Step Change in the Wear Particle Count.~~

The project team reviewed those portions of the Oil Analysis Program for which the applicant claims consistency with GALL AMP XI.M39 and found that they are consistent with the GALL Report AMP. ~~Furthermore, t~~The project team ~~concluded~~found that the applicant's Oil Analysis Program ~~provides reasonable assurance that the effects of aging will be managed so that components crediting this program can perform their intended function consistent with the current licensing basis during the period of extended operation. The project team found the applicant's Oil Analysis Program acceptable because it~~ conforms to the recommended GALL AMP XI.M22, "Lubricating Oil Analysis," with ~~an~~the exception and enhancements as described below.

3.0.3.2.13.3 Exceptions to the GALL Report

The applicant stated, in the PNPS LRA, that the exception to the GALL Report program

elements is as follows:

Element:	3: Parameters Monitored/Inspected
Exception:	Flash point is not determined for sampled oil.

The GALL Report identified the following recommendation for the "Parameters Monitored/Inspected" program element associated with the exception taken:

> Parameters Monitored/Inspected: For components with periodic oil changes in accordance with manufacturer's recommendations, a particle count and check for water are performed to detect evidence of abnormal wear rates, contamination by moisture, or excessive corrosion. For components that do not have regular oil changes, viscosity, neutralization number, and flash point are also determined to verify the oil is suitable for continued use. In addition, analytical ferrography and elemental analysis are performed to identify wear particles.

The applicant stated, in the PNPS LRA, that analyses of filter residue or particle count, viscosity, total acid/base (neutralization number), water content, and metals content provide sufficient information to verify the oil is suitable for continued use.

During the audit and review, the project team asked the applicant to provide justification for not monitoring the flashpoint of oil that is not regularly changed. In its response to this request, the applicant stated that flash point is not determined for sample oil because analysis of filter residue or particle count, viscosity, total acid/base (neutralization number), water content, and metals content provide sufficient information to verify the oil does not contain water or contaminants that would permit the onset of aging effects. Also, the applicant stated that the percent fuel dilution in diesel engine oils is monitored, which is a more accurate method than flash point for identifying fuel leak and oil dilution. Subsequently, the project team asked the applicant to provide the method, including any standards, used to determine fuel dilution and the acceptance criterion for oil dilution in diesel engine oils.

In its response to this request, the applicant provided a copy of procedure 3.M.3-61.3, "Emergency Diesel Generator Quarterly Preventive Maintenance," showing that quarterly lube oil samples are sent to the laboratory. ~~P~~The applicant also provided laboratory test results, showing that percent dilution is measured in accordance with ASTM standards. Acceptance criterion is less than 3 percent by weight and based on ALCO diesel engine owners' group chemistry guidelines. ~~The following will be added to LRA Section B.1.22 exception note. PNPS measures the percent fuel dilution in diesel engine oils, which is a more accurate method than flash point for identifying fuel leaks and oil dilution.~~ In a letter dated July 19, 2006 (ML062080142), the applicant stated, in Appendix B Audit Item 213, that LRA Section B.1.22 exception note is revised to state that PNPS measures the % fuel dilution in diesel engine oils which is a more accurate method than flash point for identifying fuel leak and oil dilution and that the acceptance criterion is < 3% Wt based ALCO diesel engine owners' group chemistry guidelines.

On this basis, the project team found this exception acceptable.

3.0.3.2.13.4 Enhancements

The applicant stated, in the PNPS LRA, that the enhancements in meeting the GALL Report program elements are as follows:

Enhancement 1

Elements: 1: Scope of Program
Enhancement: The Oil Analysis Program will be enhanced to periodically change CRD pump lubricating oil. A particle count and check for water will be performed on the drained oil to detect evidence of abnormal wear rates, contamination by moisture, or excessive corrosion.

The GALL Report identified the following recommendation for the "Scope of Program" program element associated with the enhancement:

> Scope of Program: On a periodic basis, this program samples lubricating oil from plant components subject to aging management review.

The applicant stated, in the PNPS LRA, that this enhancement will be initiated prior to the period of extended operation. The implementation of this enhancement by the applicant will verify that the oil environment of the CRD pump will not be conducive to loss of material thus providing additional assurance that loss of material will be adequately managed.

~~On this basis, t~~The project team found this enhancement acceptable based on the discussion above and because, when ~~enhancements are~~ the enhancement is implemented, PNPS AMP B.1.22~~, "Oil Analysis Program,"~~ will be more consistent with GALL AMP XI.M39, ~~and provide additional assurance that the effects of aging will be adequately managed.~~

Enhancement 2

Element: 3: Parameter Monitored/Inspected
Enhancement: Procedures for security diesel and reactor water cleanup pump oil changes will be enhanced to obtain oil samples from the drained oil. Procedures for lubricating oil analysis will be enhanced to specify that a particle count and check for water are performed on oil samples from the fire water pump diesel, security diesel, and reactor water cleanup pumps.

The GALL Report identified the following recommendation for the "Parameter Monitored/Inspected" program element associated with the enhancement:

> Parameters Monitored/Inspected: For components with periodic oil changes in accordance with manufacturer's recommendations, a particle count and check for water are performed to detect evidence of abnormal wear rates, contamination by moisture, or excessive corrosion. For components that do not have regular oil changes, viscosity, neutralization number, and flash point are also determined to verify the oil is suitable for continued use. In addition, analytical ferrography and elemental analysis are performed to identify wear particles.

The applicant stated, in the PNPS LRA, that this enhancement will be initiated prior to the period of extended operation. The implementation of this enhancement by the applicant will verify that the oil environment of the fire water pump diesel, security diesel, and reactor water cleanup pumps will not be conducive to loss of material thus providing additional assurance that loss of material will be adequately managed.

~~On this basis, t~~The project team found this enhancement acceptable ~~since~~based on the discussion above and because, when the enhancement is implemented, PNPS AMP B.1.22~~, "Oil Analysis Program,"~~ will be more consistent with GALL ~~AMP XI.M39 and will provide additional assurance that the effects of aging will be adequately managed~~AMP XI.M39.

3.0.3.2.13.5 Operating Experience

The applicant stated, in the PNPS LRA, that lube oil analysis for residual heat removal pump B in July 2003 showed viscosity slightly outside of the acceptable range. No other problems were noted with the oil. Retest confirmed the viscosity condition. The oil was changed at the next system window. ~~Continuous confirmation of oil quality and timely corrective actions provide evidence that the program is effective in managing aging effects for lube oil components.~~

Lube oil testing of the A diesel generator in December 2004 and of the B diesel generator in January 2005 indicated a step change in the wear particle count. The increase in iron and aluminum was very minor and levels remained well below those at which corrective action is necessary. The analysis laboratory indicated that the increases may be the result of new analysis equipment that has a higher resolution. Quarterly trending will continue for wear products and appropriate action will be taken if required. Continuous confirmation of oil quality and timely corrective actions provide evidence that the program is effective in managing aging effects for lube oil components.

The project team reviewed the operating experience provided in the PNPS LRA and interviewed the applicant's technical staff to confirm that the plant-specific operating experience did not reveal any degradation not bounded by industry experience. In addition, the project team reviewed PNPS operating experience as documented in the PNPS Operating Experience Review Report for the Oil Analysis Program and did not find any evidence of PNPS component degradation or failures that are outside the envelope of industry experience.

On the basis of its review of the above ~~industry and plant-specific~~ operating experience and discussions with the applicant's technical staff, the project team concluded that the applicant's Oil Analysis Program will adequately manage the aging effects that are identified in the PNPS LRA for which this AMP is credited.

3.0.3.2.13.6 UFSAR Supplement

The applicant provided its UFSAR Supplement for the Oil Analysis Program in PNPS LRA, Appendix A, Section A.2.1.24, which states that the Oil Analysis Program maintains oil systems free of contaminants (primarily water and particulates) thereby preserving an environment that is not conducive to loss of material, cracking, or fouling. Activities include sampling and analysis of lubricating oil for detrimental contaminants, water, and particulates.

Sampling frequencies are based on vendor recommendations, accessibility during plant

operation, equipment importance to plant operation, and previous test results.

During the audit and review, the project team noted that the applicant's description of the B.1.22 program in UFSAR Supplement in LRA, Appendix A, did not include, as a commitment, the enhancements described in LRA, Appendix B.1.22. The project team asked the applicant to include a description of the enhancements to PNPS' B.1.22 program in the UFSAR Supplement in LRA Appendix A as recommended by NUREG-1800, Section 3.X.2.4. In response to this request, the applicant stated that program description in Appendix A will be revised to identify the commitment number(s) associated with the enhancement(s) for that program as described in LRA Appendix B. In a letter dated July 19, 2006 (ML062080142), the applicant stated that ~~L~~license renewal commitment numbers 18 and 19 specify enhancements to this program.

~~On this basis, t~~The project team ~~found this enhancement acceptable because when the enhancement is implemented,~~reviewed the UFSAR Supplement for PNPS AMP B.1.22, ~~"Oil Analysis Program," will be~~found that it was consistent with ~~GALL AMP XI.M39 and will provide additional assurance that the effects of aging will be adequately managed~~the GALL Report, and determined that, with the clarification above, it provides an adequate summary description of the program as identified in the SRP-LR FSAR Supplement table and as required by 10 CFR 54.21(d).

3.0.3.2.13.7 Conclusion

On the basis of its audit and review ~~and audit~~ of the applicant's program, the project team found that those program elements for which the applicant claims consistency with the GALL Report, are consistent with the GALL Report. In addition, the project team has reviewed the exception and the associated justifications and determined that the AMP, with the exception, is adequate to manage the aging effects for which it is credited. Also, the project team has reviewed the enhancements and determined that the implementation of the enhancements prior to the period of extended operation would result in the existing AMP being consistent with the GALL Report AMP to which it was compared. The project team found that the applicant has demonstrated that the effects of aging will be adequately managed so that the intended functions will be maintained for the period of extended operation, as required by 10 CFR 54.21(a)(3). The project team 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).