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2CAN050407

May 24, 2004

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Request for Additional Information Responses for
License Renewal Application TAC No. MB8402
Arkansas Nuclear One – Unit 2
Docket No. 50-368
License No. NPF-6

Dear Sir or Madam:

By letter dated April 23, 2004 (2CNA040408), the NRC requested additional information on the Arkansas Nuclear One, Unit 2 (ANO-2) License Renewal Application (LRA) within 30 days. The requests for additional information (RAIs) are from the LRA Section 2.3, System Scoping and Screening Results (Mechanical). The responses to the RAIs are contained in the attachment.

There are no new commitments contained in this submittal. Should you have any questions concerning this submittal, please contact Ms. Natalie Mosher at (479) 858-4635.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 24, 2004.

Sincerely,

Timothy G. Mitchell
Director, Nuclear Safety Assurance

TGM/nbm

Attachment

A100

cc: Dr. Bruce S. Mallett
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**Attachment to
2CAN050407
RAI Responses**

Section 2.3 RAI Responses

RAI 2.3.1.1-1: It is stated "...The O-rings do not support an intended function of the reactor vessel and are therefore not subject to aging management review." The staff believes that the O-ring leak monitor tube serves as a pressure boundary and the piping should be within the scope of license renewal. Please provide the justification for the exclusion or submit an aging management review for the stated component.

Response: The reactor vessel flange leak detection piping contains an integral orifice within the flange itself which limits flow (in the event of a reactor vessel closure O-ring failure) to within the makeup capability of the plant. In the event of leakage past the O-rings and through the restricting orifice, the downstream vessel leak detection piping and associated valves do not perform a reactor coolant system (RCS) pressure boundary function and would only serve to direct RCS fluid to the drain tank. Therefore, the associated reactor vessel leak detection piping and valves do not support an intended function and are not subject to aging management review.

RAI 2.3.1.4-1: In Section 2.3.1.4 it is stated that "...The pressurizer components provide RCS pressure control for mitigation of a feedwater line break (FWLB) with alternating current (AC) available as described in Section 15.1.14.2.2.2. However, the most limiting FWLB is without AC power available and the pressurizer sprays are not credited to mitigate that event. Therefore, RCS pressure control using the pressurizer sprays is not an intended function of the pressurizer."

Since credit is taken to mitigate an accident, RCS pressure control using the pressurizer sprays is an accident mitigation function of the pressurizer even if the postulated accident is not the limiting one. Since credit is taken for the pressure control in the accident analysis, pressurizer relief valve discharge pipe and the quencher tank should be within the scope of license renewal. Please provide justification for the exclusion or submit an aging management review for the components.

Response: The analysis of FWLB with AC power available in ANO-2 Safety Analysis Report (SAR) Section 15.1.14.2.2.2 is part of the parametric study that was completed to determine the bounding feedwater line break analysis for the initial licensing of ANO-2. For the FWLB with AC power, SAR Section 15.1.14.2.2.1 (Item D on page 15.1-98) states that the sprays "limit the pressure transient to a value below the high pressurizer pressure trip while increasing the energy of the RCS." The pressurizer sprays were used to limit the rise in the RCS pressure to below the high pressurizer pressure trip signal until the unaffected steam generator empties. Emptying the steam generator maximizes the energy of the RCS, which results in a higher peak pressurizer pressure. Thus the sprays were not "credited" to mitigate the event, but were actually used to prolong the RCS heatup and maximize the time to trip in order to perform a bounding parametric study. The combination of assumptions used for this event, including use of the pressurizer sprays, assures that the most limiting RCS transient prior to trip has occurred and that a minimum secondary heat sink exists for the subsequent RCS cooldown. As described in SAR Section 15.1.14.2.4, the FWLB with loss of AC power is the limiting event that was evaluated in subsequent analyses. The pressurizer sprays are not credited for the limiting event of the FWLB with loss of AC power as described in SAR Section 15.1.14.2.4.4.

The pressurizer relief valve discharge piping and quench tank pressure boundary integrity are not required to be maintained for the pressurizer relief valves to perform their safety function of reducing reactor coolant system pressure. As identified in SAR Section 5.5.11, the quench tank is not safety-related and quenching of steam in the tank is not a safety function. A rupture disk on the quench tank ensures a flow path is available for the discharge of the pressurizer safety valves. Therefore, the quench tank and its associated piping do not have a license renewal intended function.

Neither the pressurizer spray components nor the quench tank and its associated piping are safety-related. Their failure will not prevent satisfactory accomplishment of any of the safety functions identified in 10CFR54.4(a)(1) and they are not relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations listed in 10CFR54.4(a)(3).

RAI Table 2.3.1-2-1: In Table 2.3.1-3, Class I fittings are listed as components subject to aging management review. This is a very broad categorization. Please provide a list of specific component fittings.

Response: Class 1 fittings include elbows, tees, reducers, and flanges associated with Class 1 piping.

RAI Table 2.3.1-2-2: Why are the following parts excluded? The Staff requests clarifications for the following reactor internals exclusions:

Core support barrel (CSB) bolts and lower internals assembly bolts
Control element assembly (CEA) shroud bolts (shroud fasteners are the same as bolts?)
CSB snubber bolts
Thermal shield bolts
Core shroud bolts
Upper guide structure (UGS) ring shim, tab and plate, locking strip, guide pin, alignment screw and nut, key slot tab, hold down ring, sleeves
Lower internals assembly core support columns, core support plate, support beams and flanges, anchor block and dowel pins
Thermal shield positioning pin and shim
Fuel assembly alignment plate

Response: The ANO-2 reactor vessel internals design is an all-welded design. As such, there are no CSB or lower internals bolts.

In the ANO-2 LRA, the CEA shroud fasteners are the same as the CEA shroud bolts.

The CSB snubber bolts were inadvertently omitted from the LRA. These items are considered part of the reactor vessel since they are connected to the core stabilizing lugs. These components are fabricated of nickel-based alloy exposed to a treated borated water (internal) environment (as are the core stabilizing lugs). The aging effects and aging management programs are identical to the program for the core stabilizing lugs with the exception that the bolts have an additional aging effect of loss of mechanical closure integrity, managed by the Inservice Inspection Program.

The ANO-2 reactor vessel internals design does not include a thermal shield and associated bolting.

The ANO-2 design does not include core shroud bolts.

A complete list of items that comprise the upper guide structure at ANO-2 is provided in Table 2.3.1-2 on page 2.3-12 of the LRA. The UGS assembly at ANO-2 consists of the UGS support plate, cylinder, grid plate, flange, sleeve, lifting bolt insert, alignment keys and dowel pins. The hold down ring is identified in Table 2.3.1-2 on p. 2.3-12 of the LRA.

The lower internals assembly core support columns, core support plate, support beams and flanges, and dowel pins are identified in Table 2.3.1-2 on p. 2.3-12 of the LRA. There is no lower internals assembly anchor block in the ANO-2 reactor vessel internals design.

As stated above, the ANO-2 reactor vessel internals design does not include a thermal shield and the associated bolts, positioning pin and shim.

The fuel assembly alignment plate is identified in Table 2.3.1-2 on p. 2.3-12 of the LRA.

RAI Table 2.3.1-2-3: Diffuser plates are not identified as within the scope of license renewal. The above components provides flow distribution of the reactor coolant and could meet the criteria identified in 10CFR54.4(a)(2), and therefore, should be within the scope of license renewal. Please provide justification for the exclusion or submit an aging management review for the components.

Response: The ANO-2 reactor vessel internals design does not include a diffuser plate. The flow skirt that provides for flow distribution during normal operation is listed in Table 2.3.1-1.

RAI Table 2.3.1-2-6: In-core instrumentation tubes and safe ends were not identified in the LRA (Table 2.3.1.1) as within the scope of license renewal. The subject components perform a pressure boundary function, and therefore, should be within scope. Please justify the exclusion of these components.

Response: The in-core instrumentation (ICI) enters the ANO-2 reactor vessel via the closure head, through ICI nozzles and flange adapters. These components are identified in Table 2.3.1-1, page 2.3-9 of the LRA.

RAI Table 2.3.1-2-7: SAR Figure 4.2-14 In-Core Instrument Nozzle indicates that some parts of the nozzle are not within the scope of license renewal. Why they are excluded?

Response: SAR Figure 4.2-14 does not indicate whether parts of incore instrument nozzles are in the scope of license renewal. All parts of SAR Figure 4.2-14 which support the intended function of RCS pressure boundary are included in the scope of license renewal and are subject to aging management review (nozzle, adapter, clamp, clamp nuts and studs, spacer sleeve, and drive nut).

RAI Table 2.3.1-2-8: Are the instrument isolation valve bodies, which act as pressure boundary in the event of a leak in the In-Core Instrumentation system, within the scope of license renewal?

Response: There are no instrument isolation valves in the ANO-2 ICI system.

RAI Table 2.3.1-3-1: The reactor coolant pump (RCP) support lugs were not identified as within the scope of license renewal. Also in SAR Section 5.5.1.4.2.3, RCP Supports, four vertical spring-type hangers and two horizontal hydraulic snubbers are mentioned. The above components provide structural support and may meet the criteria identified in 10CFR54.4(a)(2). Therefore, the components may be within the scope of license renewal. Please provide justification for their exclusion or submit an aging management review for the stated components.

Response: Snubbers and spring hangers are active components and are not subject to aging management review. The structural steel supports for the reactor coolant pumps are reviewed in the structural section of the LRA (Section 2.4.1 and Table 2.4-1 on pages 2.4-2 and 2.4-11).

The reactor coolant pump support lugs are within the scope of license renewal and subject to aging management review as integral attachments to the reactor coolant pump casing. Each ANO-2 RCP has four stainless steel (SA-240 Type 304) support lugs on the exterior of the pump casing. Stainless steel is not susceptible to loss of material in an air (external) environment; however, the attachment weld is susceptible to cracking. This cracking is managed by the ANO-2 Inservice Inspection Program for the period of extended operation.

RAI Table 2.3.1-5-1: Steam Generators: Why are the internal feedwater distribution ring (elevated feed ring) and the thermal sleeve connecting the header and the nozzle excluded from the scope of license renewal? Please provide justification for their exclusion or submit an aging management review for the stated components.

Response: The feedwater thermal sleeves are located in Table 2.3.1-5 on page 2.3-19 of the LRA.

The internal feedwater distribution ring and piping do not support any intended function (pressure boundary) of the steam generators. There are no design bases events or regulated events at ANO-2 that rely upon the steam generator feedwater ring to demonstrate successful mitigation and recovery from the event.

The possibility that loose parts might be generated and that they might prevent the accomplishment of certain safety functions of the steam generator is not, by itself, sufficient to require that the feedwater distribution ring be included in the scope for license renewal. There must be some basis in operating experience. In response to a Staff request for further information in RAI 2.3.1.6-1, Robinson Nuclear Plant surveyed operating history experience compiled by the World Association of Nuclear Operators and the Institute of Nuclear Power Operations and found that there were no recorded instances of this type of failure. They did find, however, instances wherein J-tubes were replaced, due to corrosion problems, and an instance wherein there was direct leakage for the feedwater ring. While these can be considered preconditions to the loose part scenario, the postulation that such loose parts might prevent the accomplishment of certain safety functions is purely

hypothetical. The steam generators are equipped with two stages of integral moisture separators which reduce steam moisture content to less than 0.1 percent. It is not credible that metallic loose parts large enough to affect downstream components could pass through the tube bundle and then through the moisture separators that are designed to remove tiny droplets of moisture from the steam path.

In summary, considering the hypothetical nature of effects from postulated loose parts, the feedwater distribution rings do not meet the scoping requirements of 10CFR54.4.

RAI Table 2.3.1-5-2: Support pads were not identified in the LRA as within the scope of license renewal. The above components provide structural support and could meet the criteria identified in 10CFR54.4(a)(2). Therefore, the component should be within the scope of license renewal. Please provide justification for the exclusion or submit an aging management program for the stated component.

Response: Support pads are listed as steam generator support foundation and reviewed in the structural section of the LRA, Table 2.4-1 on page 2.4-12.

RAI Table 2.3.1-5-3: Seismic lugs were not identified in the LRA as within the scope of license renewal. The above component provides structural support and could meet the criteria identified in 10 CAR 54.4(a)(2). Therefore, the component should be within the scope of license renewal. Please provide justification for the exclusion or submit an aging management program for the stated component.

Response: The steam generator seismic lugs are called key brackets and snubber lugs at ANO-2 and are identified in Table 2.3.1-5 on p. 2.3-19 of the LRA.

RAI P&ID-1: On P&ID LRA-M-2236, Sheet 1, a series of screens and supports completely cover the containment sump. Also, grating cages and partition plates are in the sump. Are they within the scope of license renewal? Please provide justification for their exclusion or submit an aging management review for the stated components.

Response: Containment sump structural steel is covered under the structural portion of the ANO-2 LRA Section 2.4.1, "Containment & Containment Internals." In Tables 2.4-1 and 3.5.2-1, the structural steel for the containment sump is included under the line item "structural steel." The structural steel in the LRA tables includes grating cages and partition plates.