

FNP Program: Reactor Vessel Internals Program	Document Type: NUREG-1801 Program Exception Comparison
Version: 1	

FNP Reactor Vessel Internals Program Exception Comparison

1. OBJECTIVE

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

This document compares the FNP Reactor Vessel Internals Program exceptions to NUREG-1801 to previously submitted programs credited by other applicants. The objective is to identify areas where similar exceptions to NUREG-1801 have been previously accepted by the NRC staff.

The FNP Reactor Vessel Internals Program is consistent with NUREG-1801, Sections XI.M2 and XI.M21 with exception. This comparison document focuses solely on the FNP exception to NUREG-1801 identified in the FNP LRA, Appendix B.3.2. Other program attributes have been determined to be consistent with NUREG-1801 and need not be addressed.

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2. PROGRAM EXCEPTIONS COMPARISON:

2.1 Reactor Vessel Internals Program Exception No. 1

FNP Program	Reactor Vessel Internals Program; <i>LRA Section B.5.1</i>
NUREG-1801 Reference	XI.M16, <i>PWR Vessel Internals</i>
Precedent Program	Ginna Reactor Vessel Internals Program <i>LRA Appendix B2.1.27</i>
Precedent Program SER References	Draft SER: Scheduled SER issue date is 10/9/2003. Ginna RAI Response Letter; dated May 13, 2003, RAI / RAI responses B2.1.27-1 and B2.1.27-2 Ginna Open Item Response Letter; dated Sept. 16, 2003, Open Item 3.1.2.3.3-1

2.1.1 FNP Program Exception

The FNP Reactor Vessel Internals Program LRA documentation identifies the following exception to NUREG-1801 Section XI.M16:

(From the FNP LRA, Section B.5.1.3)

“Based on the recent replacement of selected FNP baffle bolting with an improved bolt design and a lack of data regarding the effectiveness of ultrasonic examinations, FNP takes exception to the requirement for ultrasonic examination of baffle bolting. FNP will perform VT-1 of these connections. Additionally, SNC will continue to participate in industry activities coordinated by the WOG and MRP and will update this inspection program as appropriate based on the results of future research initiatives.”

2.1.2 Precedent LRA Reference (Ginna)

(From the Ginna LRA, Appendix B2.1.27, page B-55)

“Inspection and replacement of baffle-former bolts was performed in 1999, and the results are considered acceptable. There are no future plans for inspection/replacement of baffle-former bolts at Ginna Station. However, ongoing industry initiatives will be monitored and the Reactor Vessel Internals Program will be modified appropriately to incorporate industry lessons learned.”

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2.1.3 Precedent SER Reference

The Ginna Draft SER is scheduled for release by the NRC on October 9th, 2003. This document is not yet available for review.

A review of Ginna RAIs, RAI responses, Open Items, and Open Item responses related to the Reactor Vessel Internals Program did not identify any concerns regarding this position.

2.1.4 Discussion

The Ginna position here is similar to the FNP position in that Ginna has recently replaced baffle / former bolting. Other PWR submittals are not specifically applicable to FNP since baffle / former bolting has not been replaced at units with available SERs. While the specifics of the Ginna baffle / former bolting replacement work are not known, it is assumed that a similar baffle assembly structure is used at Ginna and that the replacement bolt design is similar to the FNP replacement baffle / former bolts.

Ginna did not identify this specific position as an exception to NUREG-1801, Section XI.M16. This is likely due to a difference in interpretation regarding the wording contained in NUREG-1801, Section XI.M16. Since Section XI.M16 implies that some type of augmented examination is required, SNC conservatively evaluated this difference as an exception.

In summary, the FNP LRA notes an exception to NUREG-1801, XI.M16 regarding augmented inspection of baffle / former bolting. A similar position has been taken within the Ginna LRA (although not specifically termed an exception). A review of existing NRC staff RAIs and Open Items issued does not indicate any staff concerns with this position. A draft SER regarding Ginna License Renewal is expected in the very near future. Based on the conclusions presented in that SER, the staff acceptance of the Ginna position is applicable to FNP license renewal.

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2.2 FNP Reactor Vessel Internals Program Exception No. 2

FNP Program	Reactor Vessel Internals Program; <i>LRA Section B.5.1</i>
NUREG-1801 Reference	XI.M16, <i>PWR Vessel Internals</i>
Precedent Program	Turkey Point Reactor Vessel Internals Inspection Program (Visual Examination) <i>LRA Appendix B, Section 3.1.6.1</i>
Precedent Program SER Reference	Turkey Point SER , NUREG-1759 with Supplement 1; <i>Section 3.8.6.1.2</i>

2.2.1 FNP Program Exception

The FNP Reactor Vessel Internals Program LRA documentation identifies the following exception to NUREG-1801 Section XI.M16:

(From the FNP LRA, Section B.5.1.3)

“FNP will limit VT-1 and enhanced VT-1 inspections to those leading locations as determined by industry research and operating experience.”

The FNP LRA, Section B.5.1, program description identifies the reactor internals components expected to be leading indicators of aging:

While subject to change based on the results of ongoing industry research, accessible areas of the following Reactor Vessel Internals components will be included in the visual examination scope:

- *Baffle and Former Assemblies*
- *Bottom Mounted Instrumentation Column Cruciforms (casting)*
- *Core Barrel*
- *Lower Core Plate and Fuel Alignment Pins*
- *Lower Support Forging*
- *Upper Support Column Bases (casting)*

SNC supports development of improved industry data, models, and inspection methodologies through active participation in the EPRI Materials Reliability Program Reactor Vessel Internals Issue Task Group and the Westinghouse Owners Group.

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2.2.2 Precedent LRA Reference (Turkey Point)

(From the Turkey Point LRA, Appendix B, Section 3.1.6.1, Subsection: Program Scope)

“This activity will manage the aging effects of cracking due to irradiation assisted stress corrosion (IASCC) and reduction in fracture toughness due to irradiation and thermal embrittlement on accessible parts of the Turkey Point Units 3 and 4 reactor vessel internals. The reactor vessel internals parts susceptible to these aging effects and included in the visual examination scope are accessible areas of the lower core plates and fuel pins, lower support columns, core barrels, baffle/former assemblies, thermal shields, and lower support castings.”

2.2.3 Precedent SER Reference (Turkey Point)

(From the Turkey Point SER, Section 3.8.6.1.2)

“[Program Scope] As described in the application, this activity will manage the aging effects of cracking due to irradiation-assisted stress corrosion (IASCC) and reduction in fracture toughness due to irradiation and thermal embrittlement on accessible parts of the Turkey Point Unit 3 and 4 reactor vessel internals. The reactor vessel internals susceptible to these aging effects and included in the visual examination scope are accessible areas of the lower core plates and fuel pins, lower support columns, core barrel, baffle / former assemblies, thermal shields, and lower support forgings. The program will consist of VT-1 examinations utilizing remote equipment such as television cameras, fiber-optic scopes, periscopes, etc. The staff finds the scope of this program adequate for managing the aging effects for which it is intended because the program addresses the reactor vessel internal components of interest.”

2.2.4 Discussion

Turkey Point SER Section 3.8.6.1.2 outlines a strategy for selecting limiting components for visual examination based on fluence, stress, and material susceptibility. The FNP Reactor Vessel Internals Program utilizes a strategy for selecting limiting components for visual examination using a methodology consistent with the Turkey Point methodology. The resulting FNP limiting component set for inspection is similar to the results for Turkey Point. Additionally, FNP recognizes that the results of future industry research efforts and operating experience may result in changes to this component set.

It is noted that the Turkey Point LRA is a six column table LRA without direct comparisons to NUREG-1801. However, approval of the very similar Turkey Point strategy by the NRC staff is applicable to FNP license renewal.

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2.3 FNP Reactor Vessel Internals Program Exception No. 3

FNP Program	Reactor Vessel Internals Program; <i>LRA Section B.5.1</i>
NUREG-1801 Reference	XI.M16, <i>PWR Vessel Internals</i>
Precedent Program	St. Lucie Reactor Vessel Internals Inspection Program; <i>LRA Appendix B, Section 3.2.5.2.</i>
Precedent Program SER Reference	St. Lucie SER , ML031890095 (dated July 2003); <i>Section 3.1.0.7.2.</i>

2.3.1 FNP Program Exception

The FNP Reactor Vessel Internals Program LRA documentation identifies the following exception to NUREG-1801 Section XI.M16:

(From the FNP LRA, Section B.5.1.3)

“The new inspection program will not follow the inspection cycles set forth in ASME Section XI IWB. A baseline inspection of the FNP internals will be performed during the 5th ISI inspection interval. The frequency of subsequent inspections, and the inspection methodologies utilized, will be based on the results of the baseline inspections.”

2.3.2 Precedent LRA Reference (St. Lucie)

(From the St. Lucie LRA, Appendix B, Section 3.1.4 – Monitoring and Trending)

“The VT-1, and in some cases enhanced VT-1, examinations of selected reactor vessel internals parts will be performed one time for each Unit during the period of extended operation. Based on the results of this examination additional examinations and/or repairs, if required, will be scheduled.”

2.3.3 Precedent SER Reference

From the St. Lucie SER, Section 3.1.0.7.2)

“Monitoring and Trending: The VT-1, and in some cases enhanced VT-1, examinations of selected RVI parts will be performed one time for each unit during the period of extended operation. Based on the results of this examination, additional examinations and/or repairs, if required, will be scheduled.”

And;

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“Conclusions: The staff finds that this AMP will adequately manage cracking, loss of preload, dimensional changes, and reduction in fracture toughness of RV internals, such that the intended function(s) of the RVIs will be maintained consistent with the CLB throughout the period of extended operation, as required by 10 CFR 54.21(a)(3).”

2.3.4 Other Pertinent Information - Ginna

The Ginna Draft SER is scheduled for release by the NRC on October 9th, 2003. This document is not yet available for review. However, a review of Ginna RAIs, RAI responses, Open Items, and Open Item responses related to the Reactor Vessel Internals Program identified one RAI / RAI response and an associated Open Item / Response regarding this exception.

RAI B2.1.27-2

The applicant has described the 10 elements of the Reactor Vessel Internals Program but has not identified whether all 10 elements of the program are in accordance with GALL Program XI.M16 and whether the applicant's program contains any exceptions or enhancements to the 10 elements in GALL Program XI.M16. The applicant is requested to identify whether all 10 elements of the program are in accordance with GALL Program XI.M16 and whether the applicant's program contains any exceptions or enhancements to the 10 elements in GALL program XI.M16.

Ginna Response

The Reactor Vessel Internals Program is a new program that is consistent with, but includes one exception to, NUREG-1801 (Generic Aging Lessons Learned (GALL) Report), Section XI.M16, "PWR Vessel Internals". The only exception is that NUREG-1801, Section XI.M16 specifies examination schedules in accordance with IWB-2400, which requires core support structures to be inspected once during each 10-year interval. While this applies to the VT-3 examinations, some augmented examinations may be performed only once, unless degradation is detected.

Open Item 3.1.2.3.3-1

In response to F-RAI B2.1.27-2 in a May 13, 2003, letter, the applicant indicated that the Reactor Vessel Internals Program is consistent with, but includes one exception to, NUREG-1801 GALL Section XI.M16, "PWR Vessel Internals". The only exception is that NUREG-1801, Section XI.M16 specifies examination schedules in accordance with IWB-2400, which requires core support structures to be inspected once during each 10-year interval. While this applies to the VT-3 examinations, some augmented examinations may be performed only once, unless degradation is detected. RG&E will participate in industry activities

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concerning the development of augmented inspection techniques for inspection of core support structures. The required inspections and frequency of inspection will depend upon the results of the industry program on reactor vessel internal. Therefore, the exception may not be relevant and will be further evaluated by the staff when the results of the industry program are known. The applicant is to confirm that the Reactor Vessel Internals Program will be submitted for staff review prior to entering the license renewal period.

Ginna Response

RG&E will continue to participate in industry activities as development of augmented inspection techniques for core support structures progress. A Reactor Vessel Internals program will be submitted for staff review prior to Ginna entering the period of extended operation.

Ginna takes a similar exception to the NUREG-1801 inspection schedule as the FNP Program. However, a notable difference is that Ginna does not specify any specific inspection schedule, but relies upon the results of future research initiatives, and that the Ginna RVI Program was required to be submitted for staff review prior to entering the period of extended operation. FNP aligns to the St. Lucie precedent of specifying that a baseline examination will be performed, with future inspection requirements based upon this baseline inspection.

2.3.5 Discussion

The St. Lucie LRA and associated SER outline an inspection schedule consistent with the FNP Program inspection schedule. A one-time baseline inspection will be conducted in conjunction with ASME Section XI inspection requirements. Future inspection requirements will be based upon the results of the baseline inspections. Additionally, a review of Ginna license renewal documentation identified where Ginna takes a similar exception to NUREG-1801, Section XI.M16. While the Ginna inspection schedule has not yet been determined, the correspondence demonstrates the acceptability of an alternate approach.

Based on the above information, the NRC staff approval of the St. Lucie inspection schedule and acceptance of the Ginna exception to NUREG-1801, Section XI.M16 is applicable to the FNP Program.

3. Conclusion

Reviews of existing LRAs, SERs, and other license renewal correspondence have identified areas of similarity between the FNP Reactor Vessel Internals Program Exceptions to NUREG-1801 and methodologies approved for prior applicants. These approved approaches are applicable to the FNP Program as described above.