

FNP Program: External Surfaces Monitoring Program	Document Type: Plant-Specific Program Attribute Comparison
Version: 1	

External Surfaces Monitoring Program Attribute Comparison

FNP Program	External Surfaces Monitoring Program (LRA Section B.5.3)
Precedent Program	Ft. Calhoun General Corrosion of External Surfaces Program LRA Appendix B, Section B.3.3
Precedent Program SER Reference	ML031120003, NUREG XXXX (dated 4/21/2003) Section 3.0.3.12

1. OBJECTIVE

This document supports application for renewal of the FNP Units 1 and 2 operating licenses.

This document compares the FNP External Surfaces Monitoring Program's pertinent attributes against a previously submitted program credited by another applicant. The objective is to identify areas where similar program attributes have been previously accepted by the NRC staff in an SER.

Comparisons of plant specific programs, which are those that are different from any of the programs evaluated in NUREG-1801, require comparisons of pertinent program attributes. These will typically include the first six attributes only:

- Program Scope
- Preventive Actions
- Parameters Inspected or Monitored
- Detection of Aging Effects
- Acceptance Criteria
- Monitoring and Trending

The corrective action, confirmatory process, and administrative controls attributes are considered to be plant-specific attributes common to all aging management programs. Therefore, no comparison is made for these three attributes.

The operating experience attribute is plant-specific and cannot be directly compared to another applicant. Therefore, no comparison is made for this attribute.

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2. PROGRAM ATTRIBUTE COMPARISON:

2.1 Program Scope

2.1.1. FNP LRA

“The FNP program will employ visual inspection to manage accessible and insulated external surfaces susceptible to loss of material that require aging management for license renewal. Susceptible external surfaces include carbon steel and low alloy steels in inside and outside environments, and galvanized steel, cast iron, copper alloys, and aluminum in an outside environment.

The FNP External Surfaces Monitoring Program is credited for managing loss of material in the external surfaces of specific component/commodity groups in the following LRA systems.” (Numerous systems are listed).

2.1.2. Precedent LRA (Ft. Calhoun) (From the Ft. Calhoun LRA, Section B.3.3)

“The General Corrosion of External Surfaces Program consists of several FCS activities that manage the aging effects of loss of material and cracking for components in the following systems.” (Numerous systems are listed).

2.1.3. Precedent SER Reference (Ft. Calhoun) (From the Ft. Calhoun SER, Section 3.0.3.12.2)

“As indicated in the LRA, the program consists of several FCS activities that manage the aging effects of loss of material and cracking for components in auxiliary boiler fuel oil, auxiliary building HVAC, auxiliary feedwater (AFW), chemical and volume control, CCW, containment ventilation, control room HVAC, diesel generator lube oil, starting air, feedwater, fire protection fuel oil, gaseous waste disposal, instrument air, main steam (MS) and turbine steam extraction, containment penetration systems and system interface components for non-CQE systems, nitrogen gas, primary sampling, raw water, and ventilating air. The staff finds that relevant systems and structures are included in the scope of the program, and therefore, the scope is acceptable.”

2.1.4. Discussion

The set of systems included in the FNP scope is similar to those for the Ft. Calhoun (FCS) program but there are some differences as follows:

FCS includes the following systems that are not included in FNP's systems - auxiliary boiler fuel oil system (not in-scope for FNP), feedwater system (external surfaces monitoring program not credited for FNP's FDWTR system because of the high temperature), nitrogen gas system (small segments of FNP's nitrogen system are included in ECCS), and ventilating air system (FNP does not have an equivalent system).

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FNP includes the following systems that are not included in the FCS systems - demineralized water system, containment spray system, hydrogen control system, oil-static cable pressurization system, yard structures HVAC system, reactor makeup water storage system, spent fuel pool cooling and cleanup system, emergency core cooling system, liquid waste and drains, potable and sanitary water system, and electrical components.

FNP credits 11 systems that FCS does not credit for aging management by these external surfaces inspection type programs. FNP's external surfaces monitoring program has a more broad coverage of plant components than does FCS's general corrosion of external surfaces program.

Since FNP's program covers many of the same systems as FCS's program, the staff evaluation and acceptance of the FCS program scope (systems) should be applicable to the scope of the FNP program.

2.2 Preventive Actions

2.2.1. FNP LRA

"The FNP external surfaces monitoring program activities will include actions to monitor and report conditions. There will be no preventive actions credited for these activities."

2.2.2. Precedent LRA (Ft. Calhoun) (From the Ft. Calhoun LRA, Section B.3.3)

"This program does not prevent aging."

2.2.3. Precedent SER Reference (Ft. Calhoun) (From the Ft. Calhoun SER, Section 3.0.3.12.2)

"The applicant did not identify any preventive actions taken as part of this program. The staff recognizes that while this program may not prevent the occurrence of the aging effects stated, the program description should clearly describe the manner in which this program will be used to manage aging effects."

By letter dated October 11, 2002, the staff requested, in RAI B.3.3-1, that the applicant describe what this program accomplishes. In its response dated December 19, 2002, the applicant responded that this program is a condition monitoring program which identifies evidence of corrosion on external surfaces, or significant degradation of coatings, sealants, and caulking through visual inspections, and initiates corrective action prior to any loss of intended function. The staff notes that aging management of bolts is performed by several programs: bolting for mechanical systems is managed by this program and the bolting integrity program, structural bolting is managed by the structures

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monitoring program, and bolting degradation due to exposure to boric acid is identified by the boric acid corrosion prevention program.

Based on the applicant's response, to the RAI, the staff concurs with the applicant that preventive actions are not needed because this is a condition monitoring program."

2.2.4. Discussion

No preventive actions are credited for either the FNP program or the FCS program. Therefore, the staff evaluation and acceptance of the RNP program preventive actions is applicable to the FNP program preventive actions.

With respect to the FCS RAI concerning what the general corrosion of external surfaces program accomplishes, the FNP response to such an RAI would be similar to FCS's response: The FNP external surfaces monitoring program is a condition monitoring program which identifies evidence of corrosion on external surfaces, significant degradation of coatings, age-related degradation of in-scope polymers or elastomers, and missing or damaged insulation through visual inspections and initiates corrective action prior to any loss of intended function. Closure bolting (i.e., bolting for mechanical systems) is managed by the external surfaces monitoring program and structural bolting is managed by the structural monitoring program. Bolting degradation due to exposure to boric acid is identified by the borated water leakage assessment and evaluation program.

2.3 Parameters Inspected or Monitored

2.3.1. FNP LRA

"Surface conditions of selected equipment and components will be monitored by plant personnel for signs of corrosion or wear. Periodic inspections of accessible portions of piping and tubing will be performed to detect signs of loss of material, flange leakage, missing or damaged insulation, damaged coatings, and fretting of tubing. Inspections of insulated surfaces will be on a sampling basis and target areas identified by baseline documentation and operating experience as most susceptible. Accessible in-scope polymers or elastomers will also be inspected for age-related degradation."

2.3.2. Precedent LRA (Ft. Calhoun) (From the Ft. Calhoun LRA, Section B.3.3)

"Surface conditions of components are monitored through visual observation and inspection to detect signs of external corrosion and to detect conditions that can result in external corrosion, such as fluid leakage."

2.3.3. Precedent SER Reference (Ft. Calhoun) (From the Ft. Calhoun SER, Section 3.0.3.12.2)

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“The applicant stated that the surface conditions of components are monitored through visual observation and inspection to detect signs of external corrosion and to detect conditions that can result in external corrosion, such as fluid leakage.

By letter dated October 11, 2002, the staff requested, in RAI B.3.3-2, that the applicant describe the parameters, besides fluid leakage, that detect degradation of surface conditions on components within the scope of this program, and to justify why these parameters need not be included in this program to manage the aging of components within the program scope. In its response dated December 19, 2002, the applicant responded that fluid leakage was identified only as an example of a condition which could lead to component degradation if not corrected. Fluid leakage is an indicator of a degradation condition which, in addition, could lead to corrosion on surrounding components if allowed to continue. The applicant responded further by stating that this program includes monitoring of components and their external coatings for evidence of cracking, checking, blistering, rusting, pinholes, abrasions, delamination, and significant substrate defects (e.g., corrosion pits). The monitoring of these indications ensures that component degradation is identified and corrected prior to any loss of pressure boundary.

Based on the applicant’s response to the RAI, the staff finds that the program monitors conditions that relate to the aging effects of concern.”

2.3.4. Discussion

The FNP program parameters inspected or monitored are not specifically called out in the external surfaces monitoring program description just as they are not called out in FCS’s general corrosion of external surfaces program description. However, FNP’s response to such an RAI concerning these parameters would be similar to FCS’s response because the parameters inspected or monitored are the same, i.e., are consistent with the FCS program parameters inspected or monitored.

Therefore, the staff evaluation and acceptance of the FCS program parameters inspected or monitored is applicable to the FNP program parameters monitored or inspected.

2.4 Detection of Aging Effects

2.4.1. FNP LRA

“Visual inspections will be conducted, typically by walkdowns intended to be performed such that at a minimum, all accessible (non-insulated) portions of a system are observed on a regular basis.”

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2.4.2. Precedent LRA (Ft. Calhoun) (From the Ft. Calhoun LRA, Section B.3.3)

“The aging effects of concern are loss of material and cracking. These effects can be detected by visual observation and inspection of external surfaces. Inspection for evidence of leaking fluids also provides indirect monitoring of certain components that are routinely accessible.”

2.4.3. Precedent SER Reference (Ft Calhoun) (From the Ft. Calhoun SER, Section 3.0.3.12.2)

“The applicant indicated that the aging effects of loss of material and cracking are detected by visual observation and inspection of external surfaces. In addition, evidence for leaking fluids also provides indirect monitoring of certain components that are not routinely accessible.

By letter dated October 11, 2002, the staff requested, in RAI B.3.3-3, that the applicant describe the methods, besides the observance of fluid leakage, that will be used to detect loss of material and cracking in locations that may be inaccessible, such as the bottom of a tank, and provide a justification for why these methods are not material to demonstrate adequate aging management for components within the scope of the program. In its response dated December 12, 2002, the applicant stated that this program relies on visual observations and inspections, and is only applicable to those components accessible to this type of inspection. Aging management activities on components inaccessible to visual inspections, such as ultrasonic testing of buried emergency diesel fuel oil tank, are incorporated into other plant programs.

The staff finds the applicant’s response to be reasonable and adequate because this program inspects for the aging effects of accessible components, in conjunction with other programs which inspect components not readily accessible.”

2.4.4. Discussion

The FNP program detects aging effects in accessible portions of systems similar to the FCS program. Inspection of insulated surfaces will be on a sampling basis and target areas identified by baseline documentation and operating experience as most susceptible. As with FCS, aging management activities on components inaccessible to visual inspections (other than via insulation removal), such as the buried emergency diesel fuel oil storage tanks, are incorporated into other plant programs (for example, buried piping and tank inspection program).

Therefore, the staff evaluation and acceptance of the FCS program’s detection of aging effects is applicable to the FNP program’s detection of aging effects.

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2.5 Monitoring and Trending

2.5.1. FNP LRA

“Baseline documentation for the condition of the managed external surfaces will be established prior to the beginning of the period of extended operation. The baseline information may be established through compilation of existing information already contained in the CR database, engineering support records or other records. If a satisfactory representative baseline cannot be established using existing information, then additional special inspections will be performed prior to the beginning of the period of extended operation.

Degradation of external surfaces will be monitored and trended in accordance with established procedures and guidelines. The frequency of inspection is subject to modification based on plant specific environments or observed degradation. Such observations may dictate that an increased or decreased inspection rate would be prudent for a particular system, component or area. Repetitive failures will be addressed by reviewing the inspection results and task content, and frequency will be adjusted as necessary to preclude component failures.”

2.5.2. Precedent LRA (Ft. Calhoun) (From the Ft. Calhoun LRA, Section B.3.3)

“Various plant personnel including operators and system engineers perform periodic material condition inspections and observations outside containment. These inspections are performed in accordance with approved plant procedures. Evidence of fluid leaks, significant coating damage, or significant corrosion is documented.

Inspections and observations are performed at intervals based on previous inspections and industry experience. Operator rounds occur several times daily and system engineer walkdowns occur at least quarterly. Inspections inside containment are conducted each refueling outage by a team that includes knowledgeable subject matter experts from Engineering and Quality Control. The in-containment inspections for corrosion are part of the containment coatings inspections described in the OPPD response to NRC Generic Letter 98-04, “Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment.”

2.5.3. Precedent SER Reference (Ft. Calhoun) (From the Ft. Calhoun SER, Section 3.0.3.12.2)

“As described in Section B.3.3 of the LRA, various plant personnel perform periodic material condition inspections and observations outside containment. These inspections are performed in accordance with approved plant procedures

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and include documentation of the evidence of fluid leaks, significant coating damage, or significant corrosion. The inspections and observations are performed at intervals based on previous inspections and industry experience. For example, operator rounds occur several times a day and system engineer walk downs are performed at least quarterly. In addition, inspections inside containment are performed at each refueling outage and are part of the inspections described in the OPPD response to GL 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss of-Coolant Accident. Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment."

By letter dated October 11, 2002, the staff requested, in RAI B.3.3-4, additional information on the extent of the documentation process, including whether inspections are documented and the results trended, or whether only significant findings are documented using a corrective action process. In its response dated December 12, 2002, the applicant responded that deficiencies identified during operator and system engineer walk downs are documented under the maintenance work order or corrective action process. Deficiencies identified during the containment coating inspection procedure would result in the initiation of a corrective action item if the deficiencies are significant as documented in this procedure. In addition, system engineers monitor and report ongoing and significant system deficiencies for their respective systems in their system report cards.

Based on the staff's review of the LRA, the applicant's response to the staff's RAI, and the findings of the AMR inspection, the staff finds that the activities associated with this program are appropriate because these activities and their frequency ensure that the aging effects of components within the scope of this program will be detected and corrected before compromising the components' intended functions."

2.5.4. Discussion

In a similar manner as the FCS program, the FNP program will be implemented based upon inspections conducted by walkdowns with the frequency of inspections subject to modification based on plant specific environments or observed degradation. With respect to the FCS RAI concerning the extent of the documentation process, the FNP response to such an RAI would be similar to FCS's response in that deficiencies identified during walkdowns are documented under the corrective actions process. In addition to this, degradation of external surfaces will be monitored and trended in accordance with established procedures and guidelines. Representative baseline documentation will be established for the condition of the managed external surfaces prior to the beginning of the period of extended operation.

Since the FNP program activities are comparable to the FCS program, the staff evaluation and acceptance of the FCS program monitoring and trending attributes is applicable to the FNP program monitoring and trending attributes.

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2.6 Acceptance Criteria

2.6.1. FNP LRA

“Acceptance criteria will be contained in the applicable inspection or examination procedures. These criteria will be directly correlated to the indications of aging effects requiring management.”

2.6.2. Precedent LRA (Ft. Calhoun) (From Ft Calhoun LRA, Section B.3.3)

“Plant procedures provide criteria for determining the acceptability of as-found conditions and for initiating the appropriate corrective action. The acceptance criteria and guidance are related to avoiding unacceptable degradation of the component intended functions, and include existence of leakage, presence of corrosion products, coating defects, and elastomer cracking. Appropriate provisions of NRC and industry guidance are incorporated.”

2.6.3. Precedent SER Reference (Ft. Calhoun) (From the Ft. Calhoun SER, Section 3.0.3.12.2)

“The applicant stated that plant procedures provide criteria for determining the acceptability of as-found conditions and for initiating the appropriate corrective action. These procedures incorporate appropriate provisions of NRC and industry guidance to avoid unacceptable degradation of the component intended functions by inspecting for the existence of leakage, presence of corrosion products, coating defects, and elastomer cracking.

By letter dated October 11, 2002, the staff requested, in RAI B.3.3-5, that the applicant discuss the NRC or industry guidance and operating experience used to establish the acceptance criteria. In its response dated December 19, 2002, the applicant responded that guidance from RG 1.54, “Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants,” is incorporated in the containment coatings inspection discussed in Section 5.2.5 of the FCS USAR. In addition, the system engineer and operator walk downs initiate maintenance work orders or corrective action documents based on engineering judgment and operating experience. Initiation of a corrective action document is based on procedural guidance to identify damage or degradation that adversely affects the functional capability of a structure, system, or component. The applicant further responded that the procedural guidance is being enhanced as part of the implementation of this new program.

Based on the staff’s review of the LRA, the applicant’s response to the staff’s RAI, and the findings in the AMR Inspection, the staff finds that the acceptance criteria and guidance associated with this program are appropriate because they incorporate adequate guidance to ensure that the aging effects of components

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within the scope of this program will be detected and corrected in a timely manner.”

2.6.4. Discussion

FCS's LRA states that appropriate provisions of NRC and industry guidance are incorporated into their program for the acceptance criteria. The NRC generated an RAI concerning this statement and asked FCS to discuss what NRC or industry guidance and operating experience was used to establish the acceptance criteria. FCS responded with specific reference to a regulatory guide for protective coatings applied to nuclear power plants. Additionally, they state that walkdowns initiate maintenance work orders or corrective action documents based on engineering judgment and operating experience. Also, initiation of a corrective action document is based on procedural guidance to identify damage or degradation that adversely affects the functional capability of an SSC.

In a similar manner as the FCS program, FNP's program will contain acceptance criteria in applicable inspection or examination procedures. Development of appropriate acceptance criteria will consider available industry guidance and operating experience, current practices, and applicable criteria from other programs (e.g., Structural Monitoring Program). Consistent with the FCS Program, FNP's program will initiate corrective actions based on the results of walkdowns and operating experience, and initiate corrective action documentation based on procedural guidance.

Since the FNP program activities are comparable to the FCS program, the staff evaluation and acceptance of the FCS program acceptance criteria attributes is applicable to the FNP program acceptance criteria attributes.

3. ATTRIBUTE COMPARISON SUMMARY

The FNP External Surfaces Monitoring Program attributes as described in the FNP LRA are generally consistent with the FCS program attributes described in the FCS LRA.

Based on this consistency, the staff evaluation and acceptance of the FCS program is applicable to the FNP program.