DRAFT

Date 8/2/02

L-2002-159
10 CFR 54

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Re: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Response to NRC Request for Additional Information for Review of the St. Lucie Units 1 and 2 License Renewal Application

By letter dated July 1, 2002, the NRC requested additional information regarding the St. Lucie Units 1 and 2 License Renewal Application (LRA) Section 3.3 Aging Management Review Results: Auxiliary Systems. Attachment 1 to this letter contains FPL's responses to the requests for additional information (RAIs).

Should you have any further questions, please contact S. T. Hale at (772) 467-7430.

Very truly yours,

D. E. Jernigan
Vice President
St. Lucie Plant

DEJ/STH/hlo
Attachment (1)

Enclosure 7

St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389

Response to NRC Request for Additional Information Regarding the License Renewal Application, Section 3.3 Aging Management Review Results – Auxiliary Systems.

STATE OF FLORIDA)
) ss
COUNTY OF ST. LUCIE)

D. E. Jernigan being first duly sworn, deposes and says:

That he is Vice President – St. Lucie of Florida Power and Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information and belief, and that he is authorized to execute the document on behalf of said Licensee.

____
D. E. Jernigan

Subscribed and sworn to before me this

______ day of ________________, 2002.

____

____
Name of Notary Public (Type or Print)

D. E. Jernigan is personally known to me.

cc: U.S. Nuclear Regulatory Commission, Washington, D.C.

Chief, License Renewal and Standardization Branch
Project Manager – St. Lucie License Renewal
Project Manager - St. Lucie

U.S. Nuclear Regulatory Commission, Region II
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ATTACHMENT 1
RESPONSE TO NRC REQUESTS FOR ADDITIONAL INFORMATION FOR REVIEW OF THE ST. LUCIE UNITS 1 AND 2 LICENSE RENEWAL APPLICATION

3.3 AGING MANAGEMENT REVIEW RESULTS: AUXILIARY SYSTEMS

RAI 3.3 - 1

For carbon steel, stainless steel, bronze, brass, and copper bolting in the following systems and for the environments to which they are exposed, justify why the LRA excludes the aging effects that involve loss of material and cracking. Include the bounding humidity level for the outdoor, indoor-not air conditioned, containment, and buried environments. The systems that should be considered are instrument air, component cooling water, diesel generator, intake cooling water, primary water makeup, service water system, turbine cooling water (Unit 1 only), ventilation, sampling, and steam and power conversion.

Provide a summary of the plant-specific operating experience associated with the degradation of bolting.

FPL Response

As discussed in LRA Appendix C, Subsection 5.4 (page C-16), "Loss of Mechanical Closure Integrity", the loss of bolting material and cracking were evaluated for their effects on mechanical closure integrity. Only loss of bolting material associated with aggressive chemical attack, such as that resulting from borated water leaks, was determined to require management. Instrument Air, Component Cooling Water, Intake Cooling Water, Primary Water, Service Water, Ventilation, and all Steam and Power Conversion Systems credit the Boric Acid Wastage Surveillance Program for managing loss of mechanical closure integrity due to boric acid corrosion. The emergency diesel generators and Turbine Cooling Water are not subject to loss of material due to boric acid corrosion based upon the distance of those systems to borated water sources.

Although the LRA identifies bolting (mechanical closures) material as carbon steel, the actual bolting standard for St. Lucie piping and components is a low alloy steel ASTM A193, Grade B7. This material provides increased corrosion resistance over carbon steel. Additionally, bolting is typically in a dry (non-wetted) environment and is coated with a lubricant. When the bolting is associated with a system that operates at a temperature greater than 212°F (such as Main Steam, Auxiliary Steam, Main Feedwater, and Steam Generator Blowdown) or is located in an air-conditioned environment (such as some ventilation system components), this further eliminates the presence of moisture and potential for corrosion. A review of industry operating experience did not identify loss of material due to general corrosion as an aging effect requiring management for bolting. A review of St. Lucie plant-specific operating experience only identified a few cases of corrosion of bolting. These cases were associated with non-pressure boundary valve gland bolting with the corrosion attributed to packing leaks. It is the plant policy to minimize operation with valve packing leaks, and thus packing leaks are identified and repaired on a timely basis.

Therefore, apart from aggressive chemical attack, loss of material due to corrosion of auxiliary system bolting does not require management for the Auxiliary Systems at St. Lucie Units 1 and 2.

As discussed in LRA Appendix C, Subsection 5.4 (page C-16), the potential for stress corrosion cracking (SCC) of bolting materials has been addressed at St. Lucie as part of corrective actions to NRC IE Bulletin 82-02. These actions have been effective in eliminating this aging effect. A review of St. Lucie plant-specific operating experience identified no instances of bolting degradation due to SCC which supports this conclusion. Additionally, a review of NRC generic communications did not identify any recent bolting failures attributed to SCC.

Therefore, cracking of bolting material is not an aging effect requiring management for auxiliary systems at St. Lucie Units 1 and 2.

Note that this position is consistent with that accepted by the NRC as part of the Turkey Point Units 3 and 4 LRA review.

RAI 3.3 - 2

Recent experience with extensive wastage of the vessel head as a result of boric acid leakage at the David Bessie [sic: Davis Bessie] Nuclear Power Plant suggests the seriousness of boric acid corrosion (see NRC Information Notice (IN) 2002-11, "Recent Experience With Degradation of Reactor Pressure Vessel Head," dated March 12, 2002). Clarify whether the following components are likely to be externally exposed to borated coolant leaking from any adjacent systems or components:

(1) component cooling water system carbon steel surge tanks, pump bodies, and heat exchanger shells;

(2) demineralized makeup water system (any component);

(3) instrument air system carbon and galvanized steel components, such as instrument air receivers, bolting, dryers, and compressor cooler shells;

(4) intake cooling water system carbon steel basket strainers and valve bodies; and

(5) turbine cooling water (Unit 1 only) system carbon steel components.

FPL Response

The following components are not in proximity to any systems which contain borated water and therefore are not exposed to borated water leaking from any adjacent systems or components:

- Component Cooling Water carbon steel surge tanks, pump bodies and heat exchanger shells;
- Instrument Air receivers, bolting, dryers, compressor cooler shells and associated components;
- Intake Cooling Water carbon steel basket strainers and valve bodies;
- Turbine Cooling Water carbon steel components.

Some Instrument Air components may be exposed to borated water leakage from adjacent systems or components. (See LRA Table 3.3-8, pages 3.3-56, 3.3-57, and 3.3-58.) Loss of material due to boric acid corrosion of Instrument Air carbon steel components exposed to borated water leaks is managed by the Boric Acid Wastage Surveillance Program.

Demineralized Makeup Water components are stainless steel and thus not susceptible to boric acid wastage. The Demineralized Makeup Water bolting in the scope of license renewal is not in proximity to any systems that contain borated water and therefore can not be exposed to borated water leaking from any adjacent systems or components.

RAI 3.3 - 3

In Table 3.3-5, “Emergency Cooling Canal,” and Table 3.3-9, “Intake Cooling Water,” please clarify the environment to which the concrete with embedded/encased carbon steel piping/fitting is exposed. In particular, state whether that environment is raw water-salt water, outdoor air, or some other(s).

The raw water-salt water environment contains chlorides. Similarly, the outdoor environment of St. Lucie is defined in the LRA as moist, salt-laden atmospheric air, with temperatures of 27°F – 93°F, 73% average humidity, and exposure to weather, including precipitation and wind. Therefore, the outdoor environment also contains chlorides. These chlorides in the moist, salt-laden atmospheric air may reach the steel/concrete interface in the interior of the concrete through the process of permeation, infiltration, and condensation through the pores of the concrete. Accumulation of high enough levels of chlorides will result in attacks on and disruption of the protective film formed on the surfaces of the steel as a result of the originally high pH levels in the concrete environment. Once some particular region of the protective film is destroyed, localized corrosion of the steel will begin through an electrochemical process. However, Tables 3.3-5 and 3.3-9 of the LRA do not identify any aging effects for carbon steel components in the emergency cooling canal system and the intake cooling water system associated with external exposure to an embedded/encased environment.

Explain why the aging process as described is not applicable to St. Lucie, and discuss the operating history of the plant to support the conclusion regarding the absence of applicable aging effects with respect to cracking and loss of materials.

FPL Response

Concerning the Emergency Cooling Canal embedded/encased piping listed on LRA Table 3.3-5 (page 3.3-41), a detailed review of plant drawings and vendor prints indicates that this piping is actually bolted to the concrete and is therefore not embedded/encased. In addition, the piping/fittings and bolting shown on LRA Table 3.3-5 are made of aluminum bronze and not carbon steel. LRA Table 3.3-5 (page 3.3-41) is revised as follows:

TABLE 3.3-5
EMERGENCY COOLING CANAL

Component/ Commodity Group [GALL Reference]	**Intended Function**	**Material**	**Environment**	**Aging Effects Requiring Management**	**Program/ Activity**
Internal Environment					
Piping/fittings	Pressure boundary	Aluminum bronze	Raw water – salt water (submerged)	Loss of material	Periodic Surveillance and Preventive Maintenance Program
External Environment					
Piping/fittings	Pressure boundary	Aluminum bronze	Raw water – salt water (submerged)	Loss of material	Periodic Surveillance and Preventive Maintenance Program

Bolting (mechanical closures)	Pressure boundary	Aluminum bronze	Raw water – salt water (submerged)	Loss of material	Periodic Surveillance and Preventive Maintenance Program

Concerning the Intake Cooling Water (ICW) embedded/encased piping listed on LRA Table 3.3-9 (page 3.3-63), the piping is embedded/encased in concrete where it passes through the walls of the St. Lucie Units 1 and 2 Component Cooling Water Areas. The external environments are outdoor (Unit 1) and indoor – not air conditioned (Unit 2) inside the Component Cooling Water Areas and buried (both units) outside the areas. A review of St. Lucie plant-specific operating experience did not identify any aging effects requiring management for this portion of the system. ICW piping at the plant discharge is exposed to an external environment of submerged. (See LRA Table 3.3-9 page 3.3-63.)

RAI 3.3 - 4

In Table 3.3-11, “Primary Makeup Water,” of the LRA, the applicant stated that no aging effect requiring aging management is applicable to stainless steel piping/fittings embedded/encased in concrete. Stainless steel components are much more resistant to chloride-related corrosion than carbon steel components. However, the applicant also stated that plant experience has identified loss of materials and cracking as applicable aging effects for stainless steel components in the emergency core cooling system (ECCS) pipe tunnel.

Explain why the aging effects applicable to stainless steel components in the ECCS pipe tunnel are not applicable to the stainless steel piping/fittings embedded/encased in concrete at St. Lucie. Also discuss the operating history with regards to stainless steel components in the embedded/encased environment to support the conclusion regarding the absence of applicable aging effects with respect to cracking and loss of materials.

FPL Response

As indicated in the response to RAI 3.3.1-2, stainless steel components located in the Emergency Core Cooling System (ECCS) tunnels at St. Lucie have greater susceptibility to corrosion (i.e., pitting and stress corrosion cracking) due to their potential for increased external chloride contamination. Note that the terms “tunnels” and “trenches” are synonymous at St. Lucie. This greater potential for external contamination applies to the components whose surfaces are exposed to the air environment in the tunnel, not to those which are embedded/encased in concrete. The high alkalinity of concrete provides an environment that protects the stainless steel from corrosion. A review of the St. Lucie plant-specific plant operating experience did not identify any intrusion of chlorides into concrete in a non-wetted (i.e., not submerged) environment resulting in degradation of embedded/encased stainless steel.

The Primary Water piping/fittings identified in LRA Table 3.3-11 (page 3.3-68) as exposed to an external environment of embedded/encased are associated with piping which penetrates concrete that is not wetted. Therefore, there is no potential for chloride intrusion into the concrete. As a result, loss of material and cracking are not aging effects requiring management for Primary Water system components exposed to an embedded/encased environment.

RAI 3.3 - 5

If the concrete structure in which the carbon steel components are embedded is only exposed to atmospheric air with negligible levels of chlorides, the embedded/encased steel piping/fittings may still be susceptible to a corrosion process attributable to the carbon dioxide present in the atmospheric air. This corrosion process operates via the generation of carbonic acid, which reduces the pH level in the vicinity of the steel/concrete interface. This neutralization process, in turn, disrupts the passivity of the protective films and permits attacks on the underlying carbon steel substrate. The water/cement ratio of the concrete is an important factor in affecting the rate of this corrosion process. Justify why this aging process is not applicable to St. Lucie. Discuss the operating history to support the absence of applicable aging effects with respect to cracking and loss of materials.

FPL Response

The corrosion process discussed in this RAI is called "carbonation." According to the Portland Cement Association, the depth of carbonation of good quality, well-cured concrete is generally of little significance. As discussed in LRA Subsections 3.5.1.3 and 3.5.2.3 (pages 3.5-9 and 3.5-24 respectively), St. Lucie structures are made from high quality concrete materials (high strength, high cement content, low water-cement ratio, and controlled curing). St. Lucie has not experienced cracking or loss of material in steel piping/fittings embedded in concrete. Therefore, carbonation is not a mechanism that causes aging effects requiring management at St. Lucie.

3.3.1 Chemical And Volume Control System (CVCS)

RAI 3.3.1 - 1

In Appendix C, Section 4.1.3, “Air/Gas,” of the LRA, the applicant describes the air/gas environments found at St. Lucie, Units 1 and 2. Aging effects of components exposed to the air/gas environment depend, in part, on the type of air/gas environment, the operating temperature, and the water content. Provide the characteristic parameters of the air/gas environments applicable to the components found in the CVCS. Also provide the bases by which the applicant determined that there are no aging effects requiring management for those components that are exposed to the air/gas environment.

FPL Response

As listed in LRA Table 3.3-1 (pages 3.3-13 through 3.3-15), Chemical and Volume Control (CVCS) components exposed to internal air/gas environments are the volume control tanks (VCT), the boric acid makeup tanks, and the associated valves, piping/fittings, tubing/fittings which are located above the contained water level in these tanks. The type of air/gas environment and the bases for the determination of no aging effects requiring management for these components are provided below:

(a) VCT internal gas space surfaces and associated valves, piping/fittings, and tubing/fittings are exposed to a non-wetted hydrogen environment with traces of nitrogen, oxygen, and helium at a temperature less than 150°F. The material of construction of these components is stainless steel, which is not susceptible to loss of material or stress corrosion cracking in this environment, per LRA Appendix C, Sections 5.1 and 5.2 (pages C-11 and C-14 respectively). A review of St. Lucie plant-specific operating experience validated that there are no aging effects requiring management for these components.

(b) The boric acid makeup tanks internal gas spaces surfaces and associated valves, piping/fittings, and tubing/fittings are exposed to an air/gas environment of “indoor - not air conditioned” air at a maximum temperature of 104°F. The material of construction of these components is stainless steel, which is not susceptible to loss of material or stress corrosion cracking in this environment per LRA Appendix C, Sections 5.1 and 5.2 (pages C-11 and C-14 respectively). A review of St. Lucie plant-specific operating experience validated that there are no aging effects requiring management for these components.

Therefore, no aging effects requiring management have been identified for these components.

RAI 3.3.1 - 2

Explain the difference between the outdoor environments described in Appendix C, Section 4.2.1, of the LRA, and the outdoor environment in the ECCS pipe tunnel. Also explain how this difference leads to differences in aging effects.

FPL Response

As discussed in LRA Appendix C, Section 5.2 (page C-14), sensitized stainless steels exposed to atmospheric conditions with high levels of contaminants (e.g., saltwater) are considered potentially susceptible to stress corrosion cracking (SCC). Additionally, as discussed in LRA Appendix C Section 5.1 (page C-11) pitting of stainless steel in an outdoor environment at St. Lucie is dependent on its location within the plant site. Experience at St. Lucie has identified pitting and SCC in the non-stress relieved heat affected zone regions of weld joints of stainless steel piping located in the Emergency Core Cooling System (ECCS) pipe tunnels exposed to the site marine environment. See LRA Table 3.2-2 (page 3.2-19). Note that the terms "tunnels" and "trenches" are synonymous at St. Lucie. Components located in the ECCS trenches at St. Lucie have greater susceptibility to pitting and cracking due to their potential for increased external contamination. These trenches are located in proximity to the discharge canals on the ocean side of the plant. The turbulence of water at the plant discharge and the ocean promotes increased chloride concentrations in the air and its deposition on plant equipment located at low points in its proximity. Because the ECCS trenches are low points and are covered throughout most of their length, components located in the trenches tend to collect chlorides and do not have the benefit of periodic rainfall to rinse the surfaces free of contaminants. Components located above ground elevation or in open trenches/pits (such as Component Cooling Water stainless steel components) which are exposed to an outdoor environment (i.e., including rainfall) have not experienced SCC. Therefore, the potential for external pitting and cracking due to SCC at St. Lucie is very dependent upon the localized environment of the components.

3.3.2 Component Cooling Water (CCW)

RAI 3.3.2 - 1

In Appendix C, Section 4.1.1, "Treated Water," the applicant states that crevice corrosion is insignificant for an environment with extremely low oxygen content (less than 0.1 ppm). The applicant also states that oxygen is required for pitting corrosion. Oxygen can be a contributor, but is not needed for crevice and pitting corrosion of metal. The applicant is requested to provide references supporting its position.

FPL Response

(The correct LRA Appendix C section addressing the role of oxygen in crevice corrosion is Section 5.1, "Loss of Material," not Section 4.1.1, "Treated Water".)

The reference providing the basis for the oxygen criteria associated with loss of material due to crevice corrosion is the industry guidance document developed by the Babcock and Wilcox Owners Group. This document references a "Corrosion and Wear Handbook for Water-Cooled Reactors" by D.J. DePaul, McGraw-Hill, New York.

However, it should be noted that low oxygen is not credited for precluding crevice corrosion in the Component Cooling Water (CCW) system. The control of contaminants under Chemistry Control Program and use of corrosion inhibitors (molybdate and nitrite) are credited for precluding loss of material due to corrosion. As described in LRA Appendix B Subsection 3.2.5.2 (page B-33), the Chemistry Control Program was developed in accordance with the guidelines of EPRI TR-107396, "Closed Cooling Water Chemistry Guideline." As stated in LRA Appendix C Section 5.1 (page C-12), crevice corrosion occurs most frequently in joints and connections or contact points between metals and nonmetals. These conditions would typically be found in component internals and flanged connections (such as those associated with valves and pumps), and thus would be identified during routine or corrective maintenance where disassembly was performed. When significant corrosion or failed parts are identified, the support of materials experts within FPL is typically requested to assist in root cause determination. This root cause analysis includes the use of standard metallurgical techniques for the identification of aging mechanisms, such as crevice corrosion. A review of St. Lucie plant-specific operating experience (approximately 100 St. Lucie root cause analysis reports between 1984 and the present, associated with license renewal passive components) was performed to identify any material failures attributed to crevice corrosion. The results of this review demonstrated that loss of material due to crevice corrosion is not an aging effect requiring management in the CCW or other treated water systems.

RAI 3.3.2 - 2

The applicant did not identify stress-corrosion cracking (SCC) as an aging effect for the CCW system components that are exposed to treated water. However, stainless steel components exposed to treated water can experience SCC. In addition, field experience reported in Appendix C of Topical Report (TR) 107396, “Closed Cycle Water Chemistry Guideline,” prepared by the Electric Power Research Institute (EPRI), indicates that if component cooling water is treated with nitrite as a corrosion inhibitor, carbon steel components exposed to treated water can experience intergranular stress corrosion cracking (IGSCC). Cracking of CCW piping is also reported in NRC Licensee Event Report (LER) 91-019-00, “Loss of Containment Integrity Due to Crack in Cooling Water Piping,” dated October 26, 1991.

Provide the bases for excluding cracking as an applicable aging effect for CCW system carbon and stainless steel components that are exposed to treated water.

FPL Response

As described in LRA Appendix C, Section 5.2 (page C-14), stress corrosion cracking (SCC) of stainless steel components is not considered an aging effect requiring management in a treated water environment with a temperature of less than 140°F. The operating temperature of Component Cooling Water (CCW) at St. Lucie Units I and 2 is less than 90°F, which is significantly below the SCC threshold temperature of 140°F. A review St. Lucie plant specific operating experience did not identify SCC in stainless steel CCW components as an aging effect requiring management. Therefore, SCC is not an aging affect requiring management for CCW stainless steel components.

As described in LRA Appendix C, Section 5.2 (page C-14), industry data has not identified SCC as a significant problem for carbon steel components. The industry experience reported in EPRI TR-107396 “Closed Cycle Water Chemistry Guideline” concerning intergranular stress corrosion cracking (IGSCC) of carbon steel involved nitrite-treated cooling water systems with a nitrite concentration of up to 6000 mg/l (approximately 6000 ppm). The nitrite concentration of the CCW system at St. Lucie is maintained at 300 - 450 ppm. A review St. Lucie plant-specific operating experience did not identify SCC in carbon steel components as an aging effect requiring management. Therefore, IGSCC is not an aging effect requiring management for carbon steel components.

The NRC provided a copy of Licensee Event Report (LER) 91-019-00 for Surry Nuclear Station (referenced in the GALL Report). Based on FPL’s review of this LER, the applicability to St. Lucie Units 1 and 2 could not be determined because a root cause was not identified. Note that Section VII.C.2 of the GALL Report does not identify cracking as an aging effect requiring management for stainless and carbon steel pressure boundary components in closed cooling water systems. Additionally, this position regarding SCC is consistent with that accepted by the NRC as part of the Turkey Point Units 3 and 4 LRA review.

RAI 3.3.2 - 3

The applicant did not identify SCC as an aging effect for the CCW heat exchanger tubes that are exposed to raw water. The operating experience at Turkey Point Station, shows that the CCW heat exchanger tubes, which are made of aluminum brass and exposed to raw water on the tube side, are susceptible to SCC (see U. S. Nuclear Regulatory Commission "Safety Evaluation Report with Open Items Related to the License Renewal of Turkey Point Nuclear Plant, Units 3 and 4," dated August 2001, p. 239). Provide the bases for excluding cracking as an applicable aging effect for CCW heat exchanger tubes that are exposed to raw water at St. Lucie.

FPL Response

The metallurgical analysis of the failed Turkey Point Component Cooling Water (CCW) heat exchanger tubes revealed that the cracking was initiated from the inside diameter (raw water side) and was located in the tube roll transition zone of the tube sheet. The cracking was determined to be transgranular stress corrosion cracking and was caused by the use of a new chemical injection system and the absence of sacrificial anodes. The tubes were replaced, the chemical injection system was removed from service, and zinc anodes were installed to prevent recurrence.

Although the St. Lucie CCW heat exchangers also utilize aluminum brass tubes, they have not experienced stress corrosion cracking (SCC). This is primarily due to the fact that St. Lucie never utilized a chemical injection system similar to the one once installed at Turkey Point. Additionally, St. Lucie utilizes sacrificial anodes to protect the raw water side of the heat exchangers. Finally, a review of St. Lucie metallurgical analysis reports of CCW heat exchanger tubes removed in 1988 and 1991 did not identify the presence of SCC. Therefore, cracking due to SCC is not an aging affect requiring management for these components.

RAI 3.3.2 - 4

Aging effects for CCW system components exposed to the air/gas environment depend, in part, on the type of air/gas environment, the operating temperature, and the water content. Provide the characteristic parameters of the air/gas environments applicable to the components found in the CCW system. Also provide the bases for excluding corrosion as an applicable aging effect for CCW components that are exposed to the air/gas environment.

FPL Response

The Component Cooling Water (CCW) surge tanks are vented carbon steel tanks that are internally coated for corrosion protection. The air/gas internal environment identified in LRA Table 3.3-2 (pages 3.3-18 and 3.3-19) applies to the CCW surge tanks and associated valves, piping and fittings located above the normal tank water level. This air/gas environment constitutes the atmospheric air of the surroundings (i.e., "indoor – not air-conditioned"). See LRA Appendix C Subsection 4.1.3 (page C-8).

The aging management review of the internal surfaces of the carbon steel CCW surge tanks exposed to an air/gas environment identified general corrosion as a potential aging mechanism. Based on the location of these tanks and the limited air exchange provided by the 2" tank vents, the internal general corrosion rate is expected to be small. These tanks are internally coated and a review of St. Lucie plant-specific operating experience did not identify corrosion as an aging effect requiring management. The existing tank corrosion allowance was confirmed to be acceptable for the period of extended operation, even without credit for the protection provided by the internal coatings of the tanks. Therefore, loss of material due to corrosion of the internal surfaces of the CCW surge tanks is not an aging effect requiring management.

An aging management review of the internal surfaces of the small diameter valves, piping and fittings associated with the CCW surge tanks identified general corrosion as a potential aging mechanism, and confirmed that the existing corrosion allowance for these components is adequate for the period of extended operation. A review of St. Lucie plant-specific operating experience did not identify corrosion as an aging effect requiring management. Therefore, loss of material due to corrosion of the valves, piping, and fittings associated with the CCW surge tanks is not an aging effect requiring management.

Finally, it should be recognized that loss of pressure boundary integrity above the water line will not result in loss of inventory or impact CCW surge tank system intended function since the CCW surge tanks are normally vented tanks.

RAI 3.3.2 - 5

On page B-45 of Appendix B to the LRA, the applicant states that for the Intake Cooling Water System Inspection Program, branch connections are examined as plant and industry experience warrants. Since this is an existing program, describe the findings of past examinations and discuss which aging effect(s), if any, have been observed at the branch connections. Include the corresponding root cause of any identified aging effects.

FPL Response

Past inspections of Intake Cooling Water (ICW) piping have identified susceptibility to loss of material due to corrosion resulting from localized internal and external coating failures on branch lines. Branch connections typically constitute vents, drains and instrumentation lines. Note that small branch lines may not have an internal lining/coating based upon size, and some consist of stainless steel instrumentation tubing. Accessible portions of branch connections are examined internally during the main header crawl-through inspections, and all small-bore lines are inspected externally. Below are provided some of the findings of past inspections of branch connections:

Degradation of a carbon steel coupling due to galvanic corrosion between the coupling and aluminum bronze pipe.

Through-wall leaks caused by degradation (i.e., internally initiated corrosive attack) of a carbon steel weld for a nipple attached to a 36” main line.

Localized pitting found on stainless steel drain line piping resulting in through-wall leakage.

Corrosion of a mounting bracket, process flange connection, and vent line for an ICW header pressure transmitter assembly due to exposure to a salt-laden atmosphere.

3.3.4 Diesel Generators And Support Systems

RAI 3.3.4 - 1

In Section 9.5.6.3, "System Evaluation," on page 9.5-12b of the Unit 2 updated Final Safety Analysis Report (UFSAR), the applicant states that the air receiver for the air-start system of the emergency diesel generator collects moisture to preclude fouling of the air-start valve with moisture and contamination. Provide justification for not identifying loss of material as an aging effect for the carbon steel, aluminum alloy, and copper alloy air-start system components that are exposed to the internal moist air environment.

FPL Response

LRA Table 3.3-4 (page 3.3-28) Air Start and Intake System incorrectly identified the internal environment for the Unit 2 Start-up air tanks (and associated valves, piping and fittings) as dry "Air/gas". Since the Unit 2 air start system does not have air dryers, the start-up air tanks and associated components are actually exposed to moist air. Although the material of these components is stainless steel and thus not subject to general corrosion, they are potentially susceptible to loss of material due to pitting corrosion.

As stated in the Unit 2 UFSAR Section 9.5.6.3, the air receiver for the air-start system of the emergency diesel generator collects moisture to preclude fouling of the air-start valve with moisture and contamination. These air tanks are periodically blown down to remove moisture. Therefore, Table 3.3-4 (page 3.3-28) has been corrected as shown below to indicate a "wetted air/gas" environment and credit the Periodic Surveillance and Preventive Maintenance Program. It should be noted that a review of St. Lucie plant-specific operating experience has not identified loss of material in the Unit 2 Air Start System.

Based upon moisture removal by periodic blow down of the start-up air tanks, the components downstream of the tanks are not subject to loss of material because the internal air/gas environment for these components is considered dry. All components downstream of the start-up air tanks are stainless steel or aluminum. There are no copper alloy or carbon steel components in the Unit 2 Air Start and Intake System.

Table 3.3-4 of the LRA (page 3.3-28) is revised as shown below:

TABLE 3.3-4
DIESEL GENERATORS AND SUPPORT SYSTEMS

Component/ Commodity Group [GALL Reference]	Intended Function	Material	Environment	Aging Effects Requiring Management	Program/ Activity
Air Start and Intake System					
Internal Environment					
Start-up air tanks, drain piping and valves (Unit 2 only)	Pressure boundary	Stainless steel	Air/gas (wetted)	Loss of material	Periodic Surveillance and Preventive Maintenance Program

RAI 3.3.4 - 2

Provide justification for not identifying loss of material as an aging effect for air-start system components fabricated from aluminum alloy or copper alloy exposed externally to an indoor-not air conditioned environment.

FPL Response

As discussed in LRA Appendix C, Section 5.1 (page C-11), and based upon industry guidance developed by the B&W Owners Group, both aluminum and copper alloys have high resistance to corrosion in atmospheric environments. As a result, no external aging effects requiring management were identified for these components. This conclusion is supported by a review of St. Lucie plant-specific operating experience which identified no instances of loss of material for the air start system components fabricated from aluminum or copper alloys exposed to an external environment of indoor, not air-conditioned. Also see the response to RAI 3.3.4-4.

RAI 3.3.4 - 3

In Table 3.3-4 on page 3.3-33 of the LRA, the applicant identifies loss of material as a potential aging effect for the carbon steel fuel oil tanks exposed to an air/gas environment, as a result of the potential for moisture contamination. Please provide justification for not identifying loss of material for the carbon steel day tanks, which are also exposed to the same air/gas environment.

FPL Response

The Unit 1 Diesel Oil Storage Tanks (DOSTs) are large vented tanks exposed to an outdoor environment. The Unit 2 DOSTs are inside a missile shield enclosure and are exposed to an external environment of indoor not-air conditioned. (See LRA Table 3.3-4, page 3.3-35.) Because of the large surface areas exposed to ambient temperature changes, these tanks are susceptible to condensation on the inside surfaces of the air/gas space. As such, the condensation collects in the tank bottoms and must be periodically drained off. The day tanks, however, are small tanks located inside the Emergency Diesel Generator Buildings. Based upon their size and location they do not experience large ambient temperature changes and are not subject to significant condensation. Additionally, due to periodic testing of the diesel generators, the fuel in these tanks is consumed and replenished frequently and therefore, collection of moisture is not anticipated. Also, the actual day tank internal environment is fuel oil vapor that protects the internal surfaces from corrosion. Therefore, loss of material is not an aging effect requiring management for Diesel Generator Fuel Oil System internal air/gas environments with the exception of the DOSTs.

This position is consistent with that accepted by the NRC as part of the Turkey Point Units 3 and 4 LRA review.

RAI 3.3.4 - 4

In Table 3.3-4 on page 3.3-26 of the LRA, the applicant states that plant experience shows a history of loss of material as a result of corrosion of the copper and aluminum cooling water radiator fins in the cooling water system exposed to an indoor-not air conditioned environment. The applicant is requested to explain why other copper and aluminum alloy components exposed to indoor or outdoor environments in the diesel generators and support systems are not subject to aging management. These components include tubing/fittings, air start motors, air start motor lubricators, frame arrestors (in outdoor environment), and filter housings.

FPL Response

There has been no St. Lucie plant-specific experience that identifies loss of material as an aging effect for other cooling water system components fabricated from aluminum alloy or copper alloy exposed to external environment of indoor - not air-conditioned. Based on LRA Appendix C Section 5.1 (page C-11) and other widely available engineering resources, both aluminum and copper alloys are highly corrosion resistant in non-aggressive environments and are considered to have good corrosion resistance in atmospheric environments. However, discussions with the system engineer and St. Lucie plant-specific operating experience have identified loss of material of the radiator fins, ultimately resulting in replacement of the radiator cores. This can be attributed to the corrosion rate of the fins (per "Corrosion of Metals in Marine Environments," J. A. Beavers, G. H. Koch, W.E. Berry, MCIC Report, July 1986, copper – 0.16 mil/yr and aluminum – 0.30 mil/yr). In most circumstances, this is an acceptable corrosion rate. However, due to the small thickness of the fins, the corrosion rate is much more significant. Additionally, the radiator fins tend to filter and concentrate contaminants during diesel operation providing a more aggressive environment for corrosion. Therefore, loss of material is an aging effect requiring management for the radiator cores and radiator fins (LRA Table 3.3-4 pages 3.3-24 and 3.3-26).

3.3.6 Fire Protection

RAI 3.3.6 - 1

In Section B.3.2.8, "Fire Protection Program," on page B-39 of the LRA, the applicant states that the Fire Protection Program is credited for managing the aging effects of loss of material attributable to corrosion (including selective leaching). Please identify those components and locations that are susceptible to leaching, and the associated aging management programs.

FPL Response

As described in LRA Appendix C, Section 5.1 (page C-13), loss of material due to selective leaching (dealloying) has been identified as a potential aging effect for gray cast iron and certain brass or bronze materials. Specifically, brass and bronze with >15% zinc, or aluminum bronze with >8% aluminum are susceptible to dealloying. Fire Protection system copper alloy components have zinc content <15%, therefore, these components are not susceptible to loss of material due to selective leaching. There are no aluminum bronze components in the Fire Protection System.

For gray cast iron, St. Lucie Fire Protection components exposed to an internal environment of raw water – city water and an external environment of buried, loss of material due to selective leaching is an aging effect requiring management. See LRA Table 3.3-6 pages 3.3-42 and 3.3-45.

RAI 3.3.6 - 2

The fire water supply system consists of a 12-inch cement-lined, cast-iron, underground pipe that loops around the plant. The cement lining may degrade due to cracking or spalling and cause flow blockage in the piping. Explain why an aging management review was not performed for the cement lining.

FPL Response

The cement lining in the Fire Protection water supply (suppression water distribution) system does not perform or support any license renewal intended functions that satisfy the scoping criteria of 10 CFR 54(a). The cement lining performs a preventive function of minimizing the potential for corrosion. However, the cement lining is not credited for eliminating aging effects. The cement, or mortar, lining is per AWWA C104/A21.4. The thickness is nominally 1/16". A review of St. Lucie plant-specific operating experience did not identify any instances of Fire Protection suppression water distribution system piping lining failures causing flow blockage. As stated in LRA Appendix B, Section 3.2.8 (page B-39), Fire Protection components are periodically flushed, performance tested, and inspected. Significant internal lining failures would be detected by changes in flow or pressure or by evidence of cement products during flushing of the system. Therefore, an aging management review is not required for the cement lining of the Fire Protection suppression water distribution system.

RAI 3.3.6 - 3

The fire water supply system consists of a 12-inch cement-lined, cast-iron, underground pipe that loops around the plant. Explain how the aging effect of loss of material as a result of corrosion is managed for the external surfaces of the buried pipe.

FPL Response

The St. Lucie fire water supply (suppression water distribution) cast iron piping is buried in Class 1 fill and is located above ground water elevation. Additionally, this piping is coated with a coal tar epoxy to minimize the potential for corrosion. In spite of these considerations, the aging management review of the fire water supply cast iron piping considered external loss of material to be an aging effect requiring management. As indicated in LRA Table 3.3-6 (page 3.3-45), the Fire Protection Program (LRA Appendix B, Section 3.2.8 page B-39) is credited for managing the external aging effect of loss of material for cast iron fire water supply piping. The fire water system is continuously pressurized and monitored. Any localized degradation of the external coating resulting in a corrosion cell would ultimately manifest itself in a leak in the piping. The resultant leakage would be detected by pressure monitoring instrumentation and if the leak was large enough, a fire pump would automatically start indicating an unexpected system demand. Additionally, periodic performance testing under the Fire Protection Program is utilized to manage the external aging effects.

RAI 3.3.6 - 4

In Section B.3.2.8 of Appendix B to the LRA, the applicant states that functional testing and flushing of the [fire protection] system [to] clear away internal scale and corrosion products that could lead to blockage or obstruction of the system. If this statement refers to biofouling as an applicable aging effect, discuss why Table 3.3.6 of the LRA does not include biofouling as an applicable aging effect.

FPL Response

The statement does not refer to biofouling. As stated in LRA Appendix C, Section 5.3 (pages C-15 and C-16), biofouling is an aging effect due to an accumulation of macro-organisms. Fire Protection at St. Lucie is filled with water classified as "raw water – city water." As stated in LRA Appendix B, Section 4.1.2 (page C-7), this water is potable water. The water has been rough filtered to remove large particles. City water has been purified but conservatively classified as raw water for the purposes of aging management review. Macro-organisms would not be found in this water.

3.3.8 Instrument Air

RAI 3.3.8 - 1

In Table 3.3-8, "Instrument Air," of the LRA, the applicant identifies loss of material as an applicable aging effect for carbon steel, stainless steel, and copper alloy components that are located upstream of the air dryers and, therefore, internally exposed to a wet air/gas environment. Other components made of similar materials but located downstream of the dryers are exposed to a dry air/gas environment and, therefore, have no applicable aging effect. This identification of the aging effect is reasonable for an instrument air system that has an ideal dryer, but this identification may not be supported by the operating experience at St. Lucie. As an example, NRC Information Notice (IN) 1987-28, "Air System Problems at U.S. Light Water Reactors," states that: "A loss of decay heat removal and significant primary system heatup at Palisades in 1978 and 1981 were caused by water in the air system." This experience implies that the air/gas system downstream of the dryer may not be dry.

Provide the technical basis for not identifying loss of material as an applicable aging effect for the components downstream of the air dryer. If loss of material is identified as an applicable aging effect for these components, provide an appropriate aging management program for that effect.

FPL Response

NRC Information Notice (IN) 1987-28, "Air System Problems at U.S. Light Water Reactors" and Generic Letter 88-14, "Instrument Air Supply System Problems Affecting Safety Related Equipment" were reviewed during the aging management review of Instrument Air. St. Lucie, like many other U.S. nuclear power plants, experienced general corrosion of its Instrument Air component internal surfaces early in its operating life. A review of St. Lucie plant-specific operating experience identified leak test failures and internal piping corrosion that occurred in the 1980s. The investigation of these problems demonstrated that the onset of general corrosion downstream of the air dryers was attributed to the ineffectiveness of the original air dryers in combination with the carbon steel construction of the system piping. To address these equipment problems, the instrument air dryers were replaced in 1989 with more effective desiccant dryers (including prefilter and after filters) and two new instrument air compressors were added with capacities and purification capabilities recommended by ANSI/ISA-S7.3, "Quality Standard for Instrument Air, Instrument Society of America." Additionally, FPL aggressively pursued improved system performance via upgraded maintenance procedures, additional training of operators, and verification of the system design. Since its completion of corrective actions associated with Generic Letter 88-14, St. Lucie Instrument Air has met the required air quality requirements and has not experienced corrosion related problems downstream of the instrument air dryers.

In FPL's response to Generic Letter 88-14, St. Lucie addressed air quality issues downstream of dryers. This response included the following one-time verifications: 1) Verification that actual instrument air quality is consistent with manufacturers recommendations for safety related components, 2) Verification that maintenance practices, emergency procedures, and training are adequate, and 3) Verification that the design of the entire system including air or other pneumatic accumulators is in accordance with its intended function. Note: This included testing of air operated valves.

Additionally, samples are periodically taken to test for air quality including dew point, particulates, and hydrocarbons and verify proper operation of the equipment. As documented in Instrument Air periodic dew point tests and particulate/oil tests, the new dryers provide high quality dry air for the plant.

Therefore, loss of material due to internal general corrosion is not an aging effect requiring management for carbon steel components downstream of the instrument air dryers.

3.3.9 Intake Cooling Water

RAI 3.3.9 - 1

Explain why loss of material is not an aging effect for stainless piping/fittings and tubing/fittings in the intake cooling water system that are exposed to an indoor-not air conditioned environment.

FPL Response

Pitting corrosion has been identified as a potential aging mechanism for the external surfaces of the above ground stainless steel piping/fittings, tubing/fittings, orifices and valves in Intake Cooling Water (ICW). Based on LRA Appendix C Section 5.1 (page C-11), moisture must be present for pitting corrosion to occur. Stainless steel ICW components located in an "Indoor - not air conditioned" environment (LRA Table 3.0-2 page 3.0-3) are not subject to moisture unless specifically identified in the LRA tables. Additionally, visual inspections of these components and St. Lucie plant-specific operating experience have not identified pitting corrosion as an aging mechanism that could lead to loss of material. Therefore, loss of material due to corrosion of stainless steel components in an "Indoor - not air conditioned" environment is not an aging effect requiring management.

RAI 3.3.9 - 2

Several bronze, aluminum bronze, and aluminum brass components in the intake cooling water system are externally exposed to outdoor or indoor-not air conditioned environments. These components include pump and valve bodies and piping/fittings. The applicant states that there is no applicable aging effect for these components. In Section 5.1 of Appendix C to the LRA, however, the applicant states, "Additionally, bronze and brass are considered susceptible to pitting when zinc content is greater than 15%, and aluminum bronze is considered susceptible to pitting when the aluminum content is greater than 8%."

Since the zinc content in brass can be greater than 15% and the aluminum content in aluminum bronze may vary from 4 to 15%, explain why loss of material is not an applicable aging effect for the bronze, aluminum bronze, and aluminum brass components in the intake cooling water system.

FPL Response

The intent of LRA Appendix C Section 5.1 (page C-11) is to indicate that moisture must be present for pitting to occur. Loss of material due to pitting corrosion is a factor only if the bronze, brass, or aluminum bronze component is buried, submerged in fluid or subject to wetting other than normal environment.

RAI 3.3.9 - 3

The applicant relies on detection of leakage for managing loss of material on the inside surface of several components that are exposed to raw water. The presence of leakage from a component, however, would indicate that the component could not perform its intended function as a pressure boundary. The applicant is requested to justify why the use of this program alone is adequate for managing loss of material from the inside surface of the components that are exposed to raw water.

FPL Response

As described in LRA Appendix B, Subsection 3.2.14 (page B-57), the Systems and Structures Monitoring Program manages the aging effect of loss of material for valves, piping, and fittings at selected locations of Intake Cooling Water (ICW) by leakage inspection to detect the presence of internal corrosion. These locations mostly encompass small bore piping components not addressed by the ICW crawl-through inspections due to access limitations. Evaluations have been performed to show that through-wall leakage equivalent to a sheared ¾" instrument line and an additional 100 gpm opening from another location will not reduce the ICW flow to the Component Cooling Water heat exchangers below design requirements. The leakage inspection is adequate in managing the aging effects of loss of material for the following reasons:

(a) Maintenance history shows that localized failures of cement lining result in small corrosion cells. These corrosion cells will be detected by small through-wall leakage, which provides adequate time for repairs before the system function is degraded.

(b) For small valves, piping and fittings leakage does not affect the system function because the small size of these components limits the leakage. The operating and maintenance history of this equipment demonstrates that leakage for this equipment has not been significant.

3.3.11 Primary Makeup Water

RAI 3.3.11 - 1

Clarify whether hardening is an applicable aging effect for the rubber materials of the expansion joints in the primary makeup water system. If so, discuss how this aging effect will be managed. If not, please provide the basis.

FPL Response

Marks' Standard Handbook for Mechanical Engineers (Tenth Edition page 6-147) describes rubber that is exposed to an outdoor environment (air and sun) as tending to become hard and brittle which is termed embrittlement (LRA Appendix C Section 5.2 page C-15). The aging effect resulting from embrittlement is cracking. Therefore, cracking is included in LRA Table 3.3-11 (pages 3.3-66 and 3.3-69) as an aging effect requiring management for the rubber expansion joints of the Unit 2 Primary Makeup Water System. This aging effect is managed by the Systems and Structures Monitoring Program.

RAI 3.3.11 - 2

Identify the composition of the internal air/gas environment to which the fittings and nozzles of the hose station of Unit 2 are exposed, and specify the level of humidity of this particular environment. Also clarify whether loss of material is an applicable aging effect and, if so, identify and describe the applicable aging management program. If not, please provide the basis.

FPL Response

The fittings and nozzles of the Unit 2 hose stations are exposed to internal air/gas environments consisting of the external environment (i.e., indoor – not air conditioned or Containment air). These environments are defined in LRA Table 3.0-2 (page 3.0-3). As discussed in LRA Appendix C, Section 5.1 (page C-11), loss of material is not an applicable aging effect for copper alloy materials exposed to these environments. This conclusion is supported by a review of St. Lucie plant-specific operating experience which did not identify loss of material as an aging effect requiring management for these components.

3.3.13 Service Water

RAI 3.3.13 - 1

The applicant states that the Periodic Surveillance and Preventive Maintenance Program provides visual inspection of component surfaces. Describe how visual inspection is conducted for the submerged surfaces of the sump pump.

FPL Response

The total sump depth for this pump is 2.5 feet. Dewatering of this sump will be performed, if necessary, to perform a visual inspection.

3.3.14 Turbine Cooling Water (Unit 1 Only)

RAI 3.3.14 - 1

Identify the composition of the internal air/gas environment to which the Unit 1 instrument air compressor cooling water head tank is exposed, and specify the level of humidity of this particular environment. Also clarify whether the tank wall is subjected to a changing wetting environment as the water level changes. In addition, state whether loss of material is an applicable aging effect and, if not, please provide the basis.

FPL Response

The instrument air cooling water head tank is a small diameter tank with a hinged access cover in its top. This tank is normally filled with Turbine Cooling Water (TCW) to a level approximately 1" from the top of the tank. TCW is chemically controlled and is treated with a corrosion inhibitor. The tank is vented and therefore, the small air space above the normal water level of the tank is exposed to atmospheric conditions. The tank is internally coated to protect the carbon steel surface from general corrosion. A visual inspection of the tank performed as part of the aging management review did not identify any significant coating degradation or signs of general corrosion. Additionally, even if loss of material due to general corrosion were to occur in this portion of the tank, it would not impact the component or system intended function. Therefore, there are no aging effects requiring management for the internal surfaces of this tank exposed to an air/gas environment.

3.3.15 Ventilation

RAI 3.3.15 - 1

In Table 3.3.15, "Ventilation," the applicant identifies, for the control room air-conditioning subsystem, loss of material as an applicable aging effect for the carbon steel filter housing, which is internally exposed to an air/gas environment, but not for carbon steel component valves and piping/fittings that are exposed to the same environment. Please explain this discrepancy.

FPL Response

The carbon steel valves and piping/fittings identified in LRA Table 3.3-15 (pages 3.3-75 and 3.3-76) exposed to an air/gas environment are associated with Unit 1 Control Room Air Conditioning outside air intake. The internal air/gas environment for the piping and valves is outside air. As discussed in LRA Appendix C, Section 5.1 (page C-11) carbon steel is considered susceptible to loss of material due to general corrosion in this environment. As such, the aging management review of these components evaluated the potential impact of this aging effect on component intended function. Unlike the carbon steel ventilation housings which are constructed of heavy gage sheet metal, the carbon steel piping evaluated is schedule 40 and has a nominal thickness of 0.280 inches. The valves, which are wafer-type butterfly valves, have a body thickness greater than one inch. As a result, the corrosion allowance available for the valves and piping/fittings is adequate to accommodate conservative corrosion rates for a coastal environment for the period of extended operation without loss of intended function, and thus loss of material is not an aging effect requiring management.

RAI 3.3.15 - 2

In Table 3.3-15, “Ventilation,” of the LRA, the applicant indicates that the Periodic Surveillance and Preventive Maintenance Program manages the loss of material on the inside surface of several components, such as the plenums and filter housing, which are exposed to an internal air/gas environment. In Section B.3.2.11, “Periodic Surveillance and Preventive Maintenance Program,” of the LRA, the applicant states that surface conditions of systems, structures, and components are monitored through visual examinations and leakage inspections to determine the existence of external and internal corrosion or deterioration.

The presence of leakage from a component indicates that the component has lost its ability to perform its intended pressure boundary integrity function. Explain whether the components’ capability to perform its intended function is maintained by managing the loss of material or by periodic replacement. If it is by replacement, discuss the frequency with which replacement will be performed.

FPL Response

The Periodic Surveillance and Preventive Maintenance Program (LRA Appendix B Section 3.2.11 page B-46) is credited for managing loss of material for the ventilation systems listed in LRA Table 3.3-15 (pages 3.3-75 through 3.3-88). Loss of material for these components is managed by visual inspections and examinations of the plenums, housings, shells, and supports. Leak inspection is not credited for aging management of the ventilation systems listed in LRA Table 3.3-15.

3.3.16 Waste Management

RAI 3.3.16 - 1

In Table 3.3-13 of the LRA, the applicant identifies loss of material as an applicable aging effect for the stainless steel yard sump pump of the service water system, which is exposed to an internal environment of raw water (drains). The applicant also identifies the Periodic Surveillance and Preventive Maintenance Program as the applicable aging management program. Explain why loss of material is not identified as an applicable aging effect for the stainless steel valves and piping/fittings of the waste management system, which are exposed to the same environment of raw water (drains).

FPL Response

The stainless steel yard sump is located in the pipe trench connected to the Unit 2 Component Cooling Water structure and thus is exposed to raw water consisting of drainage run-off. This water may be high in chlorides or other contaminants and therefore may create an aggressive environment for corrosion. On the other hand, the subject portion of the waste management system drains consists of that portion of the system from the reactor coolant drain tank outlet which penetrates containment. These drains are from in-containment sources such as Reactor Coolant System loop drains and other inputs to the reactor coolant drain tank. A review of St. Lucie plant-specific operating experience of Waste Management did not identify any instances of loss of material for this system. In addition, a volumetric inspection performed as part of the aging management review for stainless steel Waste Management piping in the Reactor Auxiliary Buildings identified no loss of material for these portions of the system. Therefore, loss of material is not an aging effect requiring management for the stainless steel valves and piping/fittings of Waste Management exposed to the environment of raw water (drains).