ARKANSAS NUCLEAR ONE – UNIT 2
DOCKET NO. 50-368
LICENSE NO. NPF-6

10CFR50.59 REPORT FOR 2001

This report contains a brief description of changes in procedures and in the facility as described in the Safety Analysis Report (SAR), tests and experiments conducted which were not described in the SAR, and other changes to the SAR for which a safety analysis was conducted. The report also contains the safety evaluation for each change. This report is applicable for the period from February 25, 1999 through December 10, 2000.

The safety evaluations included in this report were performed in accordance with 10CFR50.59 and determined that none of the changes involved an unreviewed safety question.

#	Initiating Doc.	Description
1	CALC 91D200301	Emergency Diesel Generator Ratings
2	CALC 93E005704	Decay Heat Calculations
3	CALC 97E011701	Revised Containment Cooling System Cooler Fan Flow and 10% Steam Generator Plugging Limits for Replacement Steam Generators
4	CALC 97E011701	Revised Containment Cooling System Cooler Fan Flow and 10% Steam Generator Plugging Limits for Replacement Steam Generators
5	CALC 98R200503	Cycle 15 Reload Analysis Report and Cycle 15 Core Operating Limits Report
6	CALC 98R200503	Cycle 15 Reload Analysis Report
7	CC 975009C201	2T-24 Acid Tank Replacement
8	CR 2-2000-0149	Spent Fuel Shipping Cask Drop Dose
9	CR 2-96-0395	Evaluation of Fibrous Insulation on Valves Inside the Containment Building
10	CR 2-1997-0577	Removal of Details of Steam Dump and Bypass System Valves
11	CR 2-1998-0436	Fire Hazards Analysis Update to Include Alternate Shutdown Critical Timing Actions
12	DCP 963089D203	Bus 2A3 Breaker Replacement
13	DCP 974814D201	Installation of Pressure Relieving Devices on Containment Penetrations to Comply with Generic Letter 96-06
14	DCP 980642D202	Containment Construction Opening
15	DCP 980642D203	Steam Generator Replacement Project – Rigging and Handling
16	DCP 980642D204	Steam Generator Replacement Project – Removal and Replacement of Major Interferences
17	DCP 980642D205	Steam Generator Replacement Project – Insulation
18	DCP 980642D206	Steam Generator Replacement Project – Temporary Utilities
19	DCP 980642D210	Replacement Steam Generator Design/Qualification
20	ER 002270E201	Change of Normal Valve Position of 2IA-250, 2IA-251, & 2IA-252 to Closed

#	Initiating Doc.	Description
21	ER 002286E201	Temporary Alteration for Removal/Maintenance of the Gland Steam Exhaust Blower
22	ER 002315E201	Update of Pressure/Temperature Values in the Chemical and Volume Control System
23	ER 002349E201	Hookups for Corrosion Product Samplers on Low Pressure Feedwater Heaters
24	ER 002357E201	High Pressure Safety Injection Valve Plug Design Change
25	ER 002357E201	High Pressure Safety Injection Valve Plug Design Change
26	ER 002357E201	High Pressure Safety Injection Valve Plug Design Change
27	ER 002357E201	High Pressure Safety Injection Valve Plug Design Change
28	ER 002357E201	High Pressure Safety Injection Valve Plug Design Change
29	ER 002357E201	High Pressure Safety Injection Valve Plug Design Change
30	ER 002357E201	High Pressure Safety Injection Valve Plug Design Change
31	ER 002357E201	High Pressure Safety Injection Valve Plug Design Change
32	ER 002409E201	Isolation of Service Water Cooling from High Pressure Safety Injection Pumps
33	ER 002528E201	Containment Sump Operability During Cycle 14 Outages from Mode 5 to Prior to Mode 5
34	ER 002631E201	LRW/BMS Configuration Change
35	ER 002686E201	Temporary Installation of Safety Injection Tank Vent Caps
36	ER 002795N201	Repair of Leaking Hot Leg RTD Nozzle
37	ER 002795N202	Replacement of Alloy 600 RTD and Sample/PT Nozzles
38	ER 002796N201	Leak Repair of Pressurizer Heater Nozzles
39	ER 002796N202	Pressurizer Heater Repair
40	ER 002804E203	Evaluation of Balance Drum and Sleeve for Material Substitution
41	ER 002864E201	Revised Specification for HEPA Filters
42	ER 002888E201	Copper Removal Soak

#	Initiating Doc.	Description
43	ER 002891E201	Temporary Connection of Instrument Air System to Generator Gas System for Purging and Testing
44	ER 002913E201	Valve Equivalency for 2FS-3216A
45	ER 002947E201	Temporary Installation of Filter Medium Over 2VEF-15 Roughing Filter
46	ER 002950E201	Removal of 2PSV-5602 and 2PSV-5603 from Service
47	ER 002990E201	Isophase Cooling Valve Position Change
48	ER 002998N201	Control Room Door Closure on Control Room Isolation Signal
49	ER 003021E201	Evaluation of 2VSF-9 Outside Air Damper Cover During Power Swap
50	ER 003056N201	Relocation of Fuel System Trouble Alarm
51	ER 003104N201	Permanent Removal of 2TE-8200 through 2TE-8207
52	ER 003109E202	Relocation of 2RC-8B
53	ER 003111E201	Temporary Revision of Reactor Building Purge Sampling Procedure
54	ER 003194N201	2K127 Annunciator Change – A EDG
55	ER 003240E201	Replacement of 2D232 Breaker Long Time/Short Time Overcurrent Tripping Device
56	ER 003251E201	Removal of Packing Leakoff Line for 2CV-4651 & 2CV-4652
57	ER 003261E201	GL96-06 Thermal Expansion Pressure Relief
58	ER 973608N201	PPS Indefinite Bypass
59	ER 973854N201	SU/BD DI Sample to On-Line Ion Chromatograph
60	ER 974061E201	Refueling Equipment Setpoints
61	ER 974119P201	Removal of Multiple Control Station 2N-130
62	ER 974328L201	Boronometer 2AE-4813 Sealed Source Removal
63	ER 974372N201	HP and LP Turbine Upgrade for Replacement Steam Generators and Power Uprate
64	ER 974811N201	Replacement of 2LS-9748
65	ER 974981N201	Replacement of Main Generator Core Monitor

#	Initiating Doc.	Description
66	ER 974991N202	Steam Generator Blowdown Filtration Modification
67	ER 974991N203	2T94B Demineralizer Modification for Steam Generator Blowdown Flow
68	ER 975122N201	High High Containment Pressure Isolation of Main Feedwater
69	ER 980066P201	Service Water Traveling Screen Upgrades
70	ER 980406N201	Main Generator Hydrogen Cooler Replacement
71	ER 980542E202	Temporary Cooling for Areas Affected by Service Water/Auxiliary Cooling Water Modifications
72	ER 980542N201	Service Water/Auxiliary Cooling Water Uprate Modification
73	ER 980547N201	Steam Generator Replacement/Power Uprate Related Setpoint Changes for PPS
74	ER 980547N203	Steam Generator Replacement/Power Uprate Instrument Range/Setpoint Changes for FWCS/RRS
75	ER 980547N204	SDBCS Update for Replacement Steam Generators
76	ER 980601E201	Temporary DI/Filter Skid for CCW
77	DCP 980642D209	Steam Generator Replacement Project – Miscellaneous Piping Systems
78	DCP 980642D209	Steam Generator Replacement Project – Miscellaneous Piping Systems
79	ER 980642E232	Containment Integrity with Concrete Removed from Liner Plate
80	ER 980655N201	EFW Steam Trap Modification
81	ER 980711C201	Replacement of Plant Heating Boiler Burner and Control
82	ER 981026A201	Correction of Labeling of Existing Lighting Panel
83	ER 981187E201	Addition of AAC Generator to the Safe Shutdown Components of Interest List
84	ER 981243N201	Steam Generator Heat Exchanger Replacement
85	ER 991457E205	Qualification of 4000 gpm Service Water Flow to 2E35A and 2E35B
86	ER 991508N201	Safety Channel 'D' Excore Detector Replacement
87	ER 991508N202	Safety Channel 'C' Excore Detector Replacement
88	ER 991545N201	Removal of 2FI-8229-1 and 2FI-8277-1

#	Initiating Doc.	Description
89	ER 991642N201	EFW Steam Supply Check Valve Replacement
90	ER 991710E203	Use of AFW System Via FWCS
91	ER 991744E202	Equivalency Evaluation for Control Hand Switches for 2K-4A and 2K-4B Emergency Diesels
92	ER 991802N201	Actuator Modification for 2CV-5630-1 and 2CV-5631-2
93	ER 991864E201	Development of Structural Integrity Test Requirements for Containment Upgrade
94	ER 991897N201	Physics Testing Improvements
95	ER 992116E201	2PSV-5090 Gag Temporary Installation
96	ER 992124E201	Alternate ACW Return Path for 2CV-1481-1 Maintenance
97	ER 992141E202	Temporary 480VAC Power for 2R14 Turbine Work
98	LCP 963355L201	HP Turbine Megawatt Recovery Effort
99	LCP 963501L201	Circulating Water Pump Motor Replacement
100	LDCR	Conduct of Operations
101	LDCR	Dilution of RCS During Heatup
102	LDCR	Removal of Reference to the Health Physics/Nuclear Chemistry Laboratory Facility
103	LDCR	Clarification of Intermediate Core Power Distribution Testing Requirements
104	MAI 13760	Flow and DP Verification for 2VUC-25A/B
105	NCP 002239N201	Reactor Building Pressure and Oxygen Control
106	NCP 002370N201	Electrical Uprate for 2R14
107	NCP 002370N201	Electrical Uprate for 2R14
108	NCP 003132N201	EDG Pneumatic Timer Replacement
109	NCP 003258N201	HPSI Test Connection Addition
110	NCP 963089N201	Removal of the 2A3 Current Limiting Reactor
111	NCP 963197N201	Replacement of SG Blowdown Sodium Analyzers

#	Initiating Doc.	Description
112	NCP 963197N202	Replacement of Startup Blowdown Demineralizer Sodium Analyzer 2AIT-4562
113	NCP 963474N201	480 MCC Cubicle Replacement
114	NCP 974094N201	Upgrade of the Refueling Machine Control Console Computer
115	NCP 974342N201	2PSV-5653 and 2PSV-5654 Flange Addition
116	NCP 975122N202	Additional AFW Trip
117	NCP 980397N201	Main Generator Stator Rewind
118	NCP 980781N201	Gaseous Radwaste System Modification for 2RITS-2429 Purging
119	NCP 981252N201	Removal of Power Cables from 2B51L9/N3 and 2B61K6/N2
120	NCP 991522N201	Containment Cooler Chilled Water Coil Replacement and Fan Pitch Change
121	NCP 991638N201	Pump Casing EFW Vent Valve Addition
122	NCP 991782N201	Service Water Pipe Replacement to Control Room Emergency Chillers
123	PC 963056P201	Startup and Blowdown Demineralizer Resin Modification
124	PC 963212P201	Sulfuric Acid Supply Valve Replacements for Regenerative Waste Tanks 2T92B/C
125	PC 973958P201	Intake Stop Log Guide Debris Barriers
126	PC 974603P201	Replacement of EDG Day Tank Level Switches
127	PC 975054P201	RCS Refueling Level Tubing Modification
128	PROC 1000.001	Organization and Responsibilities
129	PROC 1000.043	Steam Generator Water Chemistry Monitoring
130	PROC 1025.015	On Line Repair Procedures
131	PROC 1052.007	Secondary Chemistry Monitoring
132	PROC 1052.010	Chemistry Control of Circulating Water
133	PROC 1052.031	RCS pH Control
134	PROC 1082.004C	Software Change Request

#	Initiating Doc.	Description
135	PROC 2102.015	Filling and Draining the Refueling Canal
136	PROC 2104.029	Service Water System Operations
137	PROC 2104.039	HPSI System Operations
138	PROC 2311.002	Service Water System Flow Test
139	PROC 2628.013	Operation of Service Water Corrosion Inhibitor Injection System
140	SDID 2-98-0043	USAR Clarification
141	TAP 00-2-014	Temporary Connections for Isophase Bus Coolers
142	TAP 99-2-005	Temporary Cooling to 2K-4A from Loop I Service Water
143	TAP 99-2-007	Temporary Removal of 2CV-1481-1
144	TAP 99-2-009	Installation of Gag on 2PSV-5249
145	TS Bases 2.1.2	Description of Replacement Steam Generator Hydro Testing and Code Year
146	TS 3/4.1.12 Bases	Changing the Limiting Design Basis Event for the LTOP System
147	TS Bases 3/4.6.2.2	TSP Surveillance Test Change for Steam Generator Replacement
148	WP 2409.630	Flow Diversion Through One Containment Cooling Fan Unit
149	WP 2409.631	2VSF-1A Containment Cooling Fan Repair
150	WP 2409.635	2P99 Service Water System Flow Test
151	WP 2409.656	Secondary System Dispersant Trial
152	WP 2409.689	ECP Return Line Cleaning

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FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 003-04-0

This Document contains 3 Pages.

Document No. CALC-91-D-2003-01 Rev./Change No. 4

Title ANO 2 EDG Ratings

Brief description of proposed change:

As part of the SSEI follow-up actions documented in CR-ANO-2-1999-0535, CALC-91-D-2003-01 was revised to remodel the EDG heat exchangers. The calculation revision models the Unit 2 EDG heat exchangers in the software program STER. EDG load results from the revised calculation were slightly reduced from that listed in SAR Section 8.3.1.1.9.9 for elevated temperatures. The conclusion that the diesel loading requirements can be met, however has not changed. An LDCR has been prepared to change the SAR and to use CALC-91-D-2003-01 as the bases for the change. This evaluation discusses the impact of the change in EDG ratings and proposes to remove the detailed discussion from the SAR. More specifically, a listing of the ratings as a function of SW temperature >117 F is replaced with the statement "...Operation of the EDGs using service water at the anticipated worse case ECP temperature profile has been evaluated against the EDG emergency load profile. The evaluation concludes that the load profile can be met with excess margin at design fouling conditions and up to 10% tube plugging."

Will the proposed Activity:

1. Require a change to the Operating License including:

   Technical Specifications (excluding the bases)? Yes☐ No☒

   Operating License? Yes☐ No☒

   Confirmatory Orders? Yes☐ No☒

2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:

   SAR (multi-volume set for each unit)? Yes☒ No☐

   Core Operating Limits Report? Yes☐ No☒

   Fire Hazards Analysis? Yes☐ No☒

   Bases of the Technical Specifications? Yes☐ No☒

   Technical Requirements Manual? Yes☐ No☒

   NRC Safety Evaluation Reports? Yes☐ No☒

3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒

4. Result in a potential impact to the environment? (Complete Environmental Impact Determination of this form.) Yes☐ No☒

5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒

6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6? Yes☐ No☒

7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7?

   QAPM? Yes☐ No☒

   E-Plan? Yes☐ No☒

8. Does this review depend on future NRC approval of other actions? (NRC SER, Relief, etc)? (forward change to PSC per 6.3.8 or 6.3.9) Yes☐ No☒

Document No. CALC-91-D-2003-01 Rev./Change No. 4

Basis for Determination (Questions 1, 2, & 3):

1. A review of the Technical Specifications indicates that they are not affected. Specifically T.S. 3/4.8 Electrical Power Systems does not include any specific items of concern that are affected by the revised calculation. It was noted that the load range specified in 4.8.1.1.2(c)9 can not be fully utilized at elevated service water temperatures. However, this condition has always existed, it is acknowledged in the SAR, and it does not affect the ability to test the EDGs.

   A review of operating license NPF-6 was performed, and with the revision proposed to the SAR, no changes are required to the license.

   No known confirmatory orders are impacted by the proposed change.
2. A revision to SAR section 8.3.1.1.9.9 is required. This section lists the continuous EDG load limits for elevated service water temperatures. This was added to the SAR in amendment 12 following the issue of calculation 91-D-2003-01. An LDCR has been completed.
3. The revision to calculation 91-D-2003-01 does not involve a test or an experiment.

☐ Proposed change does not require 10CFR50.59 Evaluation per Attachment 1, Item # ____, (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in questions 1, 2 and 3. If search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document	Section
LRS:	50.59 Unit 2 (KW Or kilowatt* Or rating*) w/20 (EDG* Or Diesel*)
MANUAL SECTIONS:	TS Section 3/4.8 and bases SAR Section 8.3.1.1.9 License NPF-6
FIGURES:	8.3-50,51

Edward Paul Blackard — Certified Reviewer's Signature; Edward Paul Blackard — Printed Name; 6/20/00 — Date

Reviewer's certification expiration date: 3/22/01

Assistance provided by:

Printed Name	Scope of Assistance	Date
Mark Harris	Document Search	6/19/00

Search Scope Review Acceptability (NA, if performed by Technical Reviewer per 1000.006)

Certified Reviewer's Signature; DAVID MACPHEE — Printed Name; 6/21/00 — Date

ENVIRONMENTAL IMPACT DETERMINATION (UNIT 1 and UNIT 2)

Document No. CALC-91-D-2003-01 Rev./Change No. 4

Complete the following Determination. If the answer to any item below is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

FORM TITLE: ARKANSAS NUCLEAR ONE 10CFR50.59 EVALUATION	FORM NO. 1000.131B	REV. 003-04-0

This Document contains 2 Pages.

10CFR50.59 Eval. No. FFN# 00-067
(Assigned by PSC)

Document No. **CALC-91-2003-01** Rev./Change No. **4**

Title **ANO 2 EDG Ratings**

Brief Description of Change:

As part of the SSEI follow-up actions documented in CR-ANO-2-1999-0535, CALC-91-D-2003-01 was revised to remodel the EDG heat exchangers. The calculation revision models the Unit 2 EDG heat exchangers in the software program STER. EDG load results from the revised calculation were slightly reduced from that listed in SAR Section 8.3.1.1.9.9 for elevated temperatures. The conclusion that the diesel loading requirements can be met, however has not changed. An LDCR has been prepared to change the SAR and to use CALC-91-D-2003-01 as the bases for the change. This evaluation discusses the impact of the change in EDG ratings and proposes to remove the detailed discussion from the SAR. More specifically, a listing of the ratings as a function of SW temperature >117 F is replaced with the statement "...Operation of the EDGs using service water at the anticipated worse case ECP temperature profile has been evaluated against the EDG emergency load profile. The evaluation concludes that the load profile can be met with excess margin at design fouling conditions and up to 10% tube plugging."

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1. Will the probability of an accident previously evaluated in the SAR be increased?

   Yes ☐ No ☒

   The EDG is part of a safety system that is available to provide emergency power during an accident. SAR paragraph 15.1.12 discusses internal and external events including fires. The diesel, its fuel oil delivery system, its exhaust system or its generator are all potential initiators of a fire. SAR chapter 15.1.26 discusses an accident where a fire could lead to control room uninhabitability. The revised calculation however, does not indicate any change to the frequency of these SAR chapter 15 accidents. The calculation concludes that the EDG will still be capable of providing power for the anticipated accident loads. As such, the EDG will be able to perform its safety function to power required loads and the probability of a chapter 15 accident, is not increased.

2. Will the consequences of an accident previously evaluated in the SAR be increased?

   Yes ☐ No ☒

   The proposed change does not adversely impact any equipment credited with accident mitigation nor does it affect fission product barriers or introduce new pathways for fission product release. Furthermore this activity does not create new or aggravate existing onsite dose consequences that might restrict access to vital areas or otherwise impede mitigating actions.

3. Will the probability of a malfunction of equipment important to safety be increased?

   Yes ☐ No ☒

   Though the actual loading on the EDGs has not increased as a result of this calculation, the more conservative STER model predicts a lower continuous EDG load rating for elevated service water temperatures. The calculation revises the 2-21 hour EDG load demand to utilize the decreasing

demand for the motor driven EFW pump and the RB cooler fans. In so doing it shows that sufficient margin still exists even with the more conservative STER model. It incorporates the anticipated worse case ECP temperature profile to give a representation of EDG load capabilities. The calculation is still inherently conservative due to its assumptions of design fouling, minimum service water flow, maximum ambient air termperature and 10 % tube plugging. It concludes that the EDG is still capable of supporting the required loading therefore the likelihood of failure has not increased.

4. Will the consequences of a malfunction of equipment important to safety be increased?

Yes ☐ No ☒

The change to the evaluated capability of the EDGs does not affect the consequence of a malfunction of the EDG or any equipment reliant on the EDG. Adequate EDG capacity has been shown to still be available for all required loads. Any monitoring or mitigation functions will be performed as analyzed. No new pathways for releases are created nor are the consequences of any existing release paths increased by the re-evaluation of the EDGs.

5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created?

Yes ☐ No ☒

The change to the evaluated EDG capability shows adequate capacity exists. It does not create any new circumstances, failure scenarios or interactions between SSCs that have not already been evaluated. As such no new accident scenarios are created.

6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?

Yes ☐ No ☒

The change to the evaluated EDG capability shows adequate capacity exists. It does not create any new equipment functions or impact the method of performing existing equipment functions. Therefore no new failure mechanisms are postulated.

7. Will the margin of safety as defined in the basis for any technical specification be reduced?

Yes ☐ No ☒

The Technical Specifications Basis for Electrical Power Systems (3/4.8) does not discuss EDG load requirements, EDG load carrying capability, or evaluated load margins. It does mention that the operability of the AC sources ensures that sufficient power will be available to supply safety related equipment. Since the calculation provides evidence that this is still the case the margin of safety is not reduced.

Edward Paul Blackard — Edward Paul Blackard — 6/20/00

Certified Reviewer's Signature | Printed Name | Date

Reviewer's certification expiration date: **3/22/01**

Assistance provided by:

Printed Name	Scope of Assistance	Date
Mark Harris	**Technical Development**	**6/20/00**

PSC review by: _____ Date: 7/6/2000

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FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 3 PC-1

This Document contains 4 Pages.

Document No. CALC-93-E-0057-04 Rev./Change No. 3

Title UNIT 2 SAR TABLE 9.1-6 LDCR DECAY HEAT CALCULATIONS

Brief description of proposed change:

The revision is being performend to ensure that the time to offload the core is more conservative than what Tech Specs assume. Calculations were also performed at the Batch level instead of the individual assembly level to maintain consistency with the original analysis.

Will the proposed Activity:

1. Require a change to the Operating License including:

   Technical Specifications (excluding the bases)? Yes☐ No☒

   Operating License? Yes☐ No☒

   Confirmatory Orders? Yes☐ No☒

2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:

   SAR (multi-volume set for each unit)? Yes☒ No☐

   Core Operating Limits Report? Yes☐ No☒

   Fire Hazards Analysis? Yes☐ No☒

   Bases of the Technical Specifications? Yes☐ No☒

   Technical Requirements Manual? Yes☐ No☒

   NRC Safety Evaluation Reports? Yes☐ No☒

3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒

4. Result in a potential impact to the environment? (Complete Environmental Impact Determination of this form.) Yes☐ No☒

5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒

6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6? Yes☐ No☒

7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7?

   QAMO? Yes☐ No☒

   E-Plan? Yes☐ No☒

Document No. CALC-93-E-0057-04 Rev./Change No. 3

Basis for Determination (Questions 1, 2, & 3):

Please see the attached continuation page.

☐ Proposed change does not require 10CFR50.59 Evaluation per Attachment 1, Item # ____. (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in questions 1, 2 and 3. If search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.

Document Section

LRS: 50.59 - Unit 2 (pool w/30 decay heat, offload, off-load, core w/10 discharge, heat w/30 batch, spent w/30 heat, residual w/30 heat)

MANUAL SECTIONS: U2 TS (3/4.9.3), U2 SAR (9.1.3, Table 9.1-3, 9.1-6), U2 SERs (Ammendment 43)

FIGURES:

Todd Erskine — Certified Reviewer's Signature
Todd A. Erskine — Printed Name
8/4/99 — Date

Reviewer's certification expiration date: 3/19/01

Assistance provided by:

Printed Name	Scope of Assistance	Date

Search Scope Review Acceptability (NA, if performed by Technical Reviewer per 1000.006)

Jonathan M. Ralston — Certified Reviewer's Signature
Jonathan M. Ralston — Printed Name
8-4-99 — Date

ENVIRONMENTAL IMPACT DETERMINATION
(UNIT 1 and UNIT 2)

Document No. CALC-93-E-0057-04 Rev./Change No. 3

Complete the following Determination. If the answer to any item below is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

Document No. CALC-93-E-0057-04 Rev./Change No. 3

10CFR50.59 Review Continuation Page

Will the proposed activity:

1) Require a change to the Operating License? No

No changes to the Tech Specs, Operating License or Operating License documents are required as a result of this CALC revision. TS 3.9.3.b contains time limits on the number of fuel assemblies that can be discharged to the SFP (subcritical 175 hours prior to movement of more than 70). The rate of assembly discharge assumed in the calculation (full core offloaded 168 hours after shutdown) is conservative with respect to the TS time limits.

2) Result in any information in the SAR or SAR documents being violated or no longer true or accurate? Yes

A search of the Unit 2 SAR and pending changes (LDCR 2-9.1-0035) has identified the following as the only impact of the proposed CALC revision:

- Table 9.1-6 is directly impacted by the proposed CALC revision. The revised calculation analyzed two additional batches of fuel and used historical operating and cooling times as well as actual batch sizes, instead of predictions. Decay heat loads were also analyzed at the sub-batch level to more accurately model the effects of ANO-2's unique fuel management. The maximum theoretical heat load calculated by the combination of assemblies in this table will change.

The SER for Amendment 43 describes steps taken to limit the decay heat load in the spent fuel pool following a normal discharge of spent fuel from the reactor and also following a full core offload. This SER is associated with the re-rack of the SFP and states that "the one-third core will be removed from the reactor vessel and stored in the spent fuel pool 150 hours after reactor shutdown. In the event of a full core discharge, the decay heat load will be limited by requiring a seven-day decay time after shutdown before core discharge." The assumptions used in the in the proposed CALC revision are consistent with those described in this SER.

The SER for Amendment 43 also includes statements concerning the amount of time available to initiate makeup and the amount of makeup required to maintain cooling (via boiloff) should the fuel pool cooling system fail completely. These statements were made based on the analysis that was current at the time, in order to demonstrate the acceptability of the then current theoretical maximum heat load. CALC-93-E-0057-02 contains the current analysis for Service Water makeup to the Spent Fuel Pool. Review of this calculation indicates that the revised heat loads are less restrictive than currently analyzed. Therefore, no adverse impact to the SER statements exists.

3) Involve a test or experiment not described in the SAR? No

The calculation of theoretical decay heat loads does not constitute a test or experiment.

FORM TITLE: 10CFR50.59 SAFETY EVALUATION	FORM NO. 1000.131B	REV. 3 PC-2

This Document contains 3 Pages.

Document No. CALC-93-E-0057-04 Rev./Change No. 3 10CFR50.59 Eval. No. FFN-99-058 (Assigned by PSC)

Title Unit 2 SAR Table 9.1-6 LDCR Decay Heat Calculations

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1. Will the probability of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒
2. Will the consequences of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒
3. Will the probability of a malfunction of equipment important to safety be increased? Yes ☐ No ☒
4. Will the consequences of a malfunction of equipment important to safety be increased? Yes ☐ No ☒
5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒
6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒
7. Will the margin of safety as defined in the basis for any technical specification be reduced? Yes ☐ No ☒

Todd Erskine — Certified Reviewer's Signature

Todd A. Erskine — Printed Name

8/4/99 — Date

Reviewer's certification expiration date: 3/19/2001

Assistance provided by:

Printed Name	Scope of Assistance	Date

PSC review by: _____ Date: 8/19/99

Document No. CALC-93-E-0057-04 Rev./Change No. 3

10CFR50.59 Review Continuation Page

Basis for answers to Questions:

1) Will the probability of an accident previously evaluated in the SAR be increased? No

The heat load of fuel assemblies stored in the spent fuel pool does not relate to causing an accident described in Chapter 15 of the Unit 2 SAR. SFP heat load is not an accident initiator. Section 15.1.23.1 states that "Fuel failure during refueling as a result of inadvertent criticality or *overheating* is not credible." Instead, the fuel handling accident is postulated to occur as a result of mishandling. Furthermore, the maximum theoretical heat load is being reduced slightly. This is the only accident in the U2 SAR that involves fuel assemblies and the SFP.

2) Will the consequences of an accident previously evaluated in the SAR be increased? No

None of the radiation dose consequences for the Chapter 15 accidents occur because of activities in the spent fuel pool with the exception of the fuel handling accident. The fuel handling accident is postulated to occur as a result of mishandling and not because of overheating. Sections 15.1.23.2.2 G and H discuss pool decontamination factors. Given that the design basis spent fuel pool temperatures will remain unchanged, the maximum amount of Iodine and Noble Gas released from the spent fuel pool water is unaffected by the change in heat load. The dose consequences of the fuel handling accident are therefore not increased.

3) Will the probability of a malfunction of equipment important to safety be increased? No

The maximum theoretical heat load of the spent fuel pool is being reduced. The load on the service water system and components is therefore also reduced. The net effect on the ability to maintain the integrity of the reactor coolant pressure boundary, or systems required to maintain its integrity, is to reduce the probability of malfunction. However direct or indirect this effect may be is of no concern. The heat load in the spent fuel pool has no bearing on the ability to safely shutdown the reactor. A reduction in the heat load will not have an adverse impact on the spent fuel pool racks or structure of the pool itself. The design basis temperatures will remain unchanged. There is no impact on the ventilation system as the amount of Iodine / Noble Gas released by the fuel pool water is not adversely impacted (see response for question 2).

4) Will the consequences of a malfunction of equipment important to safety be increased? No

The change in spent fuel pool heat load will not increase radiological release consequences, with or without a failure of equipment important to safety. The only accident postulated to occur in the spent fuel pool is the fuel handling accident. This accident is caused by mishandling. The amount of water present and quantity of activity present in the water is ultimately unchanged since the design basis temperatures of the pool remain the same.

5) Will the possibility of an accident of a different type than previously evaluated in the SAR be created? No

The change in SFP heat load is not a significant change to circumstances already considered in existing SAR analyses. The design basis temperatures of the SFP are unchanged. The change in heat load will not change the configuration or operation of the SFP cooling system, fuel handling equipment or ventilation systems. The fuel handling accident remains the bounding accident scenario involving the spent fuel pool.

Document No. CALC-93-E-0057-04 Rev./Change No. 3

10CFR50.59 Review Continuation Page

6) Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created? No

Current analyses of the spent fuel pool cooling system are bounding for the changed heat load. The revised heat loads are less than those currently used in analysis of the spent fuel pool cooling system. The proposed change is therefore justified since the existing acceptance criteria are not exceeded.

7) Will the margin of safety as defined in the basis for any technical specification be reduced? No

The bases for Unit 2 TS 3.9.3 state that the time limits in the TS exist in part to ensure that the capacity of the spent fuel pool cooling system is not exceeded. The revised decay heat loads are less than those previously analyzed. The proposed change therefore increases the margin between actual spent fuel pool heat load and the capacity of the cooling system.

3

FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 003-04-0

This Document contains 3 Pages.

Document No. CRN 00-351 to 91-E-0117-01, Rev. 3 Rev./Change No. 0

Title CRN to 91-E-0117-01 Rev. 3 to reflect revised CCS fan flow and 10% SG plugging limits for RSGs

Brief description of proposed change:

The offsite and control room doses calculated in 91-E-0117-01 Rev. 3 and CRN 98-060 to this calc are the basis of the dose values reported in section 15.1.13 of the ANO-2 SAR. This CRN has revised the mixing rate between the sprayed and unsprayed regions to reflect the reduction in Containment Cooling System (CSS) cooler fan volumetric flow rates from 30,000 cfm per fan to 27, 000 cfm per fan (NCP 991522N201) in response to CR-ANO-C-0191, CA 44. This CRN also adjusted the RCS volume used in determining the recirculation volume for assessing the dose from ESF leakage following a loss of coolant accident to reflect a maximum of 10% tube plugging for the replacement steam generators from the 30% evaluated for the old steam generators. The containment cooling and spray times and the time to commencement of recirculation were corrected.

Will the proposed Activity:

1.	Require a change to the Operating License including:		
	Technical Specifications (excluding the bases)?	Yes☐	No☒
	Operating License?	Yes☐	No☒
	Confirmatory Orders?	Yes☐	No☒
2.	Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:		
	SAR (multi-volume set for each unit)?	Yes☒	No☐
	Core Operating Limits Report?	Yes☐	No☒
	Fire Hazards Analysis?	Yes☐	No☒
	Bases of the Technical Specifications?	Yes☐	No☒
	Technical Requirements Manual?	Yes☐	No☒
	NRC Safety Evaluation Reports?	Yes☐	No☒
3.	Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance)	Yes☐	No☒
4.	Result in a potential impact to the environment? (Complete Environmental Impact Determination of this form.)	Yes☐	No☒
5.	Result in the need for a Radiological Safety Evaluation per section 6.1.5?	Yes☐	No☒
6.	Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6?	Yes☐	No☒
7.	Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7?		
	QAPM?	Yes☐	No☒
	E-Plan?	Yes☐	No☒
8.	Does this review depend on future NRC approval of other actions? (NRC SER, Relief, etc)? (forward change to PSC per 6.3.8 or 6.3.9)	Yes☐	No☒

Document No. CRN 00-351 to 91-E-0117-01, Rev. 3 Rev./Change No. 0

Basis for Determination (Questions 1, 2, & 3):

1) This CRN does not require a change to the Operating License. The changes made in CRN 00-351 are beyond the level of detail of the operating license.

2) The Unit 2 SAR contains statements that will change as a result of this CRN.
Unit 2 SAR section 15.1.13.4.1 will require revision to reflect the revised sump volume (62898 ft^3 vice the present 68101 ft3. SAR sentences referring to the original Bechtel FSAR evaluation of ESF recirculation leakage will be deleted rather than updated.
Unit 2 SAR section 15.1.13.4.3 will require revision to reflect the revised sump volume (62898 ft^3 vice the present 68101 ft3 and discussion of why this was bounded by the previously used value of 64552 ft^3).
Unit 2 SAR Table 15.1.13-1 will require revision to reflect the revised sump volume (62898 ft^3 vice the present 64552 ft3) and the revised mixing rate between the sprayed and unsprayed region (11880 cfm vice the present 13200 cfm).
Unit 2 SAR Table 15.1.13-2 "Loss of Coolant Accident Doses" requires revision to reflect the updated offsite doses.
Unit 2 Table 15.1.13-3 "Iodine Inventory in Containment Sump At Time of Recirculation Start" requires revision to reflect the iodine inventory, which has decreased.

An LDCR for the Unit 2 SAR affected Tables has been prepared and an evaluation will be performed. No other changes are required to SAR documents.

3) This CRN does not involve a test or experiment not described in the SAR.

☐ Proposed change does not require 10CFR50.59 Evaluation per Attachment 1, Item # ____. (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in questions 1, 2 and 3. If search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document	Section
LRS:	50.59 Unit 2 (LOCA, "Loss of Coolant Accident", "ESF leakage", recirculation, "pump seal failure", " sump w/10 volume, mixing w/10 sprayed","30,000","68101","13,200","mixing rate")

MANUAL SECTIONS: Unit 2 SAR Section 15.1.13 and associated Tables, NRC SER NO. 194 for ANO Unit 2

FIGURES: None

John Thomas Sankoorikal — Certified Reviewer's Signature
JOHN T. SANKOORIKAL — Printed Name
11/30/00 — Date

Reviewer's certification expiration date: 8/4/02

Assistance provided by:

Printed Name	Scope of Assistance	Date
Chal Creese	Prepared by	11/30/00

Search Scope Review Acceptability (NA, if performed by Technical Reviewer per 1000.006)

Stanley J. Haynes — Certified Reviewer's Signature
Stanley J. Haynes — Printed Name
11/30/00 — Date

ENVIRONMENTAL IMPACT DETERMINATION
(UNIT 1 and UNIT 2)

Document No. CRN 00-351 to 91-E-0117-01, Rev. 3 Rev./Change No. 0

Complete the following Determination. If the answer to any item below is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

FORM TITLE: 10CFR50.59 SAFETY EVALUATION	FORM NO. 1000.131B	REV. 003-04-0

This Document contains 1 Page.

Document No. CRN 00-351 to 91-E-0117-01 Rev. 3 Rev./Change No. 0 10CFR50.59 Eval. No. FFN#00-14 (Assigned by PSC)

Title CRN to 91-E-0117-01 Rev. 3 to reflect revised CCS fan flow and 10% SG plugging limits for RSGs

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1. Will the probability of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒
2. Will the consequences of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒
3. Will the probability of a malfunction of equipment important to safety be increased? Yes ☐ No ☒
4. Will the consequences of a malfunction of equipment important to safety be increased? Yes ☐ No ☒
5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒
6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒
7. Will the margin of safety as defined in the basis for any technical specification be reduced? Yes ☐ No ☒

John Thomas Sankoorikal — Certified Reviewer's Signature

JOHN T. SANKOORIKAL — Printed Name

11/30/00 — Date

Reviewer's certification expiration date: 8/4/02

Assistance provided by:

Printed Name	Scope of Assistance	Date
Chal Creese	Prepared by	11/30/00

PSC review by: R V Fuller Date: 11-30-00

Document No. CRN 00-351 to 91-E-0117-01 Rev. 3 Rev./Change No. _____

10CFR50.59 Review Continuation Page

The offsite and control room doses calculated in 91-E-0117-01 Rev. 3 and CRN 98-060 to that calc are the basis of the dose values reported in section 15.1.13 of the ANO-2 SAR. This CRN has revised the mixing rate between the sprayed and unsprayed regions to reflect the reduction in Containment Cooling System (CSS) cooler fan volumetric flow rates from 30,000 cfm per fan to 27, 000 cfm per fan (NCP 991522N201) in response to CA 44 of CR-ANO-C-2000-0191. This CRN also adjusted the RCS volume used in determining the recirculation volume for assessing the dose from ESF leakage following a loss of coolant accident to reflect a maximum of 10% tube plugging for the replacement steam generators from the 30% evaluated for the old steam generators.

The sump volume assumed for 10% tube plugging is less limiting than that assumed previously for 30% tube plugging, in that the larger volume results in dilution of the activity associated with ECCS leakage.

The lower CSS fan flow effect is to reduce mixing between the unsprayed and sprayed regions of the containment, and therefore is more limiting than that used previously in that it slows the iodine removal process due to containment spray operation credited in the analysis.

The Unit 2 SAR contains statements that will change as a result of this CRN:

1) Unit 2 SAR section 15.1.13.4.1 will require revision to reflect the revised sump volume (62898 ft^3 vice the present 68101 ft3, ~~and 1.85E9 cc vice the present 1.83E9 cc~~) per TS 11/30/00
2) Unit 2 SAR section 15.1.13.4.3 will require revision to reflect the revised sump volume (62898 ft^3 vice the present 64552 ft3)
3) Unit 2 SAR Table 15.1.13-1 will require revision to reflect the revised sump volume (62898 ft^3 vice the present 64552 ft3) and the revised mixing rate between the sprayed and unsprayed region (11880 cfm vice the present 13200 cfm).
4) Unit 2 SAR Table 15.1.13-2 "Loss of Coolant Accident Doses" requires revision to reflect the updated offsite doses.
5) Unit 2 Table 15.1.13-3 "Iodine Inventory in Containment Sump At Time of Recirculation Start" requires revision to reflect the iodine inventory, which has decreased.
6) Unit 2 SAR Table 15.1.13-2 "Loss of Coolant Accident Doses" requires revision to reflect the updated offsite and control room doses.

The new doses calculated by this CRN are presented in the Table below

CRNCASE1 (RB LEAKAGE)	EAB	LPZ	CONTROL ROOM
THYROID	74.79	9.216	16.690
WB	2.666	0.271	1.016
SKIN	6.060	0.6266	36.310

CRNCASE2 (ESF LEAKAGE)	EAB	LPZ	CONTROL ROOM
THYROID	2.347	0.985	1.881

CRNCASE3 (SEAL FAILURE)	EAB	LPZ	CONTROL ROOM
THYROID	0.000	7.386	10.35

TOTALS	EAB	LPZ	CONTROL ROOM
THYROID	77.137	17.587	28.921
WB	2.666	0.271	1.016

Unit 2 SAR Table 15.1.13-2 determines control room thyroid, whole body and skin totals by adding 0.1 Rem direct containment dose ("shine") to the Control Room Totals calculated in 91-E-0117-01. The Table below compares the proposed total doses resulting from this CRN to those previously calculated in 91-E-0117-01 Rev. 3 and presently in the Unit 2 SAR Table 15.1.13-2. (The precision of the SAR Table doses is different than the calculated values).

Totals	CRN EAB	OLD(2) EAB	Present SAR EAB	Limit (Rem)	% Change	% Margin Reduction	Delta(Rem)	SAR pre SER 194 (Rem)
Thyroid	77.137	73.87	73.9	300	4.42%	1.4%	3.267	121.5
WB	2.666	2.656	2.66	25	0.38%	0.0%	0.01	3.43
Skin	6.06	6.042	6.04	N/A	0.30%	N/A	0.018	5.17

Totals	CRN LPZ	OLD(2) LPZ	Present SAR LPZ	Limit (Rem)	% Change	% Margin Reduction	Delta(Rem)	SAR pre SER 194 (Rem)
Thyroid	17.587	17.194	17.2	300	2.29%	0.14%	0.393	30.4
WB	0.2705	0.2701	0.27	25	0.15%	0.00%	0.0004	3.24
Skin	0.6266	0.6257	0.63	N/A	0.14%	N/A	0.0009	1.84

Totals (1)	CRN Control Room	OLD(2) Control Room	Present SAR Control Room	Limit (Rem)	% Change	% Margin Reduction	Delta(Rem)	
Thyroid	29.021	28.512	28.5	30	1.79%	34.2%	0.509	
WB	1.116	1.116	1.12	5	0.00%	0.0%	0	
Skin	36.41	36.42	36.4	75	-0.03%	0.0%	-0.01	

1) All Control Room doses from CRN increased by 0.1 Rem for shine as in SAR.
2) OLD refers to the calculated values in 91-E-0117-01 prior to this CRN, to the same precision.

The present Unit 2 SAR Table 15.1.13-2 LOCA offsite and Control Room doses were reviewed and approved by the NRC in SER 194 dated 12/23/1998. The NRC stated in this SER

> The staff has assessed the capability of ANO-2 to meet the thyroid dose limits of 10 CFR Part 100 and GDC-19 with the elimination of the sodium hydroxide addition system for iodine. As a result of this assessment, the staff has concluded that the thyroid doses would not exceed the dose guidelines presently contained in 10 CFR Part 100 or GDC-19 of 10 CFR Part 50, Appendix A for either offsite locations or control room operators. Therefore, the staff finds the proposed TS amendment request acceptable.

Therefore the Acceptance Criteria for this accident is the Guideline values in 10CFR100 and GDC-19, shown in the Table above as limit in Rem. Prior to Amendment 194, the Offsite Doses in Table 15.1.13-2 were higher than those calculated in CRN 00-351 (shown in the Table above under SAR pre SER 194), so these new offsite doses are clearly acceptable.

While EAB Thyroid, Whole Body and Skin doses have increased slightly, they remain within the acceptance criteria used by the NRC, and bounded by values which have previously been approved by the NRC. The increase in EAB whole body dose is trivial, and considered within the accuracy of the analysis. The increase in EAB thyroid dose represents a 1.4% decrease in margin to the acceptance criteria. There is no Acceptance Criteria for Offsite Skin dose and the increase for the EAB skin dose is trivial.

Any increases seen in LPZ thyroid, whole body and skin doses were also trivial, and considered within the accuracy of the analysis. All LPZ and control room doses remain within the acceptance criteria used by the NRC, and are bounded by values previously approved by the NRC.

The Control Room doses increase by 0.506 Rem, an increase of about 1.8%. The new dose is still within the Acceptance Criteria of 30 Rem for the thyroid dose to Control Room occupants.

In addition to the new calculated results, the dose values in the SAR will be rounded to the next higher integer value, with the exception of control room thyroid which will be rounded up to the nearest 0.5 Rem.. This enables minor calculation adjustments to be performed without requiring SAR revision. The resulting doses presented in the SAR will be as follows.

Totals	CRN EAB	OLD(2) EAB	Limit (Rem)	% Change	% Margin Reduction	Delta(Rem)
Thyroid	78	73.87	300	5.59%	1.8%	4.13
WB	3	2.656	25	12.95%	1.5%	0.344
Skin	7	6.042	N/A	15.86%	N/A	0.958

Totals	CRN LPZ	OLD(2) LPZ	Limit (Rem)	% Change	% Margin Reduction	Delta(Rem)
Thyroid	18	17.194	300	4.69%	0.29%	0.806
WB	1	0.2701	25	270.23%	0.24%	0.7299
Skin	1	0.6257	N/A	59.82%	N/A	0.3743

Totals (1)	CRN Control Room	OLD(2) Control Room	Limit (Rem)	% Change	% Margin Reduction	Delta(Rem)
Thyroid	29.5	28.512	30	3.47%	66.4%	0.988
WB	2	1.116	5	79.21%	22.8%	0.884
Skin	37	36.42	75	1.59%	1.5%	0.58

1) All Control Room doses from CRN increased by 0.1 Rem for shine as in SAR.

ANSWERS TO THE SEVEN 50.59 EVALUATION QUESTIONS

1) Will the probability of an accident previously evaluated in the SAR be increased?

   This CRN has evaluated the Control Room, EAB and LPZ dose consequences of an MHA. There is no interface with any accident initiators, so the probability of any accident previously evaluated in the SAR is unaffected.

2) Will the consequences of an accident previously evaluated in the SAR be increased?

   NO.
   The present Unit 2 SAR Table 15.1.13-2 LOCA offsite and Control Room doses were reviewed and approved by the NRC in SER 194 dated 12/23/1998. The NRC stated in this SER

   > The staff has assessed the capability of ANO-2 to meet the thyroid dose limits of 10 CFR Part 100 and GDC-19 with the elimination of the sodium hydroxide addition system for iodine. As a result of this assessment, the staff has concluded that the thyroid doses would not exceed the dose guidelines presently contained in 10 CFR Part 100 or GDC-19 of 10 CFR Part 50, Appendix A for either offsite locations or control room operators. Therefore, the staff finds the proposed TS amendment request acceptable.

   Therefore the Acceptance Criteria for this accident is the Guideline values in 10CFR100 and GDC-19. Prior to Amendment 194, the Offsite Doses in Table 15.1.13-2 were higher than those calculated in CRN 00-351, so these new offsite doses are clearly acceptable.

While EAB Thyroid, Whole Body and Skin doses have increased slightly, they remain within the acceptance criteria used by the NRC, and bounded by values which have previously been approved by the NRC. The increase in EAB whole body dose is trivial, and considered within the accuracy of the analysis. There is no Acceptance Criteria for Offsite Skin dose, and the increase for the EAB skin dose is trivial, and considered within the accuracy of the analysis.

Any increases seen in LPZ thyroid, whole body and skin doses were also trivial, and considered within the accuracy of the analysis. All LPZ doses remain within the acceptance criteria used by the NRC, and are bounded by values previously approved by the NRC.

The Control Room doses increase by 0.506 Rem, an increase of about 1.8%. The new dose is still within the Acceptance Criteria of 30 Rem for the thyroid dose to Control Room occupants.

3) Will the probability of a malfunction of equipment important to safety be increased?
NO

The dose values reflect the control room and offsite dose consequences of a MHA. While control room operators may be considered as equipment important to safety, and control room habitability is necessary to have the capability to mitigate the consequences of plant conditions that could lead to potential offsite doses comparable to 10CFR100 guidelines, the original design criteria is that control room doses be within the guidelines of GDC 19. Since these criteria are still met, and this change is simply a modification of calculation assumptions, there is no increase in the probability of a malfunction of equipment important to safety.

4) Will the consequences of a malfunction of equipment important to safety be increased?
NO

While control room operators may be considered as equipment important to safety, and control room habitability is necessary to have the capability to mitigate the consequences of plant conditions that could lead to potential offsite doses comparable to 10CFR100 guidelines, the original design criteria is that control room doses be within the guidelines of GDC 19. Since these criteria are still met, and this change is simply a modification of calculation assumptions, there is no increase in the consequences of a malfunction of equipment important to safety.

5) Will the possibility of an accident of a different type than any previously evaluated in the SAR be created?

NO.
This change affects the calculated control room and offsite dose consequences of a MHA. The dose values do not affect or create any possible accident initiators.

6) Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?

NO.
This change affects the calculated the control room and offsite dose consequences of a MHA as previously evaluated in the SAR. Since this change is simply a modification of calculation assumptions, there is no possibility that this change could create a malfunction of equipment.

7) Will the margin of safety as defined in the basis for any technical specification be reduced?

NO.

The bases of Unit 2 TS 3/4.7.6 , "CONTROL ROOM EMERGENCY AIR CONDITIONING/AIR FILTRATION SYSTEM" states

> The OPERABILITY of the control room emergency ventilation and air conditioning system ensures that 1) the ambient air temperature does not exceed the allowable temperature for continuous duty rating for the equipment and instrumentation cooled by this system and 2) the control room will remain habitable for operations personnel during and following all credible accident conditions.

The OPERABILITY of this system in conjunction with control room design provisions is based on limiting the radiation exposure to personnel occupying the control room to 5 rem or less whole body, or its equivalent. This limitation is consistent with the requirements of General Design Criteria 19 of Appendix "A", 10 CFR 50.

The bases of Unit 1 TS 3.9 "CONTROL ROOM EMERGENCY AIR CONDITIONING AND ISOLATION SYSTEM", states

The control room emergency ventilation and air conditioning system is designed to isolate the combined control rooms to ensure that the control rooms will remain habitable for Operations personnel during and following all credible accident conditions and to ensure that the ambient air temperature does not exceed the allowable temperature for continuous duty rating for the equipment and instrumentation cooled by this system. The design configuration of the system is based on limiting the radiation exposure to personnel occupying the control room to 5 REM or less whole body, or its equivalent, in accordance with the requirements of General Design Criteria 19 of Appendix A, 10 CFR 50.

The GDC 19 criteria are still met, so that the statement in the bases of the Unit 1 TS is accurate. Since GDC 19 criteria are still met, there has been no reduction of a margin of safety as defined in the bases for any Technical Specification.

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FORM TITLE:	FORM NO.	REV.
10CFR50.59 DETERMINATION	1000.131A	003-04-0

This Document contains 3 Pages.

Document No. CRN 00-351 to 91-E-0117-01, Rev. 3 Rev./Change No. 0

Title CRN to 91-E-0117-01 Rev. 3 to reflect revised CCS fan flow and 10% SG plugging limits for RSGs

Brief description of proposed change:

The offsite and control room doses calculated in 91-E-0117-01 Rev. 3 and CRN 98-060 to this calc are the basis of the dose values reported in section 15.1.13 of the ANO-2 SAR. This CRN has revised the mixing rate between the sprayed and unsprayed regions to reflect the reduction in Containment Cooling System (CSS) cooler fan volumetric flow rates from 30,000 cfm per fan to 27, 000 cfm per fan (NCP 991522N201) in response to CR-ANO-C-0191, CA 44. This CRN also adjusted the RCS volume used in determining the recirculation volume for assessing the dose from ESF leakage following a loss of coolant accident to reflect a maximum of 10% tube plugging for the replacement steam generators from the 30% evaluated for the old steam generators.

Will the proposed Activity:

1.	Require a change to the Operating License including:		
	Technical Specifications (excluding the bases)?	Yes☐	No☒
	Operating License?	Yes☐	No☒
	Confirmatory Orders?	Yes☐	No☒
2.	Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:		
	SAR (multi-volume set for each unit)?	Yes☒	No☐
	Core Operating Limits Report?	Yes☐	No☒
	Fire Hazards Analysis?	Yes☐	No☒
	Bases of the Technical Specifications?	Yes☐	No☒
	Technical Requirements Manual?	Yes☐	No☒
	NRC Safety Evaluation Reports?	Yes☐	No☒
3.	Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance)	Yes☐	No☒
4.	Result in a potential impact to the environment? (Complete Environmental Impact Determination of this form.)	Yes☐	No☒
5.	Result in the need for a Radiological Safety Evaluation per section 6.1.5?	Yes☐	No☒
6.	Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6?	Yes☐	No☒
7.	Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7?		
	QAPM?	Yes☐	No☒
	E-Plan?	Yes☐	No☒
8.	Does this review depend on future NRC approval of other actions? (NRC SER, Relief, etc)? (forward change to PSC per 6.3.8 or 6.3.9)	Yes☐	No☒

Document No. CRN 00-351 to 91-E-0117-01, Rev. 3 Rev./Change No. 0

Basis for Determination (Questions 1, 2, & 3):

1) This CRN does not require a change to the Operating License. The changes made in CRN 00-351 are beyond the level of detail of the operating license.

2) The Unit 2 SAR contains statements that will change as a result of this CRN.
Unit 2 SAR section 15.1.13.4.1 will require revision to reflect the revised sump volume (65239 ft^3 vice the present 68101 ft3. SAR sentences referring to the original Bechtel FSAR evaluation of ESF recirculation leakage will be deleted rather than updated.
Unit 2 SAR section 15.1.13.4.3 will require revision to reflect the revised sump volume (65239 ft^3 vice the present 68101 ft3 and discussion of why this was bounded by the previously used value of 64552 ft^3).
Unit 2 SAR Table 15.1.13-1 will require revision to reflect the revised sump volume (65239 ft^3 vice the present 64552 ft3) and the revised mixing rate between the sprayed and unsprayed region (11880 cfm vice the present 13200 cfm).
Unit 2 SAR Table 15.1.13-2 "Loss of Coolant Accident Doses" requires revision to reflect the updated offsite doses.
Unit 2 Table 15.1.13-3 "Iodine Inventory in Containment Sump At Time of Recirculation Start" requires revision to reflect the iodine inventory, which has decreased.

An LDCR for the Unit 2 SAR affected Tables has been prepared and an evaluation will be performed. No other changes are required to SAR documents.

3) This CRN does not involve a test or experiment not described in the SAR.

☐ Proposed change does not require 10CFR50.59 Evaluation per Attachment 1, Item # ____. (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in questions 1, 2 and 3. If search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document	Section
LRS:	50.59 Unit 2 (LOCA, "Loss of Coolant Accident", "ESF leakage", recirculation, "pump seal failure", " sump w/10 volume, mixing w/10 sprayed")

MANUAL SECTIONS: Unit 2 SAR Section 15.1.13 and associated Tables, NRC SER NO. 194 for ANO Unit 2

FIGURES:

John W Cotton — Certified Reviewer's Signature; John W. Cotton — Printed Name; 11/22/00 — Date

Reviewer's certification expiration date: 9/8/01

Assistance provided by:

Printed Name	Scope of Assistance	Date

Search Scope Review Acceptability (NA, if performed by Technical Reviewer per 1000.006)

Daniel W. Fouts — Certified Reviewer's Signature; Daniel W. Fouts — Printed Name; 11/22/00 — Date

ENVIRONMENTAL IMPACT DETERMINATION
(UNIT 1 and UNIT 2)

Document No. CRN 00-351 to 91-E-0117-01, Rev. 3 Rev./Change No. 0

Complete the following Determination. If the answer to any item below is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

FORM TITLE: 10CFR50.59 SAFETY EVALUATION	FORM NO. 1000.131B	REV. 003-04-0

This Document contains 1 Page.

Document No. CRN 00-351 to 91-E-0117-01 Rev. 3 Rev./Change No. 0 10CFR50.59 Eval. No. FFNB 00-146 (Assigned by PSC)

Title CRN to 91-E-0117-01 Rev. 3 to reflect revised CCS fan flow and 10% SG plugging limits for RSGs

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1. Will the probability of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒
2. Will the consequences of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒
3. Will the probability of a malfunction of equipment important to safety be increased? Yes ☐ No ☒
4. Will the consequences of a malfunction of equipment important to safety be increased? Yes ☐ No ☒
5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒
6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒
7. Will the margin of safety as defined in the basis for any technical specification be reduced? Yes ☐ No ☒

John W Cotton — Certified Reviewer's Signature

John W. Cotton — Printed Name

11/22/00 — Date

Reviewer's certification expiration date: 9/8/01

Assistance provided by:

Printed Name	Scope of Assistance	Date

PSC review by: [signature] Date: 11/22/00

Document No. CRN 00-351 to 91-E-0117-01 Rev. 3 Rev./Change No. _____

10CFR50.59 Review Continuation Page

The offsite and control room doses calculated in 91-E-0117-01 Rev. 3 and CRN 98-060 to that calc are the basis of the dose values reported in section 15.1.13 of the ANO-2 SAR. This CRN has revised the mixing rate between the sprayed and unsprayed regions to reflect the reduction in Containment Cooling System (CSS) cooler fan volumetric flow rates from 30,000 cfm per fan to 27, 000 cfm per fan (NCP 991522N201) in response to CA 44 of CR-ANO-C-2000-0191. This CRN also adjusted the RCS volume used in determining the recirculation volume for assessing the dose from ESF leakage following a loss of coolant accident to reflect a maximum of 10% tube plugging for the replacement steam generators from the 30% evaluated for the old steam generators.

The sump volume assumed for 10% tube plugging is less limiting than that assumed previously for 30% tube plugging, in that the larger volume results in dilution of the activity associated with ECCS leakage.

The lower CSS fan flow effect is to reduce mixing between the unsprayed and sprayed regions of the containment, and therefore is more limiting than that used previously in that it slows the iodine removal process due to containment spray operation credited in the analysis.

The Unit 2 SAR contains statements that will change as a result of this CRN:

1) Unit 2 SAR section 15.1.13.4.1 will require revision to reflect the revised sump volume (65239 ft^3 vice the present 68101 ft3, and 1.85E9 cc vice the present 1.83E9 cc)
2) Unit 2 SAR section 15.1.13.4.3 will require revision to reflect the revised sump volume (65239 ft^3 vice the present 64552 ft3)
3) Unit 2 SAR Table 15.1.13-1 will require revision to reflect the revised sump volume (65239 ft^3 vice the present 64552 ft3) and the revised mixing rate between the sprayed and unsprayed region (11880 cfm vice the present 13200 cfm).
4) Unit 2 SAR Table 15.1.13-2 "Loss of Coolant Accident Doses" requires revision to reflect the updated offsite doses.
5) Unit 2 Table 15.1.13-3 "Iodine Inventory in Containment Sump At Time of Recirculation Start" requires revision to reflect the iodine inventory, which has decreased.
6) Unit 2 SAR Table 15.1.13-2 "Loss of Coolant Accident Doses" requires revision to reflect the updated offsite and control room doses.

The new doses calculated by this CRN are presented in the Table below

(RB LEAKAGE)	EAB	LPZ	CONTROL ROOM
THYROID	74.29	9.191	16.66
WB	2.664	0.2705	1.016
SKIN	6.056	0.6264	36.31

(ESF LEAKAGE)	EAB	LPZ	CONTROL ROOM
THYROID	2.098	0.9414	1.803

(SEAL FAILURE)	EAB	LPZ	CONTROL ROOM
THYROID	0.000	7.121	9.975

TOTALS	EAB	LPZ	CONTROL ROOM
THYROID	76.388	17.253	28.438
WB	2.664	0.2705	1.016
SKIN	6.056	0.6264	36.31

Unit 2 SAR Table 15.1.13-2 determines control room thyroid, whole body and skin totals by adding 0.1 Rem direct containment dose ("shine") to the Control Room Totals calculated in 91-E-0117-01. The Table below compares the proposed total doses resulting from this CRN to those previously calculated in 91-E-0117-01 Rev. 3 and presently in the Unit 2 SAR Table 15.1.13-2. (The precision of the SAR Table doses is different than the calculated values).

Totals	CRN EAB	OLD(2) EAB	Present SAR EAB	Limit (Rem)	% Change	% Margin Reduction	Delta(Rem)	SAR pre SER 194 (Rem)
Thyroid	76.388	73.87	73.9	300	3.41%	1.1%	2.518	121.5
WB	2.664	2.656	2.66	25	0.30%	0.0%	0.008	3.43
Skin	6.056	6.042	6.04	N/A	0.23%	N/A	0.014	5.17

Totals	CRN LPZ	OLD(2) LPZ	Present SAR LPZ	Limit (Rem)	% Change	% Margin Reduction	Delta(Rem)	SAR pre SER 194 (Rem)
Thyroid	17.253	17.194	17.2	300	0.34%	0.02%	0.059	30.4
WB	0.2705	0.2701	0.27	25	0.15%	0.00%	0.0004	3.24
Skin	0.6264	0.6257	0.63	N/A	0.11%	N/A	0.0007	1.84

Totals (1)	CRN Control Room	OLD(2) Control Room	Present SAR Control Room	Limit (Rem)	% Change	% Margin Reduction	Delta(Rem)	
Thyroid	28.538	28.512	28.5	30	0.09%	1.7%	0.026	
WB	1.116	1.116	1.12	5	0.00%	0.0%	0	
Skin	36.41	36.42	36.4	75	-0.03%	0.0%	-0.01	

1) All Control Room doses from CRN increased by 0.1 Rem for shine as in SAR.
2) OLD refers to the calculated values in 91-E-0117-01 prior to this CRN, to the same precision.

The present Unit 2 SAR Table 15.1.13-2 LOCA offsite and Control Room doses were reviewed and approved by the NRC in SER 194 dated 12/23/1998. The NRC stated in this SER

> The staff has assessed the capability of ANO-2 to meet the thyroid dose limits of 10 CFR Part 100 and GDC-19 with the elimination of the sodium hydroxide addition system for iodine. As a result of this assessment, the staff has concluded that the thyroid doses would not exceed the dose guidelines presently contained in 10 CFR Part 100 or GDC-19 of 10 CFR Part 50, Appendix A for either offsite locations or control room operators. Therefore, the staff finds the proposed TS amendment request acceptable.

Therefore the Acceptance Criteria for this accident is the Guideline values in 10CFR100 and GDC-19, shown in the Table above as limit in Rem. Prior to Amendment 194, the Offsite Doses in Table 15.1.13-2 were higher than those calculated in CRN 00-351 (shown in the Table above under SAR pre SER 194), so these new offsite doses are clearly acceptable.

While EAB Thyroid, Whole Body and Skin doses have increased slightly, they remain within the acceptance criteria used by the NRC, and bounded by values which have previously been approved by the NRC. The increase in EAB whole body dose is trivial, and considered within the accuracy of the analysis. The increase in EAB thyroid dose represents a 1.1% decrease in margin to the acceptance criteria. There is no Acceptance Criteria for Offsite Skin dose, and the increase for the EAB skin dose is trivial, and considered within the accuracy of the analysis.

Any increases seen in LPZ thyroid, whole body and skin doses were also trivial, and considered within the accuracy of the analysis. All LPZ and control room doses remain within the acceptance criteria used by the NRC, and are bounded by values previously approved by the NRC.

The Control Room doses would not require a change to the values cited in the SAR. Only the calculated thyroid dose increased over that previously calculated, and the increase of 0.026 Rem would not cause the result reported in the SAR to change.

ANSWERS TO THE SEVEN 50.59 EVALUATION QUESTIONS

1) Will the probability of an accident previously evaluated in the SAR be increased?

This CRN has evaluated the Control Room dose consequences of an MHA. There is no interface with any accident initiators, so the probability of any accident previously evaluated in the SAR is unaffected.

2) Will the consequences of an accident previously evaluated in the SAR be increased?

NO.
The present Unit 2 SAR Table 15.1.13-2 LOCA offsite and Control Room doses were reviewed and approved by the NRC in SER 194 dated 12/23/1998. The NRC stated in this SER

> The staff has assessed the capability of ANO-2 to meet the thyroid dose limits of 10 CFR Part 100 and GDC-19 with the elimination of the sodium hydroxide addition system for iodine. As a result of this assessment, the staff has concluded that the thyroid doses would not exceed the dose guidelines presently contained in 10 CFR Part 100 or GDC-19 of 10 CFR Part 50, Appendix A for either offsite locations or control room operators. Therefore, the staff finds the proposed TS amendment request acceptable.

Therefore the Acceptance Criteria for this accident is the Guideline values in 10CFR100 and GDC-19. Prior to Amendment 194, the Offsite Doses in Table 15.1.13-2 were higher than those calculated in CRN 00-351, so these new offsite doses are clearly acceptable.

While EAB Thyroid, Whole Body and Skin doses have increased slightly, they remain within the acceptance criteria used by the NRC, and bounded by values which have previously been approved by the NRC. The increase in EAB whole body dose is trivial, and considered within the accuracy of the analysis. The increase in EAB thyroid dose represents a 1.1% decrease in margin to the acceptance criteria. There is no Acceptance Criteria for Offsite Skin dose, and the increase for the EAB skin dose is trivial, and considered within the accuracy of the analysis.

Any increases seen in LPZ thyroid, whole body and skin doses were also trivial, and considered within the accuracy of the analysis. All LPZ doses remain within the acceptance criteria used by the NRC, and are bounded by values previously approved by the NRC.

The Control Room doses would not require a change to the values cited in the SAR and previously approved by the NRC. Only the calculated thyroid dose increased over that previously calculated, and the increase of 0.026 Rem would not cause the result reported in the SAR to change.

3) Will the probability of a malfunction of equipment important to safety be increased?
NO

The dose values reflect the control room dose consequences of a MHA. While control room operators may be considered as equipment important to safety, and control room habitability is necessary to have the capability to mitigate the consequences of plant conditions that could lead to potential offsite doses comparable to 10CFR100 guidelines, the original design criteria is that control room doses be within the guidelines of GDC 19. Since these criteria are still met, and this change is simply a modification of calculation assumptions, there is no increase in the probability of a malfunction of equipment important to safety.

4) Will the consequences of a malfunction of equipment important to safety be increased?
NO

While control room operators may be considered as equipment important to safety, and control room habitability is necessary to have the capability to mitigate the consequences of plant conditions that could lead to potential offsite doses comparable to 10CFR100 guidelines, the original design criteria is that control room doses be within the guidelines of GDC 19. Since these criteria are still met, and this change is simply a modification of calculation assumptions, there is no increase in the consequences of a malfunction of equipment important to safety.

5) Will the possibility of an accident of a different type than any previously evaluated in the SAR be created?

NO.
This change affects only the calculated control room dose consequences of a MHA. The dose values do not affect or create any possible accident initiators.

6) Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?

NO.
This change affects only the calculated the control room dose consequences of a MHA as previously evaluated in the SAR. Since this change is simply a modification of calculation assumptions, there is no possibility that this change could create a malfunction of equipment.

7) Will the margin of safety as defined in the basis for any technical specification be reduced?

NO.

The bases of Unit 2 TS 3/4.7.6 , "CONTROL ROOM EMERGENCY AIR CONDITIONING/AIR FILTRATION SYSTEM" states

> The OPERABILITY of the control room emergency ventilation and air conditioning system ensures that 1) the ambient air temperature does not exceed the allowable temperature for continuous duty rating for the equipment and instrumentation cooled by this system and 2) the control room will remain habitable for operations personnel during and following all credible accident conditions. The OPERABILITY of this system in conjunction with control room design provisions is based on limiting the radiation exposure to personnel occupying the control room to 5 rem or less whole body, or its equivalent. This limitation is consistent with the requirements of General Design Criteria 19 of Appendix "A", 10 CFR 50.

The bases of Unit 1 TS 3.9 "CONTROL ROOM EMERGENCY AIR CONDITIONING AND ISOLATION SYSTEM", states

> The control room emergency ventilation and air conditioning system is designed to isolate the combined control rooms to ensure that the control rooms will remain habitable for Operations personnel during and following all credible accident conditions and to ensure that the ambient air temperature does not exceed the allowable temperature for continuous duty rating for the equipment and instrumentation cooled by this system. The design configuration of the system is based on limiting the radiation exposure to personnel occupying the control room to 5 REM or less whole body, or its equivalent, in accordance with the requirements of General Design Criteria 19 of Appendix A, 10 CFR 50.

The GDC 19 criteria are still met, so that the statement in the bases of the Unit 1 TS is accurate. Since GDC 19 criteria are still met, there has been no reduction of a margin of safety as defined in the bases for any Technical Specification.

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FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 003-04-0

Document No. 98-R-2005-03 & 98-R-2005-04 Rev./Change No. 0

Title ANO-2 CYCLE 15 RELOAD ANALYSIS REPORT AND ANO-2 CYCLE 15 CORE OPERATING LIMITS REPORT

Brief description of proposed change:

Implement required changes to the LBDs to support the Cycle 15 operation documented in the Reload Analysis Report (additional description is given in the following pages.)

Will the proposed Activity:

1. Require a change to the Operating License including:
   - Technical Specifications (excluding the bases)? Yes☐ No☒
   - Operating License? Yes☐ No☒
   - Confirmatory Orders? Yes☐ No☒
2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:
   - SAR (multi-volume set for each unit)? Yes☒ No☐
   - Core Operating Limits Report? Yes☒ No☐
   - Fire Hazards Analysis? Yes☐ No☒
   - Bases of the Technical Specifications? Yes☐ No☒
   - Technical Requirements Manual? Yes☐ No☒
   - NRC Safety Evaluation Reports? Yes☐ No☒
3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒
4. Result in a potential impact to the environment? (Complete Environmental Impact Determination of this form.) Yes☐ No☒
5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒
6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6? Yes☐ No☒
7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7?
   - QAPM? Yes☐ No☒
   - E-Plan? Yes☐ No☒
8. Does this review depend on future NRC approval of other actions? (NRC SER, Relief, etc)? (forward change to PSC per 6.3.8 or 6.3.9) Yes☒ No☐

FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 003-04-0

Document No. 98-R-2005-03 & 98-R-2005-04 Rev./Change No. 0

Basis for Determination (Questions 1, 2, & 3):

See attached discussion.

☐ Proposed change does not require 10CFR50.59 Evaluation per Attachment 1, Item # ____, (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in questions 1, 2 and 3. If search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document Section

LRS: 50.59 – Unit 2, ALL (See attached for keywords)

MANUAL SECTIONS: See attached.

FIGURES: See attached.

John Thomas Sankoorikal — Certified Reviewer's Signature
John T. Sankoorikal — Printed Name
8/30/00 — Date

Reviewer's certification expiration date: 8/4/02

Assistance provided by:

Printed Name	Scope of Assistance	Date
Fred H. Smith	Core Design - Neutronics	8/30/00
Dennis E. Barr	Core Design - Mechanical	8/30/00
Jacque Lingenfelter	Thermal Hydraulics	8/30/00
Todd A. Erskine	Safety Analysis, CEA Events	8/30/00
Larry D. Young	Safety Analysis, MSLB	8/30/00
Stanley J. Haynes	ECCS	8/30/00
Robert W. Clark	Center Assembly	8/30/00

Search Scope Review Acceptability (NA, if performed by Technical Reviewer per 1000.006)

Daniel W. Fouts — Certified Reviewer's Signature
Daniel W. Fouts — Printed Name
8/31/00 — Date

ENVIRONMENTAL IMPACT DETERMINATION (UNIT 1 and UNIT 2)

Document No. 98-R-2005-03 & 98-R-2005-04 Rev./Change No. 0

Complete the following Determination. If the answer to any item below is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

Document	Section
LRS:	
50.59, ANO-2	ALL (reload*, Batch*, Cycle*, fuel, fuel w/10 mechanical, grid, plenum, max* w/10 burnup, poison, gadolin*, gd2o3, gd?o*, power w/10 peaking, critical boron, CEA, ejection, withdrawal, boron, dilution, MTC, "moderator temperature coefficient", "breakpoint", COLR, COLSS, LHR, PLHR, PLHGR, "linear heat rate", PDIL, DNBR, "4.4-2"; "thermal hydraulic* w/20 core"; "289,800"; "108.2"; "104.4"; "2.33"; "14.9"; "31.4"; "180,882"; "51,775"; "5400"; "34.4", MSLB*, Steam Line Break*, SLB, CEA w/10 sequence, sequence w/10 critical*, group w/10 critical*, target w/10 critical*, ECP, estimated w/10 critical, critical w/10 position, critical w/10 approach, EPAC, PAC, physics w/10 assessment, subcritical w/10 withdraw*, sequen* w/10 withdraw*, excore w/10 *calib*, ex-core w/10 *calib*, excore w/20 ejection, ex-core w/20 ejection, ROPM, overpower margin, ECCS performance, PCT, "peak cladding temperature", "545", "549", "inlet temp*", TCOLD, "332.5")
MANUAL SECTIONS:	
ANO-2 TS	Tech. Spec. 3 / 4.2, 3.1.1.4, 3.1.3.1, 3.1.3.6, 4.1.1.1.1
ANO-2 TS Bases	3/4.1.1.1, 3/4.1.3, 2.1
ANO-2 SAR	4.4 and Tables, 15.1.14.1, 4.2.3, 4.3, 4.5, 7.2.1.1.2.3, 7.2.2.1.1, 7.5.1.4.1, 7.7.1.1.1, 7.7.1.4, 14.3, 15.1.1, 15.1.2, 15.1.3, 15.1.20, 6.2, 6.3, 6.7, 7.6, 7.8, 5.8, 15.1, 5.1, 5.2, 14.1, 14.3, 15.3, 4.7, 9.6, 9.7
ANO-2 COLR	ALL
ANO-2 TRM	ALL
ANO-2 SER	Amendment 024, 026, 032, 033, 066, 070, 083, 138, 190, 202, 111, 117, 139, 156, 197; NSE – 4.1, 4.2, 4.4, 5.1, 6.1, 9.1, 15.1, 15.3, 15.4

FIGURES:

ANO-2 SAR All Chapter 4, and 15 Figures.

SUPPLEMENTAL INFORMATION

The ANO-2 Cycle 15 Reload Analysis Report (RAR) and the Core Operating Limits Report (COLR) are addressed in this 10CFR50.59 Review. The ANO-2 Cycle 15 RAR (Ref. 1) describes the Cycle 15 core and provides an evaluation of the design and performance of the core during Cycle 15. The impact of the new core design on the licensing analyses that qualifies the ANO-2 core is also evaluated. ANO-2 Technical Specification 6.9.5 requires that the core operating limits be established and documented in the Core Operating Limits Report (COLR) for each reload cycle. The ANO-2 Cycle 15 COLR (Ref. 2) provides the core operating limits that have been established for Cycle 15. The ANO-2 Licensing Basis Documents (LBDs) were reviewed with respect to the new core design and analyses changes to determine the revisions required to the LBDs. The changes that affect the LBDs are discussed below.

A major change for ANO-2 Cycle 15 is the replacement of the Steam Generators in 2R14 (Unit 2 Refueling outage #14). The safety impacts of this change have been addressed through various Engineering Requests (ERs) under the ER 980642D210. In particular, ER 980564-E203 addressed the Non-LOCA events (e.g. CEA withdrawal, Ejection, Steam Line Break, etc.) and ER 980563-E201 addressed the LOCA events. Results of the LOCA and Non-LOCA event analyses were provided to the NRC on 11/29/99 (2CAN119901, Proposed Technical Specification Changes and Resolution of Unreviewed Safety Question Associated with Applicable Limits and Setpoints Supporting Steam Generator Replacement) for review and approval.

The safety analysis for this reload relies on these results and therefore, requires the NRC approval of the above submittal prior to loading the fuel (see next paragraph). This 50.59 will not address the changes covered by the submittal, but will rely on the final NRC SER. The required LDCRs for those changes are provided in ER 980642D210. Therefore, approval of this reload 50.59 also requires the PSC approval of the 50.59 for ER 980642D210. This 50.59 will address only those changes required due to the ANO-2 Cycle 15 specific analyses and that are not covered by the NRC submittal noted above.

It should be noted that the only safety analysis event of concern during the loading of fuel is the mode 6 boron dilution. As noted in the submittal, there is no impact to the event due to the RSGs or TS changes in the RSG NRC submittal. There are no related SAR changes either. Therefore, fuel may be loaded prior to the approval of the NRC submittal, but the PSC approval of the ER 980642D210 50.59 is required.

PAC Process: Most of the reload analysis is done using a checklist assessment process in which the cycle specific values for key parameters are compared to bounding values used in the Analyses of Record (AOR) for ANO-2. Automated procedures are used to perform this comparison. The Physics Assessment Checklist (PAC) is used to assess physics parameters and Comprehensive Checklists (CCL) are used to check non-physics parameters. If these parameters are bounded by the AOR value no further analysis is needed. If the limits are exceeded an assessment of the parameters or a reanalysis of the event will be performed. Parameters that failed the PAC assessment and their disposition will be discussed as required in the appropriate sections.

Cycle 15 Core Neutronics and Fuel Management

The Cycle 15 core consists of 68 fresh batch T assemblies and 109 previously irradiated assemblies from fuel batches M (1 thrice burned assembly), R (28 twice burned assemblies), and S (80 once burned assemblies) and which are used in a "very low leakage" fuel management scheme. The Cycle 15 reload fuel enrichment and batch size have been selected to achieve a nominal cycle length of 471 EFPD @ 20 ppm boron based on a Cycle 15 energy of 536 EFPD. Batch T is the third ANO-2 cycle to employ Gadolinia as an integral poison. The Gadolinia concentration remains at 6 w/o as in previous cycles. The number of pins containing Gadolinia has been selected to provide sufficient reactivity hold down while maintaining power distribution controls. As in Cycle 14, the Gadolinia poison reduces the slope of the Boron letdown curve during the initial half of the cycle but maintains a negative slope over the entire cycle. This characteristic will ensure that the Boron concentration can be reduced in a predictable manner over the cycle to offset the effects of fuel depletion. The Cycle 15 core power peaking factors have similar magnitude and will behave throughout the cycle in a fashion similar to Cycle 14 core. Critical boron concentrations and reactivity parameters are similar to Cycle 14. The HZP MTC will be slightly positive at BOC but is predicted to be well within Technical Specification and COLR requirements with analysis uncertainties applied at worst case temperature and burnup levels. The enrichment and burnable poison loading scheme of pellets and rods in a fuel assembly are not significantly different for Batch T fuel assemblies compared to the Batch R and S assemblies. The peak pin burnup is well within the licensed limit even with the most limiting Cycle 14 and 15 shutdown assumptions applied.

The impact of the Cycle 15 reload batch on the fuel storage criticality analysis has been assessed. The fuel design assumptions used in that analysis have been confirmed to ensure the requirements of Technical Specification 3.9.12 remain applicable.

The Cycle 15 reload analysis considers an operating window shown in the following table. Operation is licensed up to the EFPD limits shown in the Table including coastdown.

ALL in EFPD	Maximum Cycle 15 End Point
Cycle 14 Short End Point - 511	511
Cycle 14 Long End Point - 546	491

From the above Table it can be seen that as long as the Cycle 14 shutdown (EFPD) occurs between 511- 546 EFPD the results presented in the RAR will remain valid. The 2R14 outage was modeled based on the decay of dominant short-lived isotopes. This approach was evaluated and found appropriate for outage lengths of up to 100 days. The Cycle 15 core model was revised based on the projected performance of the replacement steam generators. The core was modeled based on nominal operation at a T-inlet of 549 °F and a core flow 352,323 gpm. Physics parameters were generated considering a T-inlet range of 540 - 556.7 °F. Changing the T-inlet to 549 °F will result in changing one of the CPC Reload Data Block (RDB) constants, VADJ, to avoid unnecessary CPC imposed penalty. The effect of the change in operating point is addressed thoroughly by ER 980642D210. Changes to the reload data block are governed by procedure 1022.002. A specific 50.59 determination will be performed to address the change in VADJ prior to implementation. Neutronic parameters important to safety were generated using U.S. NRC approved codes and methods, which are applicable to the Cycle 15 core.

The applicability of the transient and accident analyses to the Cycle 15 core was determined by comparison of the Cycle 15 specific physics parameters to the safety analysis assumptions. This comparison is summarized in the PAC described in the Cycle 15 RAR. Relative to Cycle 14, the PAC includes additional flexibility in the subcritical CEA bank withdrawal sequences. The PAC considers the withdrawal of Group 6 prior to Group P while retaining the previous sequence with Group P being withdrawn first. All the PAC parameters that failed to meet the acceptance criteria were resolved with Cycle 15 specific analysis or assessments. This is discussed in the following sections.

During the manufacture of the Cycle 15 reload, fuel pellets from other process streams were found in the ANO-2 process stream. These pellets were detected by a combination of visual examinations of individual pellet lots and the automatic scanning of fuel rods for enrichment differences. A root cause assessment has determined that the pellets were placed in the process stream by deliberate actions. The fuel pellet misloading event is described in the SAR 15.1.15.1.1. The SAR credits the extensive quality control and manufacturing surveillance programs as sufficient to preclude the possibility of manufacturing an assembly with misloaded fuel pellets. Westinghouse has performed an assessment of the probability of incorrectly loaded fuel pellets not being detected in a completed fuel assembly after the deliberate placement. This assessment determined the probability to be the same as before the event so the assessment in the SAR remains applicable to Cycle 15. Westinghouse has revised their manufacturing process to include additional inspections and controls (Ref. 3).

Required SAR changes to incorporate the results and information will be addressed in this 50.59 and will require an evaluation.

Batch T Reload Fuel Assembly Design Changes

With the minor exceptions discussed below, the mechanical design of the Cycle 14 Batch S and Cycle 15 Batch T reload fuel bundle assemblies is identical. The mechanical design bases have not changed since the initial core loading fuel design.

There are no mechanical design changes for the Batch T grid cages. There are a few changes in sub-supplier specifications, manufacturing processes, or manufacturing tolerances. Suppliers made the specification changes as they updated to later ASTM specifications and would no longer certify to previous revisions.

These changes are:

- Revise the ASTM specification of the lower end fitting, Holddown Plate, and Flow Plate castings from ASTM A744/A744m-94, SPI-8R to ASTM A744/A744m-96, SPI-8R. The specification change has no effect on the material grade ordered.

- Revise the ASTM specification of the Perimeter and Interior Strip Coil from ASTM B443-84, SPI-6R to ASTM B443-93, SPI-6R. There are no technical changes to the requirements and the supplier will no longer certify to the 1984 version.

- Add modified requirements on the End Cap Weld Zones. The weld zones had no specifications and used the general specifications for the entire cladding. The new specification sets the size of the deflash zone and an acceptable outside diameter after the deflash operation. The new specification is 0.381 +/- 0.003 for the deflash area versus 0.382 +/- 0.002 for the entire outside diameter. Westinghouse/CENP performed a mechanical design analysis for the new criteria and all the results were acceptable.

- Change the End Cap Material Specification from rotary swaging to cold rolling. The supplier is closing the rotary swaging facility. Westinghouse/CENP performed a Qualification Program to demonstrate that the material performs the same as the previous method.

- Revise the ASTM specification of the Guide Tube Wear Sleeve from ASTM A269-94a, SPI-46R to ASTM A269-96, SPI-46R. The specification change has no effect on the material procured.

The changes described above have been reviewed and approved by Entergy for implementation starting with the Batch T fuel (Ref. 4). The review concluded that the overall fuel assembly mechanical, thermal–hydraulic, and nuclear performances have not been altered by any of these changes. These improvements do not require any modifications to existing design criteria or methodologies and the ANO-2 Technical Specifications are not impacted.

The thermal performance of the composite fuel rods of the different fuel batches present in the ANO-2 Cycle 15 core have been evaluated using the U.S. NRC approved FATES3B version of the C-E evaluation model. The analysis was performed using a power history that enveloped the power and burnup levels representative of the peak fuel rod for each batch at each burnup interval, from beginning of cycle to end of cycle burnups. The burnup range analyzed is in excess of that expected at the end of Cycle 15. The maximum fuel rod burnup projected for ANO-2 Cycle 15 is 57,910 MWd/MTU, excluding the +750 MWd/MTU burnup allowance, and is less than the 60,000 MWd/MTU licensed limit. Predicted maximum rod internal pressures are less than the nominal operating system pressure of 2200 psia. The cold internal rod pressure will remain below the NRC Regulatory Guide 1.25 value of 1200 psig (Ref. 1).

The metallurgical requirements of the fuel cladding and the fuel assembly components for the Batch T fuel are the same as those used in Cycle 14. It should be noted that the overall dimensions of the fuel rod assembly, the poison rod assembly and the fuel bundle assembly all remain unchanged from the previous reloads. The HID-1L Zircaloy spacer grids are the same for Batch T as was used for

Batch S. The CEA guide tube assembly is also unchanged. To date the Batch S fuel bundle assemblies have performed satisfactorily.

Batch T assemblies have the same structural cage as that previously used at ANO–2 and will be capable of withstanding the expected handling loads. These assemblies will continue to be compatible with the fuel handling equipment. The manner of handling the new fuel assemblies will be unchanged. The envelope of the Batch T fuel is no different than that of previous batches. The mass of these new assemblies remains unchanged compared to the previous batch. Hence, there is no change to the fuel handling accident discussed in SAR 15.1.23.

The dimensions and positions of the CEA guide tube assemblies are unchanged compared to the assemblies used in the previous cycles. Also, any dimensional changes due to irradiation, such as assembly bow, will not be altered since no changes in the guide tubes material have occurred. There is no change to the CEA misoperation discussed SAR 15.1.3.

The steam generator replacement and long outage duration with the reactor vessel head removed increases the chance of introduction of foreign material or debris into the RCS and core. All of the assemblies in the core with the exception of the center bundle have the Guardian grid debris resistant feature. The center assembly has the long end cap feature that also provides protection against fuel damage due to debris. With the application of foreign material exclusion controls during the outage, these features will provide resistance to a potential increase in foreign material or debris.

Issues related to Crud, Ni, AOA: The replacement of the steam generators also increases the chance of additional corrosion products (crud) being introduced into the RCS as protective coatings are being formed on the SG tubing. Of primary concern is the release of Nickel from RSG surfaces. There are no additional fuel mechanical design features in place to prevent or mitigate the problems associated with elevated crud or Ni concentrations. Potential problems include crud induced axial offset anomalies (AOA), heat-transfer impediment (high oxidation), lithium hideout, or localized hydriding. Westinghouse/CENP has provided chemistry recommendations (Ref. 5) that are directed at managing nickel release and minimizing crud deposition on the fuel. These recommendations include chemical pH control and monitoring the RCS for elevated crud levels. Operational limits should be evaluated for periods of elevated crud levels. The CE recommendations were provided to the Chemistry group at ANO. ER 980558E201, which deals with Fuel Mechanical Design, will incorporate reference 5 into the ANO Calculation system.

The increase in RCS flow for Cycle 15 has the potential to impact the evaluation of fuel uplift forces. Included in the scope of ER 980642D210 is a reference to ST-99-

0447, which evaluates the applicability of an earlier uplift analysis, to Cycle 15. This evaluation requires a limitation on maximum RCS flow of 360,962 gpm, which has been included in the post installation test acceptance criteria for the steam generator replacement Nuclear Change Package. With this flow limitation, the worst case hydraulic loads will not exceed the holddown capability of the fuel assembly (gravity plus holddown spring capability) during normal operation. For the RCS flow expected in Cycle 15, the holdown springs, HID-1L Zircaloy spacer grid springs, and Guardian grid springs still have sufficient force to prevent fuel performance problems.

The Batch T fuel assembly has the same structural cage as the previous reload. Its fuel rods and poison rods have the same external dimensions, materials, clad thickness, and mass as the Cycle 13 and 14 rods. The assembly grid design features as discussed in FSAR 4.2.1.3.6 to control grid fretting continue to be implemented in Batch T. The impact of higher flow induced vibration and fretting is addressed in the ER 002271.

It is concluded that the Batch T reload fuel assemblies are acceptable for use in ANO-2 Cycle 15, and there is acceptable mechanical design adequacy/compatibility of the Cycle 15 core containing Batch T fuel assemblies and other resident fuel batches. *No specific change to the SAR is required due to the Fuel Mechanical Design.*

Center Assembly Candidate

The center assembly in the Cycle 15 core is from fuel batch M. The Cycle 15 Fuel Management Information and Cycle 15/16 Safety Analysis Groundrules (98-R-2005-01, Rev. 6) lists seven (7) batch M assemblies that are candidates for re-insertion. These assemblies are:

- AKM217
- AKM218
- AKM220
- AKM221
- AKM222
- AKM223
- AKM231

These assemblies were last in the core in Cycle 11. During 2R11 a fuel inspection campaign was conducted. A review of the records package (ABB Document No. 2005406-001, "Ultrasonic Examination of Fuel Assemblies Using FFRDS, Rev. 0")

from this campaign was conducted. It was determined that these assemblies were inspected (UT) and found to have no failures.

These assemblies do not have the GUARDIAN grids or the HID-1L spacer grid assemblies. The remaining 176 assemblies do have both of these improved assembly features. While the GUARDIAN grids do provide improved debris-resistance, the older design of the longer end caps does provide significant resistance to debris. The improvement of the HID-1L design is a greater consistency in dimensional control. These designs have previously been reviewed as part of the reload 10CFR50.59 process.

Reactor Vessel Fluence

Reactor Vessel Fluence issues for Cycle 15 after the installation of RSGs was addressed in ER 980571-E201. The installation of the RSGs does not impact any of the properties (e.g., chemical composition) of the materials that make up the reactor vessel. The Cycle 15 core design is very similar to the Cycle 14 design in that it is a low leakage design. However, inlet temperature is being increased to approximately what it was in Cycles 1 and 2. While the increase in temperature will lead to a higher flux of fast neutrons, it has been determined that the total neutron fluence calculation remains bounding for Cycle 15 operation. It is planned to remove and test a reactor vessel specimen during the RSG installation outage.

Based on the fact that the material properties are not changing and the neutron fluence calculation remains bounding, the reactor vessel itself is not impacted by the installation of the RSGs. Therefore, the Cycle 15 reload core does not negatively impact the bases of the pressure/temperature limits in the Technical Specifications. In addition, an analysis of the reactor vessel internal heating indicates that the temperatures will remain below the current temperature limits based on a loading scheme limitation. Cycle 15 falls within those limitations.

Thermal Hydraulic Analysis

The core thermal hydraulic analysis is described in Section 4.0 of the RAR. The scope of this thermal hydraulic analysis is limited to the validation of the applicability of the codes and correlations used to demonstrate that the core does not experience departure from nucleate boiling (DNB) during normal operation or anticipated operational occurrences. Other reactor coolant system thermal hydraulics design considerations, impacted by the installation of the replacement steam generators, are addressed in the Nuclear Change Package for that

modification (see ER 980642D210). The thermal hydraulic characteristics of the Cycle 15 core necessitating re-evaluation are:

- The core average heat flux for Cycle 15 is lower due to the fact that Cycle 15 utilizes 16 B_4C shims, while Cycle 14 used 272 B_4C shims.

- The minimum steady state reactor coolant flow has been restored to 322,000 gpm or 120.4×10^6 lbm/hr due to the installation of the replacement steam generators.

Both of these characteristics have a positive impact on the margin to DNB. With the exception of the change to nominal operating pressure, the changes to SAR Table 4.4-2 are the result of the increase in flow and the reduction in the number of shims. The change in the nominal operating pressure, from 2250 to 2200 psia, provides consistency with other SAR sections even though, as the footnote describes, the thermal hydraulics analysis is valid for a range of conditions and is not dependent on a specific nominal value. *Required SAR changes to incorporate the results and information from the thermal hydraulic analysis will be addressed in this 50.59 and will require an evaluation.*

The Cycle 15 thermal hydraulics analysis validates the applicability of the codes and correlations used to predict DNB and, together with the safety analyses, demonstrates that there is at least a 95% probability at a 95% confidence level that the limiting fuel rod in the core does not experience DNB during normal operation or anticipated operational occurrences.

Transients

Design Basis Events (DBEs) currently analyzed in the ANO-2 SAR were evaluated with respect to four criteria: Offsite Dose, Reactor Coolant System Pressure, Fuel Performance, and Loss of Shutdown Margin.

RSG Evaluations: The replacement of the Steam Generators resulted in the reanalysis or a qualitative reevaluation of the design basis accidents. Compared to the Original Steam Generators (OSGs), the Replacement Steam Generators (RSGs) have a larger number of tubes and a larger secondary side volume. This results in increased RCS flow rates and increased heat transfer areas for the SG tubes, which increased the RSG operating pressure. The RSGs also have different tap locations and different water volume with height. Evaluations were performed to assess the impact of RSGs on both LOCA and non-LOCA events. Changes were also required to several Reactor Protection System (RPS) and Engineerd Safety Features Actuation System (ESFAS) setpoints. These are: a decrease in pressurizer pressure

low setpoint, a decrease in SG level Low setpoint, an increase in SG pressure Low setpoint, and changes to the High Linear Power RPS setpoints with inoperable MSSVs. Some analytical values were also conservatively changed. Analyses were performed using bounding parameter values when possible.

As mentioned earlier, LOCA (ECCS Performance) and Non-LOCA events have been evaluated in ER 980563-E201 and ER 980564-E203 (Table 1.0-1 of Attachment 2 to ER 980643-E203), respectively. All SAR updates in the ERs have been compiled into a final version and can be found in ER 980642D210. All results were found to be within the applicable acceptance criteria. The LOCA and non-LOCA event results along with a conservative methodology change for dose determinations and the RPS/ESFAS setpoint changes were submitted to the NRC in 2CAN119901. For Cycle 15 reload work, these results and the submittal were assumed to be approved by NRC.

PSC concurrence with this 50.59 is contingent upon the NRC approval of the RSG submittal, 2CAN119901 and the PSC approval of the 50.59 for ER 980642D210.

All events (Anticipated Operational Occurrences and Postulated Accidents) were reanalyzed or reevaluated to assure that they meet their respective criterion at a reactor thermal power rating of 2815 MWt. Design basis event results were determined to be applicable by comparing key AOR parameters to the respective values used in the analyses done for RSG. As stated above, these events were either reanlayzed or evaluated for RSG and were shown to be applicable. The only event that was not bounded by existing analysis was the Main Steam Line Break event. A reanalysis was performed with cycle specific physics data, which showed acceptable results as discussed below. For CEA Ejection, excore decalibration exceeded the amount assumed in the existing analysis, requiring an additional assessment that showed acceptable results as discussed below. *Required SAR changes to incorporate the results and information will be addressed in this 50.59 and will require an evaluation.*

CEA Events

Proposed changes for Cycle 15 include allowing the use of Group P for criticality (in addition to Group 6 as currently allowed). Also discussed here are additional assessments required to address required overpower margin (ROPM) for a single CEA withdrawal within deadband and excore decalibration applicable to the CEA ejection analysis. Per Table 5-1 of the RAR, the design basis CEA events continue to be bounded by previous analyses.

The original part length control element assemblies (CEAs) were replaced with full length, full strength CEAs during the 2R11 refueling outage. Since the beginning of

Cycle 12, the CEA withdrawal sequence used during the approach to criticality has been Group A, B, 1 through 5, P and then 6. Criticality was always targeted on Group 6. Since this CEA configuration was established, on more than one occasion, criticality was achieved early on Group P. While these few incidents were acceptable from a procedural and reactivity balance perspective, they were perceived to be problems and created some difficulty during startups. To remedy the situation, the reload team chose to investigate the possibility of using Group P as the target group for criticality. The benefit of using Group P as the target group is that the entire administrative band of estimated critical position ± 0.5 %Δk/k will lie on this single larger CEA Group. This was not the case when using Group 6 because of it's substantially smaller worth (approximately one-third of Group P's worth).

The Cycle 15 reload groundrules were modified to reflect the desired change in withdrawal sequence. Physics information required to evaluate the bounding of the two withdrawal sequences is now being generated as part of the normal reload process. The results indicate, using the bounding sequence of the two withdrawal sequences, that there is no impact to the safety analyses. Reactivity insertion rates remain within the rates assumed in the CEA withdrawal analyses.

The following parameters were calculated to exceed safety analysis assumptions contained in other CEA events, requiring some cycle specific evaluation to justify acceptability:

- ROPM: The degradation in overpower margin resulting from a single CEA withdrawal within deadband (SCEAW) below 20% power.

- ROPM: The degradation in overpower margin resulting from a single CEA withdrawal within deadband while both CEACs are out of service below 20% power.

- Excore Decalibration: The percent difference between minimum excore power and the average excore power when a trip occurs during a CEA ejection (exceeded at 0, 20, 50, and 80% power).

The required overpower margin (ROPM) parameters related to CEA withdrawal within deadband have been cleared via cycle specific assessment, internally by Westinghouse/CE. Sufficient conservatisms have been demonstrated to exist in the CPC calculations to ensure that the Specified Acceptable Fuel Design Limits (SAFDLs) will not be exceeded as a result of a SCEAW event below 20%. For the excore decalibration parameters, the RAR demonstrates sufficient margin in other parameters related to CEA ejection to justify acceptance of the current decalibration parameters. Specific values for excore decalibration are contained in the SAR.

Required SAR changes to incorporate the results of the excore decalibration assessment will be addressed in this 50.59 and will require an evaluation.

MSLB

The Main Steam Line Break (MSLB) was reanalyzed for Cycle 15 operation because the cycle specific 3-D peaking (Fq) data exceeded those values used in the Replacement Steam Generator (RSG)/Power Uprate analysis. The methodology used in the reanalysis was identical to that used in the RSG evaluation. The Fq values used in the RSG/Power Uprate analysis became the PAC Limits against which the Cycle 15 specific results were to be compared. The Hot Full Power (HFP) and Hot Zero Power (HZP) MSLB events with and without loss of off-site power (LOAC) were analyzed to determine the maximum post trip fission power and reactivity for each case. The acceptability criteria that are applied to these cases are to ensure that the Cycle 15 fuel does not violate the SAFDLs on minimum Departure from Nucleate Boiling Ratio (DNBR) or peak Linear Heat Generation Rate (LHGR). The Cycle 15 description for the maximum post-trip reactivity, peak return to power, and minimum DNBR for the HFP and HZP cases with and without off-site power text in SAR Section 15.1.14.1.4.7 and associated Tables are revised to incorporate the results. The results confirm that there is no calculated fuel failure and that the licensing basis remains bounding for Cycle 15. Specifically, the fuel DNBR and peak LHGR values do not exceed licensing basis limits. *Required SAR changes to incorporate the results and information from the MSLB analysis will be addressed in this 50.59 and will require an evaluation.*

ECCS Analysis

The Cycle 15 ECCS Performance analysis demonstrated that the results of the RSG analyses for LBLOCA and SBLOCA apply to Cycle 15. The Cycle 15 value for the x-factor parameter was different from the data used in the RSG analysis. In order to compensate for the adverse impact of this value some conservatism in another parameter was used. The final results are bounded by the RSG results.

Conformance to the ECCS acceptance criteria for the limiting break of 0.6 DEG/PD (Double Ended Guillotine / Pump Discharge) is summarized below. The results are for a PLHGR of 13.5 kW/ft and a power level of 2900 MWt (rated core power of 2815 MWt plus a 3% power measurement uncertainty).

Parameter	Criterion	Value
Peak Cladding Temperature, °F	≤2200	2029
Maximum Cladding Oxidation, %	≤17	5.4
Maximum Core-Wide Cladding Oxidation, %	≤1	<0.99
Maintain Coolable Geometry	Yes	Yes

The results of the LOCA analyses were provided to the NRC in the 11/29/99 RSG submittal (2CAN119901). ER 980642D210 addresses all the associated SAR changes. There are no further changes to the LBDs resulting from the ECCS performance analysis and therefore, an evaluation is not required.

PSC concurrence with this 50.59 is contingent upon the NRC approval of the RSG submittal, 2CAN119901 and the PSC approval of the 50.59 for ER 980642D210.

COLR Changes

One of the basic assumptions going into the Cycle 15 Reload Design effort was that the current Cycle 14 COLR would be applicable to Cycle 15. All COLR limits except for one of the EFPD breakpoints identified in the Cycle 14 COLR MTC limit were found to be acceptable based on the Cycle 15 non-LOCA, LOCA, and the setpoint analysis performed for the reload. Listed below is the change to the Cycle 15 COLR from the latest revision of the Cycle 14 COLR.

- Modified the second EFPD breakpoint in the Core Operating Limit for Moderator Temperature Coefficient (MTC) that specifies where a less positive (burnup dependent) MTC was credited in the safety analyses. Changed 332.5 EFPD to 311.6 EFPD.

The above change is incorporated in the Cycle 15 COLR and is determined to be acceptable based on the results of the reload and setpoint analyses. *Required COLR change to incorporate this information will be addressed in this 50.59 and will require an evaluation.*

BASES FOR DETERMINATION

1. Require a change to the Operating License:

1(a) Require a change to the ANO-2 Technical Specifications? No

The Cycle 15 RAR describes and addresses the design, performance, and the safety analyses of the ANO-2 Cycle 15 core. The Cycle 15 core design and reload analysis results fully comply with the criteria discussed in the Technical Specifications. All the input assumptions and methods are consistent with or conservative with respect to the ANO-2 Technical Specifications including the approved changes based on the RSG submittal. All cycle-specific limits for operation of the Cycle 15 core are located in the Cycle 15 COLR (98-R-2005-04, Revision 0). The remaining Technical Specification Safety Limits, Limiting Safety System Settings, and Limiting Conditions for Operation (LCOs) governing the operation of the previous cycle core continue to be bounding for the Cycle 15 core.

Other than the RSG RPS/ESFAS related TS Submittal 2CAN119901 discussed earlier, no additional ANO-2 Technical Specification changes are required for the operation of the Cycle 15 Core. NRC approval of this submittal is assumed for this reload. **PSC concurrence with this 50.59 is contingent upon the NRC approval of the RSG submittal, 2CAN119901.**

Change in CEA Withdrawal Sequence

Tech. Spec. 3.1.3.6 limits the position and withdrawal sequence of regulating and group P CEAs to the sequence and positions specified in the core operating limits report (COLR). The COLR requires that group 6 and P CEAs be maintained above power dependent insertion limits (PDIL), with groups 1 through 5 at or above the programmed insertion limit (essentially fully withdrawn). The PDIL for groups 6 and P only limits insertion above 20% full power. The COLR does not include any restrictions on the use of groups 6 or P below 20% power and does not specify a withdrawal sequence for these two groups.

The proposed change is not related to the alignment requirements contained in Technical Specifications and does not impact the ability to meet shutdown margin requirements. The CEA configurations that will result are within the insertion limits established in the COLR to protect shutdown margin and safety analysis initial conditions.

ROPM & Excore Decalibration

The increase in predicted excore decalibration during a CEA ejection is strictly a safety analysis issue and beyond the scope of the TS and Operating License documents. The overpower margin required to cover the CEA withdrawal within deadband has been addressed via cycle specific analysis. This analysis demonstrates sufficient conservatism in the CPCs to ensure no SAFDLs will be violated. This resolution will not impact the power reduction requirements of TS 3.1.3.1.

MSLB

The purpose of this effort is to implement a MSLB analysis using Cycle 15 physics data, which confirms that the licensing basis is maintained. The Operating License documents will not change as the existing licensing basis for DNBR and peak LHGR are shown to remain bounding for the Cycle 15 physics data and this level of detail is not discussed in the Operating License Documents.

1(b) Require a change to the ANO-2 Operating License? No

The results of the reload analyses presented in the Cycle 15 RAR fall within the requirements for operating the ANO-2 Cycle 15 core as referenced or described in the ANO-2 Operating License. All cycle-specific limits for operation of the Cycle 15 core are located in the Cycle 15 COLR and within the requirements of the operating license. Therefore, no changes to the ANO-2 Operating License are required to support the operation of the Cycle 15 core.

1(c) Require a change to the ANO-2 Confirmatory Orders? No

The results of the reload analysis are within the requirements for operating the ANO-2 Cycle 15 core as referenced or described in the ANO-2 Confirmatory Orders. The specific results of the analyses are beyond the scope of the Confirmatory Orders. All cycle-specific limits for operation of the Cycle 15 core are located in the Cycle 15 COLR and are within the requirements of ANO-2 Confirmatory Orders. Therefore, no changes to the ANO-2 Confirmatory Orders are required to support the operation of the Cycle 15 core.

2. Require a change to SAR documents:

2(a&b) Result in information in the ANO-2 SAR or COLR being no longer true or accurate or violate a requirement stated in the document? Yes

The Cycle 15 RAR describes and addresses the design, performance, and safety analyses of the ANO-2 Cycle 15 core. The results of the reload analysis are within the requirements for operating the ANO-2 Cycle 15 core as referenced or described in the ANO-2 SAR except for some cycle specific information in Chapters 4, 15, and the COLR. The COLR is considered to be part of the SAR and reflects the specific operational limits for the core. In accordance with Technical Specification 6.9.5, the COLR is to be revised for each cycle. The Cycle 15 COLR, 98-R-2005-04, Rev. 0, has been prepared and this 50.59 addresses the changes to this document.

All SAR changes related to the NRC submittal 2CAN119901 are addressed in ER 980642D210. **PSC concurrence with this 50.59 is contingent upon the PSC approval of the 50.59 for ER 980642D210.**

Chapter 4 of the SAR describes the fuel, reactor internals, reactivity control systems, the nuclear, thermal and hydraulic design, plus testing and verification of the ANO-2 core. Chapter 15 describes the various safety analyses. Information presented in the Cycle 15 RAR impacts the information presented in these chapters. The Cycle 15 COLR reflects the cycle-specific operating limits for the ANO-2 Cycle 15 core. The change to the COLR described above will ensure that the Cycle 15 core is operated in a manner consistent with the assumptions used in the analyses described in the SAR. Incorporation of information into the SAR and the COLR requires a 10CFR50.59 evaluation. LDCRs have been prepared for these changes.

<u>CEA Withdrawal Sequence and CEA Events</u>

Changing the sequence for CEA withdrawals during the approach to criticality has the potential to impact CEA withdrawal events initiated from subcritical or critical (1% power) conditions. These events are presented in sections 15.1.1 and 15.1.2 of the SAR.

15.1.1 – CEA Withdrawal from Subcritical Conditions

The SAR discussion of the CEA withdrawal event from subcritical conditions only describes startup of the reactor as involving "a planned sequence of events during which certain CEA groups are withdrawn, at a controlled rate and in a prescribed order, to increase the core reactivity gradually from subcritical to critical." The subcritical withdrawal event is modeled as a CEA withdrawal initiated at the source power level. Per SAR section 15.1.1.2.1, the key parameters for this analysis are "the reactivity addition rate due to rod motion, moderator temperature feedback effects, and initial axial power distribution."

The procedures used by Westinghouse/CENP to evaluate the Cycle 15 core design were changed to calculate reactivity addition rates and peaking factor (Fq) values consistent with the changed withdrawal sequence. The limits shown for these parameters on Table 3.1-1 of the RAR match the assumptions stated in Table 15.1.1-4 of the SAR (assumptions used in the analysis of record). The RAR also shows that the values calculated for Cycle 15 were within the analysis limits. The SAR description of the CEA withdrawal from subcritical conditions does not detail a specific withdrawal sequence. The conclusion, based on these facts, is that no impact to this analysis exists.

15.1.2 – CEA Withdrawal from Critical Conditions

The SAR discussion of the CEA withdrawal event from critical conditions states this event is analyzed at 1% power and at full power conditions. A change in CEA withdrawal sequence during the approach to criticality naturally has the potential to impact the analysis for the 1% power level. Section 15.1.2.2.1 states that "the regulating CEA groups (Groups 1 through 5) are programmed for withdrawal in a specified sequence having a predetermined group overlap." The SAR presentation of this event does not detail a specific sequence for withdrawal of groups 6 and P. The statement concerning Groups 1 through 5 is not made inaccurate or false by the proposed change. Groups 6 and P are withdrawn following withdrawal of Groups 1 through 5.

As stated in the discussion of the subcritical CEA withdrawal event above, the procedure for generating physics data was modified to calculate reactivity addition rates and peaking factor values consistent with a bounding withdrawal sequence. The assumed values for reactivity addition rate and Fq listed in Table 15.1.2-5 (assumptions used in the analysis of record) match the limits for these parameters given in Table 3.1-1 of the RAR. The RAR shows that these limits were satisfied by the Cycle 15 core design. There is therefore no impact on this analysis.

The analysis of CEA withdrawal at full power conditions is not directly impacted by the proposed change. However, the RAR stated limit for reactivity insertion rate was verified to match the analysis assumed value stated in SAR section 15.1.2.4.2.2. The value calculated for Cycle 15 satisfies this limit.

The remaining CEA events present in SAR Chapter 15 concern CEA drop and CEA ejection and are not impacted by a change in withdrawal sequence.

The pulse counting CEA position indication system is described in SAR section 7.5.1.4.1. This system provides various alarms (PDIL, PPDIL, Out of sequence, Deviation) to aid the operator in maintaining CEA control and monitoring CEA limits. The proposed changes to the CEA withdrawal sequence are within the

envelope of the existing power dependent insertion limits (PDILs) and will not impact the PDIL alarm functions. There are no impacts to the Out of Sequence alarm functions. The Out of Sequence alarm relates to the overlap and sequencing of Groups 1 through 5 only.

Section 7.7.1.1, describes the sequential mode of CEA operation as only applying to groups 1 through 5. Groups 6 and P are moved in manual individual or manual group. The proposed change to the withdrawal sequence is limited to the withdrawal of group 6 relative to group P and does not impact this description. This conclusion is further supported by the discussion in section 7.7.1.4 which states: "the computers monitor the following functions during sequential modes of CEA group operation: (1) withdrawal sequence which starts with Group 1 and ends with regulating group 5 in consecutively increasing numbers, and (2) the insertion sequence which starts with regulating group 5 and ends with group 1 in consecutively decreasing numbers."

The proposed change has no impact on the COLR. The COLR contains a power dependent insertion limit (PDIL) curve used to establish CEA insertion limits that protect shutdown margin requirements and the initial conditions assumed in the safety analyses (per SAR section 4.3.2.6). The COLR PDIL curve allows full insertion of either or both of Group 6 and P CEAs between 0 and 20% full power. Above 20%, any combination of Group 6 and P may still be inserted, although at depths inversely proportional to power. The use of either Group 6 or P as a target group for criticality is therefore acceptable.

CEA Events - ROPM and Excore Decalibration

SAR Section 15.1.20 provides the discussion of the CEA Ejection event. The current analysis of record for this event is from Cycle 14. Table 15.1.20-18, "Results for the Cycle 14 CEA Ejection Accident Analysis", lists the excore detector uncertainties (decalibration) assumed at various power levels. 10% uncertainty was used at 0 and 20% power while 20% uncertainty was used for the 50, 80, and 100% power cases. The uncertainties used at 20, 50, and 80% power were not confirmed for Cycle 15. The RAR does demonstrate that the end result of the analysis of record is bounding for Cycle 15, due to margin in other parameters. A revision to SAR section 15.1.20 is proposed to document the continued application of the analysis of record to Cycle 15.

The remaining RAR CEA event issues are related to overpower margins calculated to exist for conditions in which a single CEA is withdrawn within the CEAC deadband (i.e., a mis-alignment is created). The base margins calculated to exist are not sufficient to meet the requirements of the current single CEA withdrawal (SCEAW) within deadband event analysis. SAR section 15.1.3 presents the CEA

mis-operation event analysis. The discussion in this section is limited to a CEA drop scenario, as this was the scenario, which resulted in the most rapid transient. The single CEA withdrawal within deadband event is beyond the level of detail provided in the SAR. The SAR is therefore not impacted by the increased overpower margin requirement of the SCEAW event. The increased ROPM requirement has been cleared via cycle specific analysis. This analysis demonstrates sufficient conservatism in the CPCs at this power level to ensure that no SAFDLs will be violated.

The COLR is not impacted by the increased ROPM requirements. COLR Figure 2, which provides power reduction requirements after CEA deviation, is based on inward deviations. This conclusion is consistent with the discussion in the NRC Safety Evaluation for Amendment 70. COLR Figures 4 and 5 provide the operating margin requirements for COLSS out of service conditions. These figures will not change as a result of the increased requirements or the resolution of this issue.

The remaining SAR documents are not sufficiently detailed to be impacted by changes in the specific values of ROPM or excore decalibration used in the CEA analyses.

MSLB

The Cycle 15 description for the maximum post-trip reactivity, peak return to power, and minimum DNBR for the HFP and HZP cases with and without offsite power text in SAR Section 15.1.14.1.4.7 and associated Tables 15.1.14-42 and 15.1.14-43 are revised to show the results. The results confirm that there is no calculated fuel failure and that the licensing basis remains bounding for cycle 15. The remaining SAR documents will not be affected by the proposed changes.

2(c) Result in information in the Fire Hazards Analysis being no longer true or accurate or violate a requirement stated in the document? No

The specific results of the reload analyses including the COLR change are beyond the scope of the FHA. Therefore, no changes to the FHA are required to support the operation of the Cycle 15 core.

2(d) Result in information in the Bases of the Technical Specifications being no longer true or accurate or violate a requirement stated in the document? No

The results of the reload analyses including the COLR are within the requirements for operating the Cycle 15 core as referenced or described in the bases of the ANO-

2 Technical specifications including the proposed bases changes. The reload analyses do not invalidate any information presented in the TS Bases. Therefore, no changes are required.

2(e) Result in information in the Technical Requirements Manual being no longer true or accurate or violate a requirement stated in the document No

The results of the reload analysis including the COLR change are beyond the scope of the Technical Requirements Manual and do not invalidate any information presented in the TRM. Therefore, no changes to the TRM are required.

2(f) Result in information in the ANO-2 SERs being no longer true or accurate or violate a requirement stated in the document? No

The results of the reload analysis including the COLR change are within the requirements for operating the ANO-2 Cycle 15 core as referenced or described in the NRC SERs and do not invalidate any information presented in the ANO-2 NRC SERs.

CEA Events

The safety evaluation reports were reviewed and found to contain similar statements to those in the SAR, with respect to the critical parameters involved with the analysis of CEA withdrawal events. The reactivity addition rate has the most influence on these events. The RAR has shown that safety limits will not be exceeded using the proposed changes to the withdrawal sequence.

The SER for Amendment 190 in particular describes the analyses performed to demonstrate applicability of safety analyses to a reduced RCS flow (30% tube plugging). The safety analyses performed to support this amendment request are the current analyses of record for the CEA withdrawal events at subcritical or 1% power conditions. As discussed above, these analyses bound the proposed change in withdrawal sequence.

3. Involve a test or experiment not described in the SAR? No

The results of the reload analysis including the COLR change are consistent with the current licensing basis documents.

The resolution of CEA event issues and changes in the target CEA group used for criticality do not involve tests or experiments. The proposed changes will not result in any plant equipment or system being operated outside of normal analyzed modes.

No tests or experiments are proposed or affected by the MSLB analysis changes. These changes only relate to the SAR Section 15.1.14.1 MSLB analysis input assumptions and results performed consistent with the latest Westinghouse/CENP methods.

The proposed changes do not involve any test or experiment that is not described in the SAR.

4. Result in a potential impact to the environment? No

Page 3 of this 10CFR50.59 Determination verifies that there are no potential environmental impacts as a result of operating the plant with the Cycle 15 core.

5. Result in the need for a Radiological Safety Evaluation? No

Operating the plant with the Cycle 15 core does not involve the processing of radioactive material outside the Auxiliary Building, Reactor Building, or the Low Level Radwaste Storage Building. In addition, no new pathways outside of the existing monitored ventilation or drainage pathways are created by operation of the Cycle 15 core. Thus, there is no need for a radiological safety evaluation.

6. Result in any potential impact to the equipment and facilities utilized for VSC activities? No

The loading and operation of the Cycle 15 core does not require any spent fuel Ventilated Storage Cask or related activities. Therefore, no change to the equipment and facilities used for the VSC activities is required.

7(a) Involve a change under 10CFR50.54 for the QAPM? No

The Cycle 15 RAR describes and addresses the design, accident analyses, and performance of the ANO-2 Cycle 15 core. The specific results of the analyses are beyond the scope of the QAPM. Therefore, no changes to the QAPM are required to support the operation of the Cycle 15 core.

7(b) Involve a change under 10CFR50.54 for the E-Plan? No

The Cycle 15 RAR describes and addresses the design, accident analyses, and performance of the ANO-2 Cycle 15 core. The specific results of the analyses are beyond the scope of the E-Plan. Therefore, no changes to the E-Plan are required to support the operation of the Cycle 15 core.

8 **Does this review depend on future NRC approval of other actions? (NRC SER, Relief, etc)? (forward change to PSC per 6.3.8 or 6.3.9)**

YES

This reload work depends on the results of the non-LOCA and LOCA events presented to NRC on 11/29/00 (2CAN119901). **PSC concurrence with this 50.59 is contingent upon the NRC approval of the RSG submittal, 2CAN119901.** Other changes to the LBDs are addressed by this 50.59 evaluation.

REFERENCES

1. ANO-2 Cycle 15 Reload Analysis Report, 98-R-2005-03, Rev. 0.

2. ANO-2 Cycle 15 Core Operating Limits Report, 98-R-2005-04, Rev. 0.

3. Letter A-2000-057, J. M. Betancourt to J. H. Willoughby, "Rogue Erbia Pellet Actions," dated August 16, 2000.

4. Letter, Manufacturing Order for ANO-2, Batch T, J. M. Betancourt (ABB) to J. H. Willoughby (EOI), A-99-037, November 8, 1999.

5. CENP Project Number 2009856, Evaluation of RCS Nickel Management Options for RSG Operation at ANO-2, ER-AN-PS-0002, Rev. 0, August 2000.

6. Letter, Fuel Uplift Forces for ANO-2 Power Uprate and Steam Generator Replacement, M. Golbabai (ABB) to R. Wilson (EOI), ST-1999-0788, October 15, 1999.

7. A partial list of ABB/Combustion Engineering Proprietary Analyses for ANO–2 Cycle 15 is given below. More may be found in the Reload Report and other RSG related transmittals documented in various ERs.

M-AK2-FMDE-99-003	01	ANO-2 Batch T Fuel Bundle Assemblies Reload Fuel Mechanical Design Parameter List
M-AK2-FMDE-2000-01	00	Transmittal of Mechanical Design Section of the Comprehensive Checklist and Assessment for Arkansas Nuclear One-Unit 2 Cycle 15
M-AK2-FMDE-2000-01	01	Transmittal of Mechanical Design Section of the Comprehensive Checklist and Assessment for Arkansas Nuclear One-Unit 2 Cycle 15
A-AN-FE-0161	004 005	ANO-2 EPAC Equivalence Analysis
A-AN-FE-0234	003	ANO-2 Main Steam Line Break Analysis for RSG and Power Uprate
A-AN-FE-0293	000	ANO-2 Cycle 15 PAC Assessment
A-AN-FE-0293	001	ANO-2 Cycle 15 PAC Assessment
A-AN-FE-0286	000	ANO-2 Cycle 15 Design ROCS/CORD Models and Depletions
A-AN-FE-0286	001	ANO-2 Cycle 15 Design ROCS/CORD Models and Depletions
AN-FE-0218	04	Release of Revision 04 of the PAC Methodology for ANO-2

AN-FE-0458	000	Clarification of CEA Bank Withdrawal Sequences Considered in the ANO-2 Cycle 15 PAC Assessment
A-AN-FE-0294	00	Arkansas Unit 2 Cycle 15 Thermal Hydraulic Reload Analysis
A-AN-FE-0291	000	ANO-2 Cycle 15 Fuel Performance Analysis
AN-FE-0464	000	ANO-2 Cycle 15 Draft Reload Analysis Report
A-2000-031 AN-FE-0466	000	Recommended SAR Updates for ANO-2, Cycle 15
A-2000-044 AN-FE-0466	001	Revised Recommended SAR Updates for ANO-2 Cycle 15
A-2000-033		Technical Review Committee (TRC) Evaluation of Postulated Single CEA Withdrawal Events Initiated From 20% Power
A-2000-042 AN-FE-0471	000	ANO-2 Cycle 15 Final Reload Analysis Report
A-2000-053 AN-FE-0478	000	ANO-2 Cycle 15 Core Operating Limits Report, 98-R-20005-04
A-AN-FE-0177	004	ANO-2 Cycle 15 Independent COOS Analysis
A-AN-FE-0291	001	ANO-2 Cycle 15 Fuel Performance Analysis
A-AN-FE-0296	000	ANO-2 Cycle 15 ECCS Performance Analysis
A-AN-FE-0297	000	ANO-2 Cycle 15 BOC Xenon Oscillation
A-AN-FE-0234	004	ANO-2 Main Steam Line Break Analysis for RSG and Power Uprate, 95-E-0076-08
A-AN-FE-0456	000 001	ANO-2 Non-LOCA Transient Analysis Assessment for Cycle 15
AN-FE-0213	01	Documentation of Setpoint Analysis CCL Values and Inputs to the Master Setpoint Analysis for ANO-2
AN-FE-0226	03	ANO-2 Cycle Independent COLSS Database Document
AN-FE-0238	04, 05	Setpoint Analysis Comprehensive Checklist for ANO-2
AN-FE-0244	01	Cycle Independent Data for ANO-2 Master Setpoint Analysis
AN-FE-0323	02 003	Assessment of the Setpoint Analysis Comprehensive Checklist for ANO-2 Cycle 14
AN-FE-0470	00	ANO-2 Cycle 15 – Assessment of Plant Parameters to confirm SCEAW AOR Applicability
AN-FE-0473	00	Assessment of the Setpoint Analysis Comprehensive Checklist for ANO-2, Cycle 15
A-AN-FE-0298	0	ANO-2 Cycle 15 Master Setpoints Analysis

Document No. 98-R-2005-03 & 98-R-2005-04 Rev./Change No. 0 10CFR50.59 Eval. No. (Assigned by PSC) FENH 00-103

Title ANO-2 Cycle 15 Reload Analysis Report and ANO-2 Cycle 15 Core Operating Limits Report

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1.	Will the probability of an accident previously evaluated in the SAR be increased?	Yes ☐	No ☒
2.	Will the consequences of an accident previously evaluated in the SAR be increased?	Yes ☐	No ☒
3.	Will the probability of a malfunction of equipment important to safety be increased?	Yes ☐	No ☒
4.	Will the consequences of a malfunction of equipment important to safety be increased?	Yes ☐	No ☒
5.	Will the possibility of an accident of a different type than any previously evaluated in the SAR be created?	Yes ☐	No ☒
6.	Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?	Yes ☐	No ☒
7.	Will the margin of safety as defined in the basis for any technical specification be reduced?	Yes ☐	No ☒

Please See Attached Discussion.

Certified Reviewer's Signature	Printed Name	Date
John Thomas Sankoorikal	John T. Sankoorikal	8/30/00

Reviewer's certification expiration date: 8/4/02

Assistance provided by:

Printed Name	Scope of Assistance	Date
Fred H. Smith	Core Design - Neutronics	8/30/00
Dennis E. Barr	Core Design - Mechanical	8/30/00
Jacque Lingenfelter	Thermal Hydraulics	8/30/00
Todd A. Erskine	Safety Analysis, CEA Events	8/30/00
Larry D. Young	Safety Analysis, MSLB	8/30/00
Stanley J. Haynes	ECCS	8/30/00
Robert W. Clark	Center Assembly	8/30/00

PSC review by: _____ Date: 9/14/00

Changes being incorporated by this evaluation have been discussed in the determination section and information in that section delineates the need for this evaluation. Please refer to the determination section for a discussion of the changes and background with respect to these changes. The changes are summarized below.

- SAR changes to Chapter 4 to incorporate the results and information for Neutronics, Fuel Management, and Fuel Design.
- SAR changes to Chapter 4 to incorporate the results and information for Thermal Hydraulic Analysis.
- SAR changes to Chapter 15 to incorporate the results and information for Main Steam Line Break (MSLB).
- SAR changes to Chapter 15 to incorporate the results and information for CEA Ejection.
- COLR change to incorporate the EFPD breakpoint information in the COLR MTC.

1. **Will the probability of an accident previously evaluated in the SAR be increased?**

No

Cycle 15 Core Neutronics and Fuel Management

The Cycle 15 fuel management scheme has been explicitly incorporated into the neutronics models. The core thermal-hydraulic effects of the replacement steam generators have also been accounted for in these models. The effects of an extended refueling outage have been appropriately considered. The physics parameters used in safety analysis were evaluated based on the Cycle 15 specific core performance. All parameters were confirmed to be bound by assumptions employed in the analysis of record or a Cycle 15 specific analysis was performed, which showed acceptable results as described below.

The power dependent control rod insertion limits have been established to ensure adequate shutdown margin during normal operations. The moderator temperature coefficient has been confirmed to comply with the Technical Specification requirements and the Cycle 15 reload fuel is consistent with the assumptions employed in the reload criticality safety analysis.

The Cycle 15 core configuration does not require any changes to plant equipment. The initiators to accidents previously evaluated in the LBD are not affected and the probability of an accident is not increased due to the Cycle 15 core.

The potential for misloaded fuel pellet is described in the SAR 15.1.15.1.1. The SAR credits the extensive quality control and manufacturing surveillance programs as sufficient to preclude the possibility of manufacturing an assembly with misloaded fuel pellets. Westinghouse has performed an assessment of the probability of incorrectly loaded fuel pellets not being detected in a completed fuel assembly after the deliberate placement of off-enrichment pellets in the manufacture of fuel for Cycle 15. This assessment determines the probability to be the same as before the event so the assessment in the SAR remains applicable to Cycle 15.

Reload Assembly Design

The Batch T reload fuel assemblies satisfy the fuel assembly mechanical structural design criteria [SAR 4.2.1] for the normal operating and upset conditions, emergency conditions, and faulted conditions. The Cycle 15 fuel performance has been evaluated and all design criteria were confirmed to be met. The Cycle 15 burnup will be well within the ANO-2 and industry experience base. Quality control procedures assure that the probability of erroneous placement or orientation of fuel assemblies in the core will not be increased. As discussed earlier, the probability of

a fuel handling accident [SAR 15.1.23] or the probability of CEA misoperation [SAR 15.1.3] will not be increased.

No changes to the plant equipment or any significant changes to operating procedures are required for Cycle 15 due to the Batch T reload assembly design. No impact to any accident initiator occurs due to the Cycle 15 fuel. Therefore, the probability of an accident previously evaluated in the SAR will not be increased due to the Cycle 15 core loading changes.

Thermal Hydraulic Analysis

The probability of an accident evaluated in the SAR will not increase due to the change in the thermal hydraulic design of the core for Cycle 15. The lower core average heat flux and increased core coolant flow are not related to any accident precursor.

Transients

CEA Ejection

The proposed change is limited to the justification of higher predicted excore decalibration values during the CEA ejection event for Cycle 15. With respect to the CEA ejection event, excore decalibration is defined as the percent difference between minimum excore power and the average excore power when a trip occurs during a CEA ejection event. As such, the excore decalibration values have nothing to do with the accident initiation and this question can be answered negatively.

MSLB

The Cycle 15 operating conditions for the MSLB evaluation remains unchanged from the previous RSG evaluation such that accident initiators remain unaffected. Therefore, the probability of a MSLB accident previously evaluated in the SAR will not be increased for Cycle 15 operation.

COLR Change

The change to the COLR described above will ensure that the unit is operated during Cycle 15 in a manner that is consistent with the assumptions used in the safety analyses for Cycle 15. The appropriate actions required if these limits are violated are in the Technical Specifications and are not being changed. The breakpoint in the COLR MTC is not an accident initiator and has no impact on the initiating events of any accident previously evaluated in the SAR.

In conclusion, based on the above discussion of changes due to the Cycle 15 reload core and the associated analyses results, the probability of an accident previously evaluated in the ANO-2 SAR will not be increased.

2. Will the consequences of an accident previously evaluated in the SAR be increased?

No

Cycle 15 Core Neutronics and Fuel Management

The Cycle 15 fuel management design changes have been explicitly incorporated in the neutronics models. The core thermal-hydraulic effects of the replacement steam generators have also been accounted for in these models. The effects of an extended refueling outage have been appropriately considered. The cycle 15 PAC was evaluated based on the Cycle 15 specific core performance. All parameters were confirmed to be bound by assumptions employed in the analysis of record or a Cycle 15 specific analysis. The consequences of events evaluated on a cycle specific basis are addressed below. The consequences of events bound by the analysis of record are not increased due to Cycle 15 neutronics or fuel management.

The current fuel storage criticality analysis has been confirmed to be applicable to Batch T reload fuel. The current storage and handling criteria preclude criticality during normal and postulated events, so the consequences are not affected.

Reload Assembly Design

The mechanical design of the Batch T and Batch S reload fuel bundle assemblies are identical. The thermal performance of composite fuel rods that envelop the fuel rods of the fuel batches present in ANO-2 Cycle 15 has been evaluated and found to be acceptable. The Cycle 15 burnup will be well within the ANO-2 and industry experience base. No change in clad barrier performance will occur. The maximum cladding plastic strain will remain below 1.0% within the anticipated fuel assembly burnup, and fuel melt will continue not to occur.

Additional fuel performance analyses were performed to show that the gadolinia rods are bounded by the urania rods with respect to rod internal pressure, fuel centerline temperature, and power–to–melt criteria. The fuel rod internal pressure remains below the nominal operating system pressure for the projected Cycle 15 maximum burnup. The cold internal rod pressure was calculated to remain below the NRC Regulatory Guide 1.25 value of 1200 psig. The number of fuel pins that will fail during a fuel handling accident will not be more than the present analyzed pin failures. Therefore, consequences of a dropped bundle accident [SAR 15.1.23] are also not increased. Adequate shoulder gap is predicted for all of the batches of fuel in Cycle 15. The chemical and metallurgical performance of the Batch T fuel will be similar to the Batch S and Batch R fuel. As such, no change will occur in the radiological release rate/duration, no new release mechanisms can be postulated, and no impact will occur to any radiation release barriers. Therefore, the

consequences of any accident previously evaluated in the SAR will not be increased because of the use of Batch T fuel assemblies.

Thermal Hydraulic Analysis

The consequences of an accident previously evaluated in the SAR will not increase due to the changes in the thermal hydraulic design of the core for Cycle 15. The lower core average heat flux and increased core coolant flow have been evaluated to show that the current DNBR limit applies for Cycle 15. Together with the safety analyses, the thermal hydraulics analysis demonstrates that the DNB related acceptance criteria for anticipated operational occurrences will be met for Cycle 15; hence, there is no increased potential for fuel failure and increased dose consequences due to these changes. For accidents other than anticipated operational occurrences, the improved margin to DNB during normal operation due to lower core average heat flux and increased core coolant flow, will not produce more adverse accident results.

Transients

CEA Ejection

The higher predicted excore decalibration during a Cycle 15 CEA ejection will not increase the consequences of the accident. With respect to the CEA ejection parameters, the reload report states: "The results of the fast-trip CEA ejection cases are not highly sensitive to excore decalibration since the power prompt-jumps above the credible trip setpoint. Due to the limited impact of these parameters on the CEA ejection Fq limits and the significant margin available to those limits in Cycle 15, these [decalibration] parameters were judged to be acceptable for ANO-2 Cycle 15. This judgement is consistent with the actions outlined in the EPAC for these parameters." The analysis of record for this event was determined to remain bounding. Therefore, the consequences of this accident previously evaluated in the ANO-2 SAR will not be increased.

MSLB

The Cycle 15 accident conditions for the MSLB remain unchanged from the previous RSG evaluation in regard to off-site dose consequences. Slightly increased post-trip reactivity, power level, and minimum DNBR do not result in fuel failure. In the absence of fuel failure, the Technical Specification limits on primary and secondary activity become the primary contributors to offsite dose. The current Technical Specifications limit the primary and secondary activity and this limitation remains unchanged. In addition, no physical plant changes are being made from the earlier RSG evaluation, which will ensure no increase in the off-site dose

consequences for a MSLB. The dose consequences remain well within the guidelines of 10CFR100 and are essentially unchanged and the consequences of this accident are not increased beyond the licensed limits. Therefore, the consequences of an accident previously evaluated in the SAR will not be increased.

COLR Change

The change to the COLR will ensure that the unit is operated during Cycle 15 in a manner that is consistent with the assumptions used in the safety analyses for Cycle 15. The actions required if these limits are violated are in the Technical Specifications and are not being changed. Changing the breakpoint used for switching to a less positive MTC will not result in a change to the evaluated consequences of the accident. The analyses for the reload has been performed with NRC approved methodologies to ensure that the SAFDLs will not be violated and the dose consequences are bounded by the results in the licensing basis analyses.

In conclusion, based on the above discussion of changes due to the Cycle 15 reload core and the associated analyses results, the dose consequences of any accidents previously evaluated in the ANO-2 SAR will not be increased.

3. Will the probability of a malfunction of equipment important to safety be increased?

No

Cycle 15 Core Neutronics and Fuel Management

The Cycle 15 reload core has similar reactivity performance as previous cycles. The critical Boron levels, reactivity coefficients and power distributions are consistent with cycle-to-cycle variations. The introduction of the Cycle 15 reload fuel will not require equipment important to safety to be operated in a different manner or with a higher duty. Therefore the probability of a malfunction of equipment important to safety is not increased due to the introduction of the Cycle 15 core.

Reload Assembly Design

The Batch T assemblies are materially, dimensionally, and structurally the same as previous fuel design used in Cycle 14. No changes in the assumptions concerning equipment availability or failure modes are made. Therefore, there is no increase the probability of a malfunction of any equipment important to safety.

Thermal Hydraulic Analysis

The probability of a malfunction of equipment important to safety will not increase due to the changes in the thermal hydraulic design of the core for Cycle 15. The lower core average heat flux and increased core coolant flow have been evaluated to show that the current DNBR limit applies for Cycle 15. The Cycle 15 core is similar to past cores and does not alter plant operation such that equipment important to safety will be affected.

Transients

CEA Ejection

With respect to the CEA ejection accident, equipment important to safety consists of components related to the high linear power trip and CPC DNBR (VOPT) trip functions of the Plant Protection System, which initiate reactor shutdown. The manner in which this equipment important to safety is operated is not changed. Excore decalibration is simply a measure of detector response to cycle specific core conditions. The higher decalibration predicted for Cycle 15 is a function of the Cycle 15 core design and in no way degrades or changes the ability of equipment important to safety to perform their functions.

MSLB

The Cycle 15 operating conditions for the MSLB evaluation remain unchanged such that the licensing basis limits for the SAFDL on peak LHGR and DNBR remain bounding. In addition, no physical plant changes are being made from those previously analyzed in the RSG evaluation. Therefore, the probability of a malfunction of equipment important to safety will not be increased.

COLR Change

The change to the COLR affects only the operational limits and ensures that the core is operated consistent with the assumptions used in the analyses. The change described above does not involve any changes in equipment. This change will not alter the manner in which the unit is operated or the function and duty of the equipment important to safety. The change does not affect the initiators to any event defined in the SAR.

In conclusion, based on the above discussion of changes due to the Cycle 15 reload core and the associated analyses results, the probability of a malfunction of equipment important to safety will not be increased.

4. Will the consequences of a malfunction of equipment important to safety be increased?

No

Cycle 15 Core Neutronics and Fuel Management

The Cycle 15 fuel management design changes have been explicitly incorporated into the neutronics models. The core thermal-hydraulic effects of the replacement steam generators have also been accounted for in these models. The effects of an extended refueling outage have been appropriately considered. The cycle 15 PAC was evaluated based on the Cycle 15 specific core performance. All parameters were confirmed to be bound by assumptions employed in the analysis of record or a Cycle 15 specific analysis. The consequences of events evaluated on a cycle specific basis are addressed below. The consequences of events bound by the analysis of record are not increased due to Cycle 15 neutronics or fuel management.

The current fuel storage criticality analysis has been confirmed to be applicable to Batch T reload fuel. The current storage and handling criteria preclude criticality during normal and postulated events, so the consequences are not affected.

Reload Assembly Design

The Batch T assemblies are materially, dimensionally, and structurally the same as previous fuel design used in Cycle 14. In addition, the cold internal pressure of the Cycle 15 fuel rods will continue to be limited to below 1200 psig. As such, no change will occur in the radiological release rate/duration, no new release mechanisms can be postulated, and no impact will occur to any radiation release barriers. The Cycle 15 burnup will be well within the ANO-2 and industry experience base. No change in clad barrier performance will occur. The maximum cladding plastic strain will remain below 1.0% within the anticipated fuel assembly burnup, and fuel melt will continue not to occur.

No changes in the assumptions concerning equipment availability or failure modes are made. Therefore, there is no increase in the consequences of a malfunction of any equipment important to safety.

Thermal Hydraulic Analysis

The consequences of a malfunction of equipment important to safety will not increase due to the changes in the thermal hydraulic design of the core for Cycle 15. The lower core average heat flux and increased core coolant flow have been evaluated to show that the current DNBR limit applies for Cycle 15. Since the core

thermal hydraulic response to accidents has not changed, the analyzed accident sequences, including the consequences of a malfunction of equipment important to safety, are unaffected by these changes.

Transients

CEA Ejection

The higher excore decalibration factors do not change the failure mechanism for any equipment important to safety. For Cycle 15, the difference between minimum and average excore power at the time of trip will be larger. However, the power peaking that exists in the core will be substantially less. The amount of energy deposited in the fuel will be less than or equal to the amount currently analyzed for. The consequences of a malfunction in equipment important to safety then, are no worse than existed previously.

MSLB

The Cycle 15 operating conditions for the MSLB remains unchanged in regard to off-site dose consequences. The current Technical Specification limits on primary and secondary activity remain unchanged and in combination with no physical plant changes will ensure no increase in the off-site dose consequences for a MSLB. Therefore, the consequences of a malfunction of equipment important to safety will not be increased.

COLR Change

The change described above does not require any changes to the assumptions concerning equipment availability or failure modes. The change does not involve any changes in equipment. In addition, the change does not impact negatively the overall function or duty of the equipment important to safety. This change will not result in a change to the evaluated consequences of the accidents, which also included consideration of all relevant equipment malfunctions.

In conclusion, based on the above discussion of changes due to the Cycle 15 reload core and the associated analyses results, the consequences of a malfunction of any equipment important to safety will not be increased.

5. Will the possibility of an accident of a different type than any previously evaluated in the LBD be created?

No

Cycle 15 Core Neutronics and Fuel Management

The Cycle 15 reload core has similar reactivity performance as previous cycles. The critical Boron levels, reactivity coefficients, and power distributions are consistent with cycle-to-cycle variations. The introduction of the Cycle 15 reload fuel will not require the use of new equipment or equipment to be operated in a different manner. Therefore the introduction of the Cycle 15 core does not create the possibility of an accident of a different type.

Reload Assembly Design

The fuel performance of the Guardian and non-Guardian fuel designs at the Cycle 15 burnups has been evaluated using U.S. NRC approved codes (FATES3B), and all design criteria were confirmed to be met. The Cycle 15 burnup will be well within the industry experience base. No new equipment is required and there is no change to the way in which the plant is operated. No changes in the failure modes of the equipment important to safety were assumed. No initiators to any of the accidents are impacted. Therefore an accident of a different type than previously evaluated will not be created by the Batch T assemblies.

Thermal Hydraulic Analysis

The possibility of an accident of a different type than any previously evaluated in the SAR is not created by the changes in the thermal hydraulic design of the core for Cycle 15. The Cycle 15 core is similar to past cores and does not alter the operation or the required configuration of the plant. As such, no new accident initiators will be created due to the thermal hydraulic changes for Cycle 15.

Transients

<u>CEA Ejection</u>

The circumstances of the CEA ejection event are largely unchanged from those previously evaluated. The amount of excore detector decalibration is an integral component of the CEA ejection analysis, but has only limited impact. Improved margins in other parameters important to this analysis are such that the current analysis of record remains clearly bounding. Initiators and consequences are unchanged, therefore no new type of accident is created.

MSLB

The Cycle 15 operating conditions for the MSLB and the physical plant conditions remain unchanged or bounded by previous analysis. This ensures that the consequences considered by previous analyses remain bounding. Therefore, the possibility of an accident of a different type than any previously evaluated in the SAR is not created.

COLR Change

The change to the COLR will ensure that the unit is operated during Cycle 15 in a manner that is consistent with the assumptions used in the Cycle 15 safety analyses. The change does not create an additional failure mode than what has already been analyzed. No initiators to any of the accidents are impacted by this modification. No new operating conditions or plant configurations are created that could lead to an accident of a different type than any previously evaluated in the SAR.

In conclusion, based on the above discussion of changes due to the Cycle 15 reload core and the associated analyses results, the possibility of an accident of a different type than any previously evaluated in the ANO-2 SAR will not be created.

6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?

No

Cycle 15 Core Neutronics and Fuel Management

The Cycle 15 reload core has similar reactivity performance as previous cycles. The critical Boron levels, reactivity coefficients and power distributions are consistent with cycle-to-cycle variations. The introduction of the Cycle 15 reload core does not require equipment to be operated in a different manner. The introduction of the Cycle 15 reload core does not create the possibility of a malfunction of equipment important to safety of a different type.

Reload Assembly Design

There is no new equipment associated with the use of Batch T fuel. No new systems or substructures are involved. The changes will not alter the way in which the plant operates. No changes in the failure modes of the equipment important to safety were assumed in the Cycle 15 analyses. Therefore, the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated will not be created.

Thermal Hydraulic Analysis

The possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR is not created by the changes in the thermal hydraulic design of the core for Cycle 15. The lower core average heat flux and increased core coolant flow do not alter the operation or the required configuration of the plant. Since no new accident initiator has been created, and the consequences of existing analyzed accidents are unaffected, no new equipment is required for mitigation of an event; thus, the possibility of a malfunction of equipment important to safety of a different type than previously evaluated is not created.

Transients

CEA Ejection

The change in relationship between minimum and average excore power level during a CEA ejection accident is a result of a slightly different core design. The operating characteristics, failure mechanisms, and reliability of equipment important to safety are unchanged. The conditions of a CEA ejection accident are

not significantly different from those previously analyzed. Existing failure analyses continue to be bounding.

MSLB

The proposed SAR change involves an accident initiator/failure that has already been considered in the SAR. This ensures that the malfunctions considered by previous analyses remain bounding. Therefore, the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR is not created.

COLR Changes

No changes in the failure modes of the equipment important to safety are assumed in the change to the COLR described above. No initiators to any of the accidents are impacted. No new operating conditions or plant configurations are created that could lead to a malfunction of equipment of a different type than any previously evaluated in the SAR.

In conclusion, based on the above discussion of changes due to the Cycle 15 reload core and the associated analyses results, the possibility of malfunction of equipment important to safety of a different type than any previously evaluated in the ANO-2 SAR will not be created.

7. **Will the margin of safety as defined in the basis for any technical specification be reduced?**

No

Cycle 15 Core Neutronics and Fuel Management

The Cycle 15 fuel management design changes have been explicitly incorporated in the neutronics models. The core thermal-hydraulic effects of the replacement steam generators have also been accounted for in these models. The effects of an extended refueling outage have been appropriately considered. The core has been appropriately modeled using U.S. NRC approved methods. The Cycle 15 Physics Assessment Checklist was evaluated based on the Cycle 15 specific core performance. All parameters were confirmed to be bound by assumptions employed in the analysis of record or a Cycle 15 specific analysis. Events that are evaluated on a cycle specific basis are addressed below. The margin of safety for events bound by the analysis of record are not reduced due to fuel management changes.

The current fuel storage criticality analysis has been confirmed to be applicable to Batch T reload fuel. The criticality analysis demonstrated that fuel stored consistent with the technical specification limits will maintain a k-effective of 0.95 in the spent fuel racks, containment temporary storage racks and fuel carrier under all conditions. The analysis of the new fuel vault demonstrates that fuel will maintain a k-effective below 0.95 during normal conditions and below 0.98 under optimum moderation conditions. Since these analysis remain applicable to the Batch T fuel the margin of safety is not decreased.

Reload Assembly Design

The fuel performance of the fuel designs at higher Cycle 15 burnups has been evaluated using U.S. NRC approved codes (FATES3B), and all design criteria were confirmed to be met. The maximum cladding plastic strain will remain below 1.0% within the anticipated fuel assembly burnup, and fuel melt will continue not to occur. Therefore, the margin to safety will not be reduced due to the Batch T reload assemblies.

Thermal Hydraulic Analysis

The margin of safety as defined in the bases for any technical specification will not be reduced as a result of the change in the thermal hydraulic design of the core for Cycle 15. The Cycle 15 core, with lower core average heat flux and increased core coolant flow, has been evaluated to show that the current DNBR limit is applicable to Cycle 15 operation. The margin of safety defined by this limit in the bases of technical specifications remains unchanged.

Transients

CEA Ejection

The consequences (energy deposited in the fuel) of the Cycle 15 CEA ejection accident are bounded by or less severe than those of the current analysis of record. Therefore, any margin to the acceptance criteria that was defined would be unchanged or increased, rather than decreased. Specific values for the amount of excore decalibration assumed in the CEA ejection analysis are not detailed in the basis for any Technical Specification.

MSLB

The reactor fuel peak LHGR and DNBR will be maintained within the previously established SAFDL and thus maintain the margin of safety. Therefore, the margin of safety as defined in the basis for plant technical specifications will not be reduced by the proposed change. In addition, the fuel fission product barriers will not be adversely impacted based on maintaining the SAFDL for the fuel.

COLR Change

The change to the COLR described above will ensure that the unit is operated during Cycle 15 in a manner that is consistent with the conservative assumptions used in the Cycle 15 safety analyses. The analyses were performed consistent with the requirements of Technical Specifications and COLR limits and demonstrate that acceptance limits approved by the NRC are not exceeded. The change described above does not modify the limits or the margin to the limits since a specific value for the MTC breakpoint is not described in the bases of the Technical Specification. The results of the reload analyses that utilized the COLR limits were found to be acceptable with respect to the margin described in the bases for these specifications. The COLR limits assure that SAFDLs are not violated for AOOs and the effects of accidents are within acceptable limits.

In conclusion, based on the above discussion of changes due to the Cycle 15 reload core and the associated analyses results, the margin of safety as defined in the bases for any ANO-2 Technical Specification (including the NRC submittal) will not be reduced.

6

FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 003-04-0

Document No. 98-R-2005-03, Rev. 1 Rev./Change No. 0

Title ANO-2 CYCLE 15 RELOAD ANALYSIS REPORT

Brief description of proposed change:

Implement required changes to the LBDs to support the Cycle 15 operation with the redesigned core documented in the Reload Analysis Report (additional description is given in the following pages.)

Will the proposed Activity:

1. Require a change to the Operating License including:
   - Technical Specifications (excluding the bases)? Yes☐ No☒
   - Operating License? Yes☐ No☒
   - Confirmatory Orders? Yes☐ No☒
2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:
   - SAR (multi-volume set for each unit)? Yes☒ No☐
   - Core Operating Limits Report? Yes☐ No☒
   - Fire Hazards Analysis? Yes☐ No☒
   - Bases of the Technical Specifications? Yes☐ No☒
   - Technical Requirements Manual? Yes☐ No☒
   - NRC Safety Evaluation Reports? Yes☐ No☒
3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒
4. Result in a potential impact to the environment? (Complete Environmental Impact Determination of this form.) Yes☐ No☒
5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒
6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6? Yes☐ No☒
7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7?
   - QAPM? Yes☐ No☒
   - E-Plan? Yes☐ No☒
8. Does this review depend on future NRC approval of other actions? (NRC SER, Relief, etc)? (forward change to PSC per 6.3.8 or 6.3.9) Yes☐ No☒

Document No. 98-R-2005-03 REV. 1 Rev./Change No. 0

Basis for Determination (Questions 1, 2, & 3):

See attached discussion.

☐ Proposed change does not require 10CFR50.59 Evaluation per Attachment 1, Item # ____. (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in questions 1, 2 and 3. If search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document Section

LRS: 50.59 – Unit 2, ALL (See attached for keywords)

MANUAL SECTIONS: See attached.

FIGURES: See attached.

John Thomas Sankoorikal — Certified Reviewer's Signature

John T. Sankoorikal — Printed Name

10/30/00 — Date

Reviewer's certification expiration date: 8/4/02

Assistance provided by:

Printed Name	Scope of Assistance	Date

Search Scope Review Acceptability (NA, if performed by Technical Reviewer per 1000.006)

Daniel W. Fouts — Certified Reviewer's Signature

Daniel W. Fouts — Printed Name

10/30/00 — Date

ENVIRONMENTAL IMPACT DETERMINATION (UNIT 1 and UNIT 2)

Document No. 98-R-2005-03, Rev. 1 Rev./Change No. 0

Complete the following Determination. If the answer to any item below is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

Document	Section
LRS:	
50.59, ANO-2	ALL (core loading, core map, Cycle 14, "13" w/10 cycle, "sub-batch", (R3 or R4) w/10 assembly, fuel management, redesign*, "AKR419", "AKR313", reload*, "4.3-1" w/10 figure)
MANUAL SECTIONS:	
ANO-2 SAR	(4tc, 4.1, 4.2, 4.3, 4.4, 4.7, 6.2, 6.3, 6.7, 9.1, 9.3, 9.7, 14.1, 15.1, 15.3)
ANO-2 COLR/TRM	ALL
ANO-2 SER	Amendment 024, 026, 032, 048, 077, 111, 139, 156, 164, 186, 197, 202, 205, 213; NSE – 13.1, 15.1
FIGURES:	
ANO-2 SAR	All Chapter 4.3 Figures.

SUPPLEMENTAL INFORMATION

PSC concurred with the 10CFR50.59 Review for Revision 0 of the ANO-2 Cycle 15 Reload Analysis Report (RAR) and the Core Operating Limits Report (COLR) on 9/14/00 (FFN # 00-103). Two PSC Action items were assigned at the PSC meeting for contingency items in the above 50.59. PSCA-00-097-01 was to verify PSC approval of ER980642D210, Steam Generator Replacement Project Design/Qualification, prior to fuel load. ER 980642D210 was approved by the PSC on 9/26/00 (FFN # 00-124). PSCA-00-097-02 was to verify NRC approval of Tech Spec Change 2CAN119901 prior to Mode 5. NRC has issued the SER for Amendment # 222 approving TS change 2CAN119901, which was received on October 2, 2000. Responses to close out the above two action items were provided to the PSC.

During the 2R14 core-offload Entergy personnel reported bubbles coming from the fuel assembly AKR419, which indicated a potential fuel pin leak. The assembly was scheduled for reload into the core for Cycle 15 operation. Entergy decided to replace the assembly with a similar assembly. Assembly AKR313, originally scheduled for discharge from Cycle 14, is a close match to the above assembly and will replace AKR419. Both are twice-burned assemblies. The burnup and k_∞ values for these assemblies are within 1.4% of the respective values. The close match of these assemblies would allow replacement of the single AKR419 assembly without significantly disturbing the symmetry of the core design. An evaluation (Ref. 1) was performed to verify the adequacy of the redesign and the results are summarized in reference 2.

Reference 2 points out that in general, the behavior of a core design is dominated by the location of the fresh fuel assemblies. The twice-burned fuel assemblies located on the core periphery do not play a large role in characterizing the core. Therefore, as long as power distributions remain similar, replacing one twice-burned fuel assembly located on the core periphery with a similar assembly will not invalidate the safety or setpoint analyses.

The evaluations performed in reference 1 compared coarse-mesh and fine-mesh radial power distributions, peaking factors (Fr, Fxy, Fq, Fz), and peaking/burnup related PAC parameter assessments for the ANO-2 Cycle 15 redesigned core to the original Short Endpoint (SEP) design depletion and to the original asbuilt depletion. The results of these comparisons confirm that the redesign has a minimal impact on the power distributions and peaking parameters. As expected, the differences relative to design and original asbuilt, although small, are largest at BOC and gradually decrease with increasing cycle burnup. This is typical behavior, as small differences tend to anneal out with increasing burnup.

The redesigned core power distributions are generally within 1.3% of the SEP Design depletion power distributions and within 0.2% of the original asbuilt depletion power distributions. The cycle maximum peaking factors for the redesigned core are still bounded by those from the design depletion. The differences are smaller if only those assemblies within 90% of the core maximum RPD (Relative Power Density) or 1-pin peak are considered. As expected the largest power distribution differences occur at BOC-15 at full core location 26 where the replacement assembly is situated in Cycle 15. The assembly box power in this location drops 2.9% and the assembly 1-pin peak drops 1% relative to the original asbuilt power distribution. These larger differences, however, are very localized, and are due to the slightly higher burnup and lower k_∞ of the replacement assembly AKR313 relative to AKR419.

The replacement of fuel assembly AKR419 with AKR313 in full core location 26 will not have a significant effect on the indicated core tilt. The small impact (less than 3%) of the replacement assembly on the relative power density in the assembly and the even smaller (less than 0.25 %) in the nearest instrumented assembly minimizes the effect of the asymmetric assembly replacement on core tilt indication. With the current incore instrument locations and tilt group structure, this effect is limited to ~0.05% increase in indicated tilt.

As mentioned earlier, the replacement assembly (AKR313, a sub-batch R3 assembly) to be used was originally planned for discharge from Cycle 14. This assembly is mechanically the same and similar in neutronic behavior to the assembly that was to be used (AKR419, a sub-batch R4 assembly). The safety and setpoint analyses will remain valid for the redesigned core. Reference 2 concludes that all the reload deliverable products (including design analyses, the PAC assessment, Final RAR, and COLSS/CPCS setpoints) are still applicable to the ANO-2 Cycle 15 redesigned core, except for the full core load map and select RAR text, tables and figures discussed below.

The following tables and figures in Revision 0 of the ANO-2 Cycle 15 RAR are being revised to reflect the Cycle 15 redesign (Ref. 3).

Table 1-1, Core Loading

Table1-1 presents the revised core loading for ANO-2 Cycle 15. Table 1-1 was revised by adding one Batch R3 fuel assembly and removing one Batch R4 fuel assembly from the core complement. The number and types of fuel pins were adjusted accordingly. Note that the total number of Gd_2O_3 rods is reduced by four. Since no Batch R3 (e.g. AKR313) fuel assemblies were originally in the Cycle 15 core design, the Batch R3 design information was obtained from the Cycle 14 RAR.

Figure 1-2, Cycle 15 Core Map

The revised full core load map for ANO-2 Cycle 15 is identical to the original map with one exception. In full core location 26 (B-4), assembly AKR419 has been replaced with assembly AKR313.

Figure1-3, Quarter Core (QC) Fuel Management Scheme

Figure 1-3 presenting the quarter core fuel management scheme is identical to the original figure with one exception. A note, "In Full core, QC Location 15 in NW Quadrant (FC Location 26) contains R3 instead of R4," has been added at the bottom of the figure to clarify the fact that the redesigned core is asymmetric. Three of the four core quadrants are unchanged from the original fuel management

pattern. The results for the quarter core with an R4 sub-batch assembly are shown in various figures in the RAR. These figures are also a reasonable representation of the results with the replacement assembly in one of the QC locations and therefore, the specific results for the quadrant with the AKR313 assembly are not given in the RAR.

Required SAR changes to incorporate the above Table and Figures will be addressed in this 50.59 and will require an evaluation.

BASES FOR DETERMINATION

1. Require a change to the Operating License:

1(a)	**Require a change to the ANO-2 Technical Specifications?**	**No**
1(b)	**Require a change to the ANO-2 Operating License?**	**No**
1(c)	**Require a change to the ANO-2 Confirmatory Orders?**	**No**

The Technical Specification documents do not contain the level of detail with regard to information about a specific type of assembly to be used for reload. The replacement assembly is an assembly from Cycle 14 that was originally intended to be discharged and is similar to the assembly that was to be used. The results of the redesign with the replacement fuel assembly documented in the revised Cycle 15 RAR are consistent with or conservative to the information presented in the Operating License documents. There are no changes required to the ANO-2 Technical specifications, Operating License, or the Confirmatory Orders to support the operation of the Cycle 15 core with the replacement assembly.

2. Require a change to SAR documents:

2(a, b) Result in information in the ANO-2 SAR or COLR being no longer true or accurate or violate a requirement stated in the document? Yes

The redesigned core uses a similar assembly (AKR313) to replace AKR419 in one of the quarter cores. The other quarter core locations will contain a sub-batch R4 assembly as originally designed. Information presented in Revision 1 of the ANO-2 Cycle 15 RAR includes information for the redesigned core. This will impact some of the information already incorporated into Chapter 4 of the SAR via Revision 0 of the RAR, which was reviewed and concurred by PSC (FFN # 00-103). Conclusions

provided in Revision 0 of the RAR will remain unchanged. There are no changes required to SAR Chapter 15 or the COLR. Operating limits provided in Revision 0 of the ANO-2 Cycle 15 COLR will remain valid for the Cycle 15 operation. Incorporation of information into the SAR will require a 10CFR50.59 evaluation. LDCRs have been prepared for these changes.

2(c, d, e, f) Result in information in the Fire Hazards Analysis, Bases of the Technical Specifications, Technical Requirements Manual, or ANO-2 SERs being no longer true or accurate or violate a requirement stated in the document? **No**

The specific results of the reload analyses with the replacement assembly are beyond the scope of the FHA or TRM. Therefore, no changes to the FHA or the TRM are required to support the operation of the Cycle 15 core.

The results of the reload analyses with the replacement assembly are within the requirements for operating the Cycle 15 core as referenced or described in the bases of the ANO-2 Technical Specifications. The reload analyses do not invalidate any information presented in the TS Bases. Therefore, no changes are required.

The results of the reload analyses with the replacement assembly are within the requirements for operating the ANO-2 Cycle 15 core as referenced or described in the NRC SERs and do not invalidate any information presented in the ANO-2 NRC SERs.

3. Involve a test or experiment not described in the SAR? **No**

The redesigned core, using the proposed replacement assembly, was analyzed using normal reload processes. The reload analyses have been verified applicable to the redesigned core. Therefore, operation of Cycle 15 as redesigned is entirely within the scope of SAR analyses and does not constitute a test or experiment.

4. Result in a potential impact to the environment? **No**

Page 3 of this 10CFR50.59 Determination verifies that there are no potential environmental impacts as a result of operating the plant with the redesigned Cycle 15 core.

5. Result in the need for a Radiological Safety Evaluation? **No**

Operating the plant with the Cycle 15 redesigned core and the replacement assembly will not involve the processing of radioactive material outside the Auxiliary Building, Reactor Building, or the Low Level Radwaste Storage

Building. In addition, no new pathways outside of the existing monitored ventilation or drainage pathways are created by operation of the Cycle 15 core. Thus, there is no need for a radiological safety evaluation.

6. Result in any potential impact to the equipment and facilities utilized for VSC activities?
No

The loading and operation of the Cycle 15 core does not require any spent fuel Ventilated Storage Cask or related facilities. Therefore, no 10CFR72.48 evaluation is required.

7(a, b) Involve a change under 10CFR50.54 for the QAPM and E-Plan?
No

The Cycle 15 RAR describes and addresses the design, accident analyses, and performance of the ANO-2 Cycle 15 redesigned core. The specific results of the analyses are beyond the scope of the QAPM and E-Plan. Therefore, no changes to the QAPM or E-Plan are required to support the operation of the Cycle 15 core.

8 Does this review depend on future NRC approval of other actions? (NRC SER, Relief, etc)? (forward change to PSC per 6.3.8 or 6.3.9)
No

The change proposed here does not depend on future NRC approval of other actions since it does not depend on other changes that involve a TS change or a USQ submitted to the NRC. All changes required to the LBDs are addressed by this 50.59 evaluation.

REFERENCES

1. A-AN-FE-0310, Rev. 0, ANO-2 Cycle 15 – Assessment of Core Redesign.
2. AN-FE-0491, Rev. 000, ANO-2 Cycle 15 Redesign Evaluation.
3. ANO-2 Cycle 15 Reload Analysis Report, 98-R-2005-03, Rev. 1.
4. ANO-2 Cycle 15 Core Operating Limits Report, 98-R-2005-04, Rev. 0.

Document No. 98-R-2005-03, Rev. 1 Rev./Change No. 0 10CFR50.59 Eval. No. FFN#00- (Assigned by PSC)

Title ANO-2 CYCLE 15 RELOAD ANALYSIS REPORT

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1.	Will the probability of an accident previously evaluated in the SAR be increased?	Yes ☐ No ☒
2.	Will the consequences of an accident previously evaluated in the SAR be increased?	Yes ☐ No ☒
3.	Will the probability of a malfunction of equipment important to safety be increased?	Yes ☐ No ☒
4.	Will the consequences of a malfunction of equipment important to safety be increased?	Yes ☐ No ☒
5.	Will the possibility of an accident of a different type than any previously evaluated in the SAR be created?	Yes ☐ No ☒
6.	Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?	Yes ☐ No ☒
7.	Will the margin of safety as defined in the basis for any technical specification be reduced?	Yes ☐ No ☒

Please See Attached Discussion.

John Thomas Sankoorikal
Certified Reviewer's Signature

John T. Sankoorikal
Printed Name

10/30/00
Date

Reviewer's certification expiration date: 8/4/02

Assistance provided by:

Printed Name	Scope of Assistance	Date

PSC review by: _____ Date: 11/2/00

Changes being incorporated by this evaluation have been discussed in the determination section and information in that section delineates the need for this evaluation. Please refer to the determination section for a discussion of the changes and background with respect to these changes. The changes are summarized below.

- SAR changes to Chapter 4 to incorporate the results and information for Neutronics, Fuel Management, and Fuel Loading.

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1. Will the probability of an accident previously evaluated in the SAR be increased?

No

PSC concurred with the 10CFR50.59 Review for Revision 0 of the ANO-2 Cycle 15 Reload Analysis Report (RAR), the Core Operating Limits Report (COLR), and all associated SAR changes on 9/14/00 (FFN # 00-103). The change described here involves replacing assembly AKR419 with a similar assembly (AKR313) in one of the quadrants of the core. The replacement assembly is neutronically and mechanically similar to the original assembly and was scheduled to be discharged from Cycle 14. The influence of a twice-burned assembly located on the core periphery on the analysis results is very small. The results of the evaluation of the redesign showed no significant changes to the results already presented in the Revision 0 of the Cycle 15 RAR. The replacement assembly can be considered to be a close match or equivalent to the one it is replacing. The initiators to accidents previously evaluated in the LBDs are not affected and the probability of an accident is not increased due to the operation of the Cycle 15 core with the replacement assembly. Therefore, the change will not increase the probability of an accident previously evaluated in the ANO-2 SAR.

2. Will the consequences of an accident previously evaluated in the SAR be increased?

No

The 10CFR50.59 Review for Cycle 15 RAR, Rev. 0, showed that the Cycle 15 neutronics, fuel management, fuel design, thermal hydraulics, transient, and LOCA analyses do not change the assumptions or the dose consequences presented in the

SAR. Replacing one sub-batch assembly (AKR419) with a very similar assembly (AKR313) will not change any of the assumptions and will not result in a change to the evaluated consequences of accidents. There will not be any increase in fuel failures or accident consequences beyond what has already been presented. The consequences of accidents are not increased beyond the licensed limits. Therefore, the consequences of an accident previously evaluated in the ANO-2 SAR will not be increased.

3. Will the probability of a malfunction of equipment important to safety be increased?

No

The replacement assembly is a similar twice-burned discharge assembly. The Cycle 15 core with the replacement assembly will not require that equipment important to safety be operated in a different manner. There is no change to the assumptions regarding equipment availability or failure modes. This change will not alter the mode of plant operation or degrade the function of equipment important to safety. The change does not affect the initiators to any event defined in the SAR. The conclusions that were made in the 50.59 for Revision 0 of the Cycle 15 RAR remain unchanged. Therefore, the probability of a malfunction of equipment important to safety will not be increased.

4. Will the consequences of a malfunction of equipment important to safety be increased?

No

Evaluation of dose consequences for accidents or abnormal events includes consideration of all relevant malfunctions of equipment important to safety. The 50.59 for Revision 0 of the Cycle 15 RAR showed that the consequences of events are bounded by the results presented in the analyses of record. The replacement AKR313 assembly is a close match to the AKR419 assembly and will not change any of the previous conclusions regarding the consequences of equipment malfunction. No changes in the assumptions concerning equipment availability or failure modes are made. Equipment responses to accidents will remain unchanged. Therefore, the consequences of a malfunction of equipment important to safety will not be increased.

5. Will the possibility of an accident of a different type than any previously evaluated in the LBD be created?

No

The Cycle 15 reload core with the replacement assembly is similar to past cores. The replacement of one peripheral assembly does not involve circumstances significantly different from what has been already considered. The previous 50.59 for Revision 0 of the Cycle 15 RAR showed that there are no new operating conditions, plant configurations, or failure modes created that could lead to an accident of a different type than any previously evaluated in the SAR. The replacement AKR313 assembly is a close match to the AKR419 assembly and will not change any of the previous conclusions. The change will not require the use of new equipment or equipment to be operated in a different manner. No initiators to any of the accidents are impacted by this modification. Therefore, the possibility of an accident of a different type than any previously evaluated in the SAR will not be created.

6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?

No

The Cycle 15 core with the replacement assembly will not require equipment important to safety to be operated in a different manner. The change will not alter the way in which the plant operates. No changes in the failure modes of equipment important to safety were assumed in the Cycle 15 analyses. The previous 50.59 for Revision 0 of the Cycle 15 RAR showed that new accident initiators are not created, the consequences of existing analyzed accidents are not changed, and new equipment for mitigation of an event is not required. These conclusions remain unchanged for the redesigned Cycle 15 core with the replacement assembly. Therefore, the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR will not be created.

7. Will the margin of safety as defined in the basis for any technical specification be reduced?

No

The 50.59 review done for the operation of Cycle 15 core already received PSC concurrence (FFN # 00-103). All Cycle 15 safety analyses were performed with assumptions that are conservative and consistent with the requirements of Technical Specifications and COLR limits. These analyses demonstrated that acceptance

limits approved by the NRC are not exceeded and that the margin of safety for events bound by the analysis of record are not reduced. The change addressed here involves Cycle 15 operation with a replacement assembly. The core was redesigned with the replacement assembly and the changes were evaluated. The replacement assembly is very similar to the one that is being replaced. It is a twice-burned assembly originally scheduled for discharge from the core. The burnup and k_∞ for these assemblies are comparable in magnitude. Evaluation showed that the power distribution, peaking, tilt, etc. for the redesigned core are not significantly different. It can be concluded that there is no impact to the fuel performance or accident analysis results previously presented. The conclusions of the previous 50.59 review remain valid for the redesigned core. There are no other limits or margin to limits specified in the bases of the TS beyond what have already been considered. There are no specific requirements on the use of a specific assembly in the core. Therefore, the margin of safety as defined in the bases for any ANO-2 Technical Specification will not be reduced.

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FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 3 PC-1

This Document contains 6 Pages.

Document No. 975009C201 Rev./Change No. 0

Title 2T-24 Acid Tank Replacement

Brief description of proposed change:

This Commercial Change Package is issued to replace the 2T-24 Cooling Tower Acid Storage Tank and perform related changes to the Cooling Tower Acid Addition System.

The existing 2T-24 Cooling Tower Acid Storage Tank currently has leakage problems and requires replacement. To enhance gravity feed, the new tank elevation will be raised by six feet. Additionally, there are some other minor changes to the Cooling Tower Acid Addition System which will be included in this Commercial Change Package . Following is a description of the changes.

1) Removal of Existing Tank

2) Remove Heat Tracing from the Tank.

The existing heat tracing on the tank and circuitry will be removed. The heat tracing is not required and will not be reinstalled on the new tank. P & ID M-2209 sht. 1 (Unit 2 SAR Figure 10.4-1) must be revised prior to close-out to reflect the deleted heat tracing.

3) Repair of Concrete in Tank Basin

4) Modification of Concrete Tank Support Pedestals

The new tank elevation will be raised by six feet. Therefore the existing concrete tank support pedestals must be modified.

5) Raise Cooling Tower Acid Pumps

The existing Cooling Tower acid Pumps, 2P-54A and 2P-54B, will be raised by one foot. The connecting piping and supports may also require some modification.

6) Installation of New Cooling Tower Acid Tank

Install the new tank 2T-24 per the direction of the System Engineer. It is currently planned to have a tank connection for the gravity feed piping and a tank connection for the pump feed piping. The existing tank has only one connection to the tank from which both the gravity feed and pump feed lines branch off. This will require a change to P&ID M-2209, sht. 1 (Unit 2 SAR Figure 10.4-1), which must be done prior to close-out.

7) Piping and Support Changes to Accommodate the New Tank

Minor piping and piping support modifications will be required to accommodate the raised tank and raised pumps. The piping modifications include lengthening a section of domestic water piping which supplies water to the eye wash station and the safety shower.

8) Modification of the Structural Steel Platform Around the Tank

The platform around 2T-24 must be modified because the new tank will be six feet higher than the existing tank.

9) Replace the 2P-3A Cooling Tower Basin Acid Gravity Header Isolation Valve 2CW-86

This valve is degraded and requires replacement.

10) Replace Acid Tank Level Detection System

Instrument Air is supplied to the existing level indicating switch 2LIS-1203. This switch will be deleted under this Commercial Change Package and the instrument air tubing will be capped. P&ID M-2218, sht 3 (Unit 2 SAR Figure 9.3-1), shows instrument air going to 2LIS-1203 downstream of instrument air valve 2IA 5048. This drawing must be revised prior to closeout to reflect the deletion of 2LIS-1203.

11) Modification of Domestic Water Piping

Safety shower/eye wash station 2SSH-13 is located on top of the Acid Tank platform (ref. P&ID M-2212, sht. 5). The Domestic Water piping to the Safety Shower must be lengthened since the tank is being raised by six feet.

Currently there is no way to isolate the piping which supplies cooling water to the 2P3A and 2P3B Circ. Water Pump Bearings from various other domestic components such as safety showers/eye wash stations, etc. (ref. P&ID M-2212, sht. 5). In order to allow future work to be done on these domestic components without affecting the water supply to the 2P3A or B Circ. Water Pump Bearings, modification details may be provided at a later date which would allow some of the domestic components to be isolated without affecting flow to the Circ. Water Pump Bearings. If this is done, it will require a change to P&ID M2212, sht. 5 (Unit 2 SAR Figure 9.2-7).

There is a flow switch 2FS-4306 and associated local alarm 2FAH-4306 associated with safety shower 2SSH-13. 2FS-4306 has an "inactive" status in the SIMs component database. This flow switch and alarm may not be reinstalled at the discretion of the system engineer or his designee. If these components are deleted this will also be included in the change to P&ID M2212, sht. 5.

12) Miscellaneous

Other miscellaneous work on the Cooling Tower Acid Addition System may be required at the direction of the System Engineer. Details will be provided by the System Engineer as required.

Note: The Cooling Tower Acid Addition System has been designated "Commercial" equipment as documented on Form CC-1 which is included in this Commercial Change Package. The portion of Domestic Water piping which will be modified under this Commercial Change Package has not been designated as "Commercial". Therefore, a Commercial Equipment Qualification Checklist, Form CC-2, is also included in the Commercial Change Package to justify using the Commercial Change Process for this mod including the changes to the Domestic Water piping. There are no safety related components associated with this Commercial Change Package.

FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 3 PC-1

Will the proposed Activity:

1. Require a change to the Operating License including:

   Technical Specifications (excluding the bases)? Yes☐ No☒

   Operating License? Yes☐ No☒

   Confirmatory Orders? Yes☐ No☒

2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:

   SAR (multi-volume set for each unit)? Yes☒ No☐

   Core Operating Limits Report? Yes☐ No☒

   Fire Hazards Analysis? Yes☐ No☒

   Bases of the Technical Specifications? Yes☐ No☒

   NRC Safety Evaluation Reports? Yes☐ No☒

3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒

4. Result in a potential impact to the environment? (Complete Environmental Impact Determination of this form.) Yes☐ No☒

5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒

6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.7? Yes☐ No☒

7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7?

   QAMO? Yes☐ No☒

   E-Plan? Yes☐ No☒

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Document No. 975009C201 Rev./Change No. 0

Basis for Determination (Questions 1, 2, & 3):

1. The Cooling Tower Acid Addition System, and the Domestic Water and Instrument Air components included in this Commercial Change Package will not affect the Operating License in any way. The components involved in this Commercial Change Package have no safety function and the Operating License does not contain the level of detail to be affected by this change.
2. Unit 2 SAR Figure 10.4-1 (P&ID M-2209, sht. 1) must be revised to reflect the deleted heat tracing on tank 2T-24 and the revised piping configuration coming off of the tank. Unit 2 SAR Figure 9.2-7 (P&ID M-2212, sht. 5) may require revision if the piping configuration of the Domestic Water System is changed. P&ID M-2218, sht 3 (Unit 2 SAR Figure 9.3-1) must be revised to reflect the deletion of 2LIS-1203. The Circulating Water System, Instrument Air, and the Domestic Water components included in this Commercial Change, have no safety function (ref. SAR sections 10.4.5, 9.3-1 and 9.2.4). There is nothing in this Commercial Change Package other than the three SAR figures mentioned above that will cause any statement or information contained in the SAR documents to become untrue or inaccurate.
3. There are no tests or experiments as described in the SAR involved with this Commercial Change Package.

☐ Proposed change does not require 10CFR50.59 Evaluation per Attachment 1, Item # ____, (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in questions 1, 2 and 3. If a keyword search was done on LRS, "all" may be entered under "Section" with the keyword(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document	Section
LRS:	All ("cooling tower", acid tank, 2t*24, acid w/50 cooling tower, domestic water, heat trac*, freeze protect*, instrument air, circulating water)
MANUAL SECTIONS:	Unit 2 SAR Sections 9.2.4, 9.3.1, 10.4.5, 15.1.28, 15.1.34, Table 3.6-25
FIGURES:	9.2-7, 9.3-1 and 10.4-1

M. Keith Butler — Keith Butler — 1/19/98

Certified Reviewer's Signature | Printed Name | Date

Reviewer's certification expiration date: 11/21/98

CL 975009C201

FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 3 PC-1

Document No. 975009C201 Rev./Change No. 0

Assistance provided by:

Printed Name	Scope of Assistance	Date
none		

Search Scope Review Acceptability (NA, if performed by Technical Reviewer per 1000.006)

Certified Reviewer's Signature	Printed Name	Date
	John Harvey	1-20-98

ENVIRONMENTAL IMPACT DETERMINATION
(UNIT 1 and UNIT 2)

Document No. 975009C201 Rev./Change No. 0

Complete the following Determination. If the answer to any item below is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

ARKANSAS NUCLEAR ONE		
FORM TITLE: 10CFR50.59 EVALUATION	FORM NO. 1000.131B	REV. 3

10CFR50.59 Eval. No. FEN-98-007
(Assigned by PSC)

Document No. **975009C201** Rev./Change No. **0**

Title **2T-24 Acid Tank Replacement**

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1. Will the probability of an accident previously evaluated in the SAR be increased?

Yes ☐ No ☒

The changes implemented by this Commercial Change Package should increase the reliability of the Cooling Tower Acid Addition System which is used to control pH of the Circulating Water system. The new tank will greatly reduce the possibility of acid leakage. Raising the level of the tank will enhance the ability to gravity feed, and raising the acid pumps will improve the ability to maintain the pumps. The Acid Tank level indicating system will be changed from providing a control room alarm to providing local level indication only. Eliminating the control room alarm should not be a significant impact because existing pH monitoring will indicate any significant problems with the Acid Addition system. Routine tank filling operations and operator tours will ensure adequate level under normal circumstances. The Acid Addition pumps do not require cooling from the process fluid and would not be damaged if the tank was allowed to empty. Removing heat tracing should not impact the system because the freezing point of the acid which is typically used at ANO is -21 degrees F or below. Per conversations with the Acid vendor, gravity flow of the acid is achievable at all temperatures experienced in Arkansas. Therefore, the acid should be able to be added under all expected ambient temperatures for this site. The Cooling Tower Acid Addition system affects the Circulating Water System which could affect a "Loss of Condenser Vacuum" accident which is analyzed in section 15.1.28 of the SAR. Due to the overall improvements and increased reliability of the system as a result of this Commercial Change Package, the probability of this accident will not be increased.

Instrument Air currently goes to instrument 2LIS-1203 which will be deleted by this Commercial Change Package. To perform this work, Instrument Air will be isolated at or downstream of valve 2IA-5048 shown on P&ID M-2218, sht. 3. The "Loss of Instrument Air" accident is discussed in section 15.1.34 of the SAR. Since Instrument Air can be easily isolated, the probability of this accident will not be increased due to this Commercial Change Package.

2. Will the consequences of an accident previously evaluated in the SAR be increased?

Yes ☐ No ☒

All of the components involved in this Commercial Change Package are in the Cooling Tower Area of the plant and are not safety related and are not required for safe shutdown of the plant. These components do not serve any mitigating functions for any accidents or affect other equipment that performs mitigating actions. The components involved in this Commercial Change Package do not involve any barriers or affect any pathways which affect dose consequences.

3. Will the probability of a malfunction of equipment important to safety be increased?

Yes ☐ No ☒

The components involved in this Commercial Change Package are not safety related and are not required for safe shutdown of the plant. There is also no interface with any equipment important to safety in this Commercial Change Package. Therefore, the probability of a malfunction of equipment important to safety will not be increased.

4. Will the consequences of a malfunction of equipment important to safety be increased?

Yes ☐ No ☒

The components involved in this Commercial Change Package are not safety related and are not required for safe shutdown of the plant. There is no interface with any safety related equipment. Therefore, the components involved in this Commercial Change Package will not affect dose consequences associated with the malfunction of any equipment important to safety.

5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created?

Yes ☐ No ☒

The Cooling Tower Acid Addition system is part of the Circulation Water System. Failure of the Circulating Water system could initiate a "Loss of Condenser Vacuum" accident which is analyzed in the SAR. There is a portion of Instrument air involved in this change package. "Loss of Instrument Air" is also analyzed in the SAR. There is nothing being done by this Commercial Change Package which will result in a significantly different system configuration. All credible postulated failure modes from equipment involved in this Commercial Change Package are enveloped by the "Loss of Condenser Vacuum" and "Loss of Instrument Air" accidents analyzed in the SAR.

6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?

Yes ☐ No ☒

The components involved in this Commercial Change Package are not safety related and are not required for safe shutdown of the plant. There is also no interface with any safety related equipment. Therefore, there are no additional types of malfunctions to equipment important to safety beyond what was previously evaluated.

7. Will the margin of safety as defined in the bases for any technical specification be reduced?

Yes ☐ No ☒

The Technical Specifications do not establish any margin of safety associated with the equipment involved in this Commercial Change Package.

Certified Reviewer's Signature: Keith Butler — Printed Name: **Keith Butler** — Date: **1/21/98**

Reviewer's certification expiration date: **11/21/98**

Assistance provided by:

Printed Name	Scope of Assistance	Date
John Harvey	Reviewed evaluation from a system perspective	1/21/98

PSC review by: _____ Date: 1/27/98

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This Document contains 3 Pages.

Document No. CR-ANO-2-2000-0149 Rev./Change No. 0

Title ANO-2 Spent Fuel Shipping Cask Drop Dose

Brief description of proposed change:

The original dose calculations for the dose resulting from a spent fuel shipping cask (not a Ventilated Storage Cask for on site storage) erroneously calculated the dose from a cask drop event. The gap fraction was not correct and the dose was underestimated. At ANO, spent fuel is **not** shipped offsite. Furthermore, any offsite shipment in the future may have a new cask design. For those reasons, it is proposed that Table 15.1.23-2 be altered to remove the cask drop doses. A brief note at the beginning of 15.1.23.3 is proposed to read "*Currently, neither unit ships spent fuel offsite and there are no plans to do so. As such, no dropped spent fuel shipping cask accident doses are presented. However, ventilated storage cask (VSC) drop accident doses are listed in table 15.1.23-2.*"

Will the proposed Activity:

1. Require a change to the Operating License including:

   Technical Specifications (excluding the bases)? Yes☐ No☒

   Operating License? Yes☐ No☒

   Confirmatory Orders? Yes☐ No☒

2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:

   SAR (multi-volume set for each unit)? Yes☒ No☐

   Core Operating Limits Report? Yes☐ No☒

   Fire Hazards Analysis? Yes☐ No☒

   Bases of the Technical Specifications? Yes☐ No☒

   Technical Requirements Manual? Yes☐ No☒

   NRC Safety Evaluation Reports? Yes☐ No☒

3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒

4. Result in a potential impact to the environment? (Complete Environmental Impact Determination of this form.) Yes☐ No☒

5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒

6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6? Yes☐ No☒

7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7?

   QAMO? Yes☐ No☒

   E-Plan? Yes☐ No☒

8. Does this review depend on future NRC approval of other actions Yes☐ No☒

(NRC, SER, Relief, etc.)? (forward change to PSC per 6.3.8 or 6.3.9)
Document No. CR-ANO-2-2000-0149 Rev./Change No. 0

Basis for Determination (Questions 1, 2, & 3):

This effort does not change the Technical Specifications, Operating License, or Confirmatory Orders. The calculated spent fuel cask drop dose is not a part of the Tech Specs nor the TS bases or Technical Requirements Manual. Similarly the other components of the Operating License are unaffected. There are no confirmatory orders including or based upon this dose calculation. This calculation does not involve any test or experiment that is not described in the SAR. The COLR is also unaffected. The portion that is affected is a Table of Doses (15.1.23-2) in the SAR. No requirements in any of the documents are affected.

☐ Proposed change does not require 10CFR50.59 Evaluation per Attachment 1, Item # ____, (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in questions 1, 2 and 3. If search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document	Section
LRS: ANO-2 50.59 – Unit 2	All ("spent fuel cask, spent fuel container, shipping container, spent fuel shipping, export fuel cask, fuel removal, cask drop, 2.86, 0.35, shipping casks, cask drop w/50 dose")

MANUAL SECTIONS: ANO-2 SAR 15.1.23, 9.1, 4.2, 15.3, 15.4, Table 15.1.23, 2 SER 43, 2NSE 900

FIGURES: None

John Thomas Sankoorikal — Certified Reviewer's Signature
John T. Sankoorikal — Printed Name
1/30/01 — Date

Reviewer's certification expiration date: 8/4/02

Assistance provided by:

Printed Name	Scope of Assistance	Date
Chal Creese	Draft preparation	1/4/01

Search Scope Review Acceptability (NA, if performed by Technical Reviewer per 1000.006)

Daniel W. Fouts — Certified Reviewer's Signature
Daniel W. Fouts — Printed Name
1/30/01 — Date

ENVIRONMENTAL IMPACT DETERMINATION (UNIT 1 and UNIT 2)

Document No. CR-ANO-2-2000-0149 Rev./Change No. 0

Complete the following Determination. If the answer to any item below is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

FORM TITLE: 10CFR50.59 SAFETY EVALUATION	FORM NO. 1000.131B	REV. 003-04-0

This Document contains 3 Pages.33Pages

Document No. CR-ANO-2-2000-0149 Rev./Change No. 0 10CFR50.59 Eval. No. FFN #01-011 (Assigned by PSC)

Title ANO-2 Spent Fuel Shipping Cask Drop Dose

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1.	Will the probability of an accident previously evaluated in the SAR be increased?	Yes ☐	No ☒
2.	Will the consequences of an accident previously evaluated in the SAR be increased?	Yes ☐	No ☒
3.	Will the probability of a malfunction of equipment important to safety be increased?	Yes ☐	No ☒
4.	Will the consequences of a malfunction of equipment important to safety be increased?	Yes ☐	No ☒
5.	Will the possibility of an accident of a different type than any previously evaluated in the SAR be created?	Yes ☐	No ☒
6.	Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?	Yes ☐	No ☒
7.	Will the margin of safety as defined in the basis for any technical specification be reduced?	Yes ☐	No ☒

John Thomas Sankoorikal
Certified Reviewer's Signature

JOHN T. SANKOORIKAL
Printed Name

1/30/01
Date

Reviewer's certification expiration date: 8/4/02

Assistance provided by:

Printed Name	Scope of Assistance	Date
Chal Creese	Draft preparation	1/4/01

PSC review by: [signature] Date: 2/15/01

Document No. ER 980528 E201 Rev./Change No. 0

10CFR50.59 Review Continuation Page

1. **Will the probability of an accident previously evaluated in the SAR be increased?** No

There are no new systems, components, substructures, design changes, physical alterations, or operating procedure changes being proposed by these changes. The analysis results are in no way related to any accident precursor. The modification of these results will have no impact on the probability of an accident previously evaluated in the SAR. A dose calculation such as this is a result of an accident and would have no bearing on the likelihood of the accident occurring.

2. **Will the consequences of an accident previously evaluated in the SAR be increased?** No

There are no new systems, components, substructures, design changes, physical alterations, or operating procedure changes being proposed by these changes Since ANO does not ship spent fuel offsite to begin with, there is no need for shipping cask dose values in the SAR. Furthermore, should there be a renewed interest in shipping fuel offsite, it would be reasonable to assume that any new cask designs would be more likely to reduce the severity of such an accident rather than increase it. The dose will be recalculated for the cask and shown to be below acceptable limits.

3. **Will the probability of a malfunction of equipment important to safety be increased?** No

There are no new systems, components, substructures, design changes, physical alterations, or operating procedure changes being proposed or driven by dose considerations in these changes. The probability of a dose induced malfunction of equipment important to safety will not be increased. Removal of this dose from the SAR will have no effect on the likelihood of failure to any safety related system or equipment currently in use at ANO.

4. **Will the consequences of a malfunction of equipment important to safety be increased?**

No

There are no new systems, components, substructures, design changes, physical alterations, or operating procedure changes being proposed or driven by dose considerations in this change. Removal of this dose from the SAR will have no effect on any safety related system or equipment currently in use at ANO nor on the consequences of any malfunction.

5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created?

No

These SAR changes are only to delete a line of a table and add clarification; no changes have been made to the assumed plant configuration or any other dose analysis input. No plant modifications, new components, physical alterations, nor operating conditions detrimentally affecting MHA doses are being implemented by this change or are required by the revised input assumption; therefore no new accidents are created and no currently non-limiting events are becoming more limiting.

6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?

No

There are no new systems, components, substructures, physical design changes, physical alterations, nor operating procedure changes detrimentally affecting MHA doses being proposed by this change. As there are no physical changes to the plant affecting these doses detrimentally, the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR will not be created.

7. Will the margin of safety as defined in the bases for any technical specification be reduced?

No

No margin of safety is affected by this change. Since the dropped shipping cask dose describes an accident in an evolution that is not employed at ANO, there is no reduction in actual plant safety or margin of safety. Furthermore, should the evolution be employed at some future date, the analysis will be performed once again using more current data. Neither Technical Specifications nor bases is affected.

FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 003-04-0

This Document contains 3 Pages.

Document No. CR-2-96-0395, CA-06 Rev./Change No. 0

Title Evaluation of Fibrous Insulation on Valves inside ANO-2 Containment Building

Brief description of proposed change:

CR-2-96-0395, CA-06 request that: 1) Isometric drawings 2CCA-15-1, 2CCA-15-2, 2CCA-15-4, 2CCA-16-1 and 2CCA-27-3 and corresponding SAR figures be revised to indicate the presence of fibrous insulation on the bodies of valves 2CV-4651, 2CV-4652, 2CV-4654, 2CV-4824-2 and 2CVC-28B. 2) Provide 50.59 to include justification for allowing fibrous insulation to be used in the containment building. 3) Provide a list of appropriate documents, including revisions numbers and dates. This action is in support of the RCP Motor Oil Addition System CSO-2-96-0284-01.

Will the proposed Activity:

1. Require a change to the Operating License including:

   Technical Specifications (excluding the bases)? Yes☐ No☒

   Operating License? Yes☐ No☒

   Confirmatory Orders? Yes☐ No☒

2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:

   SAR (multi-volume set for each unit)? Yes☒ No☐

   Core Operating Limits Report? Yes☐ No☒

   Fire Hazards Analysis? Yes☐ No☒

   Bases of the Technical Specifications? Yes☐ No☒

   Technical Requirements Manual? Yes☐ No☒

   NRC Safety Evaluation Reports? Yes☐ No☒

3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒

4. Result in a potential impact to the environment? (Complete Environmental Impact Determination of this form.) Yes☐ No☒

5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒

6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6? Yes☐ No☒

7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7?

   QAPM? Yes☐ No☒

   E-Plan? Yes☐ No☒

8. Does this review depend on future NRC approval of other actions? (NRC SER, Relief, etc)? (forward change to PSC per 6.3.8 or 6.3.9) Yes☐ No☒

Document No. CR-2-96-0395, CA-06 Rev./Change No. 0

Basis for Determination (Questions 1, 2, & 3):

1. The ANO-2 Tech Specs, Operating License, and Confirmatory Orders do not contain information or figures affected by these changes.
2. The ANO-2 Core Operating Limits, QAMO, E-Plan, FHA, Tech Spec Basis, and SERs do not contain information or figures affected by these changes. However, ANO-2 design drawings reflected in the SAR are affected by these changes. The changes to the design drawings (piping isometrics) and their correlating SAR figures (3.6-60 sht.1, 3.6-65 sht. 3, 3.6-65 sht. 4, and 3.6-65 sht. 5) include the addition of notes indicating the existence of blanket-type fibrous insulation on several valves located inside the Steam Generator 'A' cavity. In addition, SAR Section 6.2.3.2.1 paragraph 7 discusses the presence of fibrous insulation inside the containment building and its affects on the sump and ECCS. However, the changes will not affect the SAR verbiage.
3. The presence of fibrous blanket type insulation inside the containment building and the addition of notes to the ANO-2 SAR figures indicating the presence of such insulation will not result in test or experiments not described in the SAR.

☐ Proposed change does not require 10CFR50.59 Evaluation per Attachment 1, Item # ____. (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:
List sections reviewed in the Licensing Basis Documents specified in questions 1, 2 and 3. If search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document Section

LRS: "Insulation", "Blanket", "Fibrous", "Fiberglass", "Sump", "ECCS", "RB Spray", "Recirculation", "LOCA", "HELB", "2CCA"

MANUAL SECTIONS: SAR Sections 6.2.3.2.1, 5.2.3.3; Tech Spec 3 / 4 Sections 3.5.2 and 4.5.2

FIGURES: SAR Figures: 3.6-60 sht. 1, 3.6-65 sht. 3, 3.6-65 sht. 4, 3.6-65 sht. 5

Jerry W. Howell — Jerry W. Howell — 5/8/01
Certified Reviewer's Signature — Printed Name — Date

Reviewer's certification expiration date: 4/11/02

Assistance provided by:

Printed Name	Scope of Assistance	Date
S. Rex Yazza	Research	5/8/01

Search Scope Review Acceptability (NA, if performed by Technical Reviewer per 1000.006)

William R. Rowlett, Jr. — William R. Rowlett, Jr — 5/9/01
Certified Reviewer's Signature — Printed Name — Date

9

FORM TITLE: 10CFR50.59 SAFETY EVALUATION	FORM NO. 1000.131B	REV. 003-04-0

This Document contains 1 Page.

Document No. CR-2-96-0395, CA-06 Rev./Change No. 0 10CFR50.59 Eval. No. FFN-01-0 (Assigned by PSC)

Title EVALUATE FIBROUS INSULATION ON VALVES INSIDE ANO-2 CONTAINMENT BUILDING

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1. Will the probability of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒
2. Will the consequences of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒
3. Will the probability of a malfunction of equipment important to safety be increased? Yes ☐ No ☒
4. Will the consequences of a malfunction of equipment important to safety be increased? Yes ☐ No ☒
5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒
6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒
7. Will the margin of safety as defined in the basis for any technical specification be reduced? Yes ☐ No ☒

Jerry W. Howell — Certified Reviewer's Signature

Jerry W. Howell — Printed Name

5/8/01 — Date

Reviewer's certification expiration date: 4/11/02

Assistance provided by:

Printed Name	Scope of Assistance	Date
S. Rex Yazza	Research	5/8/01

PSC review by: Michael Harris Date: 5/17/01

ENVIRONMENTAL IMPACT DETERMINATION (UNIT 1 and UNIT 2)

Document No. CR-2-96-0395, CA-06 Rev./Change No. 0

Complete the following Determination. If the answer to any item below is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

Document No. CR-2-96-0395, CA-06 Rev./Change No. 0

Title. EVALUATE THE ADDITION OF NOTES TO SAR FIGURES AND THE USE OF FIBROUS INSULATION ON VALVES INSIDE ANO-2 CONTAINMENT BUILDING

10CFR50.59 Review Continuation Page

1. Will the probability of an accident previously evaluated in the SAR be increased?

   The probability of an accident previously evaluated in the SAR will not be increased. The changes affecting the piping isometric drawings and correlating SAR figures are editorial (information) in nature only. The changes include the addition of notes indicating the existence of removable blanket-type fibrous insulation, some with metal jacketing, installed on several valves located inside the "A" steam generator cavity. The notes are being added in response to CR-2-96-0395, CA-03 and CA-06 and in support of the RCP Motor Oil Addition System CSO-2-96-0284-02 to ensure that the drawings and figures reflect the as-found conditions. In addition, the presence of fibrous insulation inside will not increase the probability of an accident previously evaluated in the SAR. Fibrous or porous insulation may be used inside the containment building as long as it is metal jacketed or located away from areas that have a high probability for oil (or any combustible liquid) contamination and labeled, identifying the locations and extent of the insulation, in accordance with Specifications ANO-M-2136 and ANO-M-2543.

   Based on the proximity of the subject fibrous insulation to the oil systems associated with the RCP motors, there are no credible scenarios that can be postulated where RCP motor oil leakage or spray could contaminate the insulation locations (Ref. CR-1-96-0567, CA-25). Modification to shield the RCP lube oil systems to minimize oil contamination of surrounding components in the event of a leak were performed during 2R12 and 2P98. In addition, pre-heatup and heatup required surveillances would help to ensure that potential fire related accidents are prevented (Ref. CR-2-96-0284, CA-06 and CA-07).

   Evaluations regarding the likelihood of fibrous blanket type insulation propagating to the containment sump and affecting its operation during a LOCA, HELB, etc. event have been documented in several calculations, engineering reports and specifications (Ref. Calc 91-D-2016-07, Rev. 2, Calc 91-D-2016-11, Rev. 0, Calc 93-E-0072-04, Rev. 0, Spec. ANO-M-2136, Rev. 9, and Spec ANO-M-2543). The conclusion drawn from the documents indicated that the transportation of fibrous insulation or any debris to the containment sump during accident conditions would not reduce the NPSH available below the requirement for a Safety Event. This conclusion is also documented in ANO-2 SAR Section 6.2.3.2.1.

2. Will the consequences of an accident previously evaluated in the SAR be increased?

   The consequences of an accident previously evaluated in the SAR will not be increased. The changes include the addition of notes to isometric drawings and correlating SAR figures to indicate the as-found insulation conditions of several valves inside the "A" steam generator cavity. They do not involve any type of accident as they are editorial (information) in nature.

   The subject insulation is encased in metal lagging or is located away from sources of oil contamination, which could result in auto ignition of the insulation. The presence of fibrous insulation inside the containment building during postulated accidents has been assessed as to its effects on the ECCS. The conclusions drawn from several engineering documents indicate that accidents resulting from the use or presence of fibrous insulation inside the containment building will not increase the probability of an accident previously evaluated in the SAR. Therefore, the off-site dose consequences will not exceed the dose projections of the original design basis calculations for ANO-2.

3. Will the probability of a malfunction of equipment important to safety be increased?

   The changes are editorial (information) in nature and are only being made to indicate the as-found insulation conditions of several valves located inside the "A" steam generator cavity. They will not impact the function of plant equipment in any way.

   As for the presence of fibrous blanket type insulation inside the containment building, evaluations have been performed to evaluate the likelihood of fibrous blanket type insulation propagating to the containment sump and affecting its operation during a LOCA, HELB, etc. events (Ref. Calc 91-D-2016-07, Rev. 2, Calc 91-D-2016-11, Rev. 0, Calc 93-E-0072-04, Rev. 0, Spec. ANO-M-2136, Rev. 9, and Spec ANO-M-2543). The conclusion drawn from the documents indicated that the transportation of fibrous insulation or any debris to the containment sump during accident conditions would not reduce the NPSH available below the requirement for a Safety Event. This conclusion is also documented in ANO-2 SAR Section 6.2.3.2.1.

   The probability of a malfunction of equipment important to safety as a result of auto-ignition of oil soaked fibrous insulation is considered minimal. The potential for excessive, uncontrolled leakage from the RCP motor lube oil systems is minimal considering leakage detection capabilities and the removal of the oil spray concern. In the unlikely event of a fire, safe shutdown components are located such that a fire on a single component would not affect the ability to achieve and maintain safe shutdown conditions. (Ref. CR-2-96-0284, CA-01 (CSO-2-96-0284-01).

4. Will the consequences of a malfunction of equipment important to safety be increased?

   The consequences of a malfunction of equipment important to safety will not be increased. The addition of information notes on the isometric drawings and correlating SAR figures will not affect any type of equipment. They are only being made to indicate the as-found insulation conditions of several valves inside the "A" steam generator cavity. They will not impact the function of plant equipment in any way.

   Based on the proximity of the subject fibrous insulation to the oil systems associated with the RCP motors, there are no credible scenarios that can be postulated where RCP motor oil leakage or spray could contaminate the insulation locations (Ref. CR-1-96-0567, CA-25). Modification to shield the RCP lube oil systems to minimize oil contamination of surrounding components in the event of a leak were performed during 2R12 and 2P98. In addition, pre-heatup and heatup required surveillances would help to ensure that potential fire related accidents are prevented (Ref. CR-2-96-0284, CA-06 and CA-07).

   The subject insulation is encased in metal lagging or is located away from sources of oil contamination, which could result in auto ignition of the insulation. The presence of fibrous insulation inside the containment building during postulated accidents has been assessed as to its effects on the ECCS and found to have no affects.

   The conclusions drawn from several engineering documents indicate that the use or presence of fibrous insulation inside the containment building will not increase the consequences (i.e., increase offsite does consequences) of a malfunction of equipment important to safety.

5. Will the possibility of an accident of a different type than previously evaluated in the SAR be created?

   The possibility of an accident of a different type than previously evaluated in the SAR will not be created. The changes are editorial (information) in nature and do not involve any type of accident. The addition of the information notes to the isometric drawings and correlating SAR figures will not affect the operation of the plant in any way.

   The presence of fibrous blanket type insulation inside the containment building will not create the possibility of an accident of a different type than previously evaluated in the SAR be created. No new initiators or failures will be created that have not been previously evaluated in the SAR. As stated above, modification to shield the RCP lube oil systems to minimize oil contamination of surrounding components in the event of a leak were performed during 2R12 and 2P98. In addition, pre-heatup and heatup required surveillances would help to ensure that potential fire related accidents are prevented (Ref. CR-2-96-0284, CA-06 and CA-07).

6. Will the probability of a malfunction of equipment important to safety of a different type than that previously evaluated in the SAR be created?

The probability of a malfunction of equipment important to safety of a different type than that previously evaluated in the SAR, as result of revisions to the SAR figures, will not be created. The changes are editorial (information) in nature and are only being made to indicate the as-found insulation conditions of several valves inside the "A" steam generator cavity. The operation of the plant is not impacted by these changes.

No new initiators or failures will be created that have not been previously evaluated in the SAR since the probability of a malfunction of equipment important to safety as a result of auto-ignition of oil soaked fibrous insulation is considered minimal. The potential for excessive, uncontrolled leakage from the RCP motor lube oil systems is minimal considering leakage detection capabilities and the removal of the oil spray concern. In the unlikely event of a fire, safe shutdown components are located such that a fire on a single component would not affect the ability to achieve and maintain safe shutdown conditions. (Ref. CR-2-96-0284, CA-01 (CSO-2-96-0284-01).

Evaluations regarding the likelihood of fibrous blanket type insulation propagating to the containment sump and affecting its operation during a LOCA, HELB, etc. event have been documented in several calculations, engineering reports and specifications (Ref. Calc 91-D-2016-07, Rev. 2, Calc 91-D-2016-11, Rev. 0, Calc 93-E-0072-04, Rev. 0, Spec. ANO-M-2136, Rev. 9, and Spec ANO-M-2543). The conclusion drawn from the documents indicated that the transportation of fibrous insulation or any debris to the containment sump during accident conditions would not reduce the NPSH available below the requirement for a Safety Event. This conclusion is also documented in ANO-2 SAR Section 6.2.3.2.1.

7. Will the margin of safety as defined in the basis for any technical specification be reduced?

The margin of safety as defined in the basis for any technical specification will not be reduced. The changes are editorial (information) in nature. The margin of safety will not be affected by the addition of information notes on the isometric drawings and correlating SAR figures. The notes or the presence of fibrous insulation inside the containment building will not affect the operation of the plant.

The subject insulation is encased in metal lagging or is located away from sources of oil contamination, which could result in auto ignition of the insulation. The presence of fibrous insulation inside the containment building during postulated accidents has been assessed as to its effects on the ECCS. The evaluation regarding the fibrous blanket type insulation has determined that the use of blanket insulation in the containment building does not reduce any margins (design, operating or safety) as defined in the basis for any technical specification.

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ARKANSAS NUCLEAR ONE		
FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 3 PC-1

Document No. CR-ANO-2-1997-0577 CA-005 Rev./Change No. N/A

Title **Revise SAR Section 10.4.4.2 Based On CR-ANO-2-1997-0577 CA-002 Response.**

Brief description of proposed change: **Remove details of SDBS Valve stroke times.**

Will the proposed Activity:

1. Require a change to the Operating License including:

   Technical Specifications (excluding the bases)? Yes☐ No☒

   Operating License? Yes☐ No☒

   Confirmatory Orders? Yes☐ No☒

2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:

   SAR (multi-volume set for each unit)? Yes☒ No☐

   Core Operating Limits Report Yes☐ No☒

   Fire Hazards Analysis? Yes☐ No☒

   Bases of the Technical Specifications? Yes☐ No☒

   Technical Requirements Manual? Yes☐ No☒

   NRC Safety Evaluation Reports? Yes☐ No☒

3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒

4. Result in a potential impact to the environment? (Complete the Environmental Impact Determination of this form.) Yes☐ No☒

5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒

6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6? Yes☐ No☒

7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7:

   QAMO? Yes☐ No☒

   E-Plan? Yes☐ No☒

Document No. CR-ANO-2-1997-0577 CA-005 Rev./Change No. N/A

Basis for Determination (Questions 1, 2 & 3):

The proposed change will remove stroke time details for the Steam Dump and Bypass System (SDBS) Valves from SAR section 10.4.4.2. This change only affects SAR section 10.4.4.2. The remaining LBDs do not describe the SDBS Valves to this level of detail. This change does not involve a test or experiment not described in the SAR. A 50.59 Evaluation is attached to address the SAR impact.

☐ Proposed change does not require 10 CFR 50.59 Evaluation per Attachment 1, Item #_____, (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in Question 1, 2 and 3. If a search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document	Section
LRS: **50.59 – Unit 2**	**ALL ("SDBS", "SDBCS", "Dump/Bypass", "Atmospheric w/5 Dump", "Steam w/5 Dump")**
MANUAL SECTIONS: **SAR**	**Sections 7.7.1.1.5, 10.3, 10.4.4. Tables: 14.1-1, 14.1-4.**
FIGURES: **SAR**	**10.2-3, 10.2-4.**

M. Tyler Bennett — Certified Reviewer's Signature

M. Tyler Bennett — Printed Name

6/15/99 — Date

Reviewer's certification expiration date: 4/16/2001

Assistance provided by:

Printed Name	Scope of Assistance	Date
N/A	N/A	N/A

Search Scope Review Acceptability (NA, if performed by Technical Review per 1000.006)

N/A — Certified Reviewer's Signature

N/A — Printed Name

N/A — Date

ENVIRONMENTAL IMPACT DETERMINATION (UNIT 1 and UNIT 2)

Document No. CR-ANO-2-1997-0577 CA-005 Rev./Change No. N/A

Complete the following Determination. If the answer to any checklist item is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

Document No. CR-ANO-2-1997-0577 CA-005 Rev./Change No. N/A

Basis for Determination (Questions 1, 2 & 3):

The proposed change will remove stroke time details for the Steam Dump and Bypass System (SDBS) Valves from SAR section 10.4.4.2. This change only affects SAR section 10.4.4.2. The remaining LBDs do not describe the SDBS Valves to this level of detail. This change does not involve a test or experiment not described in the SAR. A 50.59 Evaluation is attached to address the SAR impact.

☐ Proposed change does not require 10 CFR 50.59 Evaluation per Attachment 1, Item #_____, (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in Question 1, 2 and 3. If a search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document	Section
LRS: **50.59 – Unit 2**	**ALL ("SDBS", "SDBCS", "Dump/Bypass", "Atmospheric w/5 Dump", "Steam w/5 Dump")**
MANUAL SECTIONS: **SAR**	**Sections 7.7.1.1.5, 10.3, 10.4.4. Tables: 14.1-1, 14.1-4.**
FIGURES: **SAR**	**10.2-3, 10.2-4.**

M. Tyler Bennett — Certified Reviewer's Signature

M. Tyler Bennett — Printed Name

6/15/99 — Date

Reviewer's certification expiration date: 4/16/2001

Assistance provided by:

Printed Name	Scope of Assistance	Date
N/A	N/A	N/A

Search Scope Review Acceptability (NA, if performed by Technical Review per 1000.006)

N/A — Certified Reviewer's Signature

N/A — Printed Name

N/A — Date

ARKANSAS NUCLEAR ONE		
FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 3 PC-1

Document No. CR-ANO-2-1997-0577 CA-005 Rev./Change No. N/A

Title **Revise SAR Section 10.4.4.2 Based On CR-ANO-2-1997-0577 CA-002 Response.**

Brief description of proposed change: **Remove details of SDBS Valve stroke times.**

Will the proposed Activity:

1. Require a change to the Operating License including:

   Technical Specifications (excluding the bases)? Yes☐ No☒

   Operating License? Yes☐ No☒

   Confirmatory Orders? Yes☐ No☒

2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:

   SAR (multi-volume set for each unit)? Yes☒ No☐

   Core Operating Limits Report Yes☐ No☒

   Fire Hazards Analysis? Yes☐ No☒

   Bases of the Technical Specifications? Yes☐ No☒

   Technical Requirements Manual? Yes☐ No☒

   NRC Safety Evaluation Reports? Yes☐ No☒

3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒

4. Result in a potential impact to the environment? (Complete the Environmental Impact Determination of this form.) Yes☐ No☒

5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒

6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6? Yes☐ No☒

7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7:

   QAMO? Yes☐ No☒

   E-Plan? Yes☐ No☒

ARKANSAS NUCLEAR ONE		
FORM TITLE: 10CFR50.59 REVISION	FORM NO. 1000.131D	REV. 003-04-0

This Document contains 1 Page.

Document No. **CR-ANO-2-1997-0577 CA-005** Rev./Change No. **N/A** 10CFR50.59 Eval. No. **FFN-99-041**

Revision No. **01**

This form is to be used to document Revisions to 10CFR50.59 Evaluations. Revisions to a 10CFR50.59 Evaluation after PSC review may become necessary due to SRC review, changes to the original document, etc. Refer to section 6.2.4 of this procedure for additional guidance.

Reason for revision to 10CFR50.59 Evaluation:
50.59 Safety Evaluation Subcommittee requested revision due to: 1) the proposed SAR change not being viewed from a physical change perspective, 2) not uniquely answering the evaluation questions, and 3) not including a basis for not being an accident.

Will the proposed revision result in any additional:

1)	Change to the Operating License?	Yes ☐ No ☒
2)	Change to other Licensing Basis Document?	Yes ☐ No ☒
3)	Conduct of test or experiment?	Yes ☐ No ☒
4)	Impact to the environment?	Yes ☐ No ☒
5)	Need for a Radiological Safety Evaluation?	Yes ☐ No ☒
6)	Impact Ventilated Storage Cask Activities?	Yes ☐ No ☒
7)	Impact the QAMO or E-Plan?	Yes ☐ No ☒

If yes, describe below and take appropriate action as per initial Determination:

Indicate revisions to the 10CFR50.59 Evaluation by placing revision number at the top right hand corner of each page of the form(s). Changes should be lined through, initialed, dated and indicated with the revision number. For extensive changes, new forms may be used with revision bars in the margin denoting changes. Attach this form to front of previous 10CFR50.59 Evaluation. Return to the PSC for review.

M. Tyler Bennett
Certified Reviewer's Signature

M. Tyler Bennett
Printed Name

5/30/01
Date

Reviewer's certification expiration date: **5-15-2003**

PSC review: _____ Date: 6/7/01

ARKANSAS NUCLEAR ONE		
FORM TITLE: 10CFR50.59 EVALUATION	FORM NO. 1000.131B	REV. 003-04-0

This Document contains 3 Pages.

10CFR50.59 Eval. No. **FFN-99-041 Rev. 01**
(Assigned by PSC)

Document No. **CR-ANO-2-1997-0577 CA-005** Rev./Change No. **N/A**

Title **Revise SAR Section 10.4.4.2 To Remove Specific Stroke Times For Steam Dump & Bypass Valves**

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

Summary:

Section 10.4.4.2 of the Unit 2 SAR will be changed to remove references to specific Steam Dump and Bypass System (SDBS) Valve stroke times. The SDBS valves have modulation stroke speeds of 15 to 20 seconds from full open to full closed, and vice versa, when the valves are at system pressure with flow. Due to the "closed bias" plug design, the valves have different stroke times between "in-service" and "static" conditions under which stroke testing is performed. Under static conditions, valve stroke times range from 10 to 25 seconds.

CR-ANO-2-1997-0577 was initiated due to allowable stroke times of two SDBS Valves (Upstream Atmospheric Dump Valves) 2CV-1001 & 1051 being outside the 15 to 20 seconds as stated in SAR Section 10.4.4.2. The allowable stroke times were specified by OP-2305.005 "Valve Stroke & Position Verification", Supp. 1 "Quarterly Containment Isolation Valve Stroke Test". The difference being "static" vs. "in-service" stroke time testing. Additionally, "in-service" stroke time testing is not required and not desired due to the effect a full open/close stroke would have on plant operation.

Rev. 1 This level of detail does not need to be included in the SAR and will be removed to prevent future issues with SDBS Valve stroke time requirements with respect to the SAR. There are no stroke times credited in the accident analyses (including dose analysis) for the SDBS Valves (2CV-0301, 0302, 0303, 0305, 0306, 1001, & 1051). Operation of the SDBS valves in quick open mode (1 second) is modeled in the loss of feedwater analysis to maximize inventory loss. However, failure of the valves to open would only improve the results and the 1 second stroke time has no impact on analysis. The modulating stroke times (15 to 20 seconds) are modeled in non-Q transient analyses used to optimize feedwater and SDBS Valve controls and to establish cyclic loads for fatigue analyses of secondary components. However, minor changes in stroke times of these valves will have no significant impact on these analyses.

1. **Will the probability of an accident previously evaluated in the SAR be increased?** Yes ☐ No ☒

   SAR Chapter 15 was reviewed to identify accidents that consider SDBS Valve operation. SDBS Valve functionality and capacity are considered in the following accidents, however, valve stroke times are not considered: "Excess Heat Removal Due To Secondary System Malfunction", "Loss of External Load and/or Turbine Trip", and SGTR With And Without Concurrent Loss of AC Power". None of the accidents previously evaluated in the SAR credit specific stroke times for the SDBS Valves. SDBS Valve stroke time is not an accident initiator. None of the evaluated accidents will have increased probability within a frequency class or between a frequency class because of this proposed SAR change.

2. Will the consequences of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒

SDBS Valve capacity is considered in the accident analysis (i.e. "SGTR With And Without Concurrent Loss of AC Power" and "Loss of External Load and/or Turbine Trip") but does not credit stroke times for the valves. Therefore, the proposed SAR change does not involve a condition that mitigates an accident and has no effect on radiological release consequences.

3. Will the probability of a malfunction of equipment important to safety be increased? Yes ☐ No ☒

The SDBS Valves are not safety-related. SDBS Valve stroke time is not an accident initiator. The proposed SAR change does not directly or indirectly degrade the performance or reliability of a safety-related SSC assumed to function in the accident analysis. Therefore, there is no increase in probability of occurrence of a malfunction of equipment important to safety.

4. Will the consequences of a malfunction of equipment important to safety be increased? Yes ☐ No ☒

The proposed change will remove reference to SDBS stroke times from the SAR. SDBS Valve stroke time is not an input to the dose consequences of any accident or equipment malfunction. Therefore, the consequences of a malfunction of equipment important to safety is not increased as a result of the proposed change.

5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒

Rev. 1

The proposed change does not involve circumstances different from those considered by previous analysis. No credible accident scenarios can be created by the proposed change. Therefore, the change would not be considered capable of creating the possibility of an accident of a different type.

6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒

Removing the stroke times for the SDBS Valves from the SAR do not affect the valves themselves. The valves will function and respond as before. SAR Chapter 7 was reviewed for Failure Modes and Effects (FME) consideration. Malfunctions considered in the Chapter 7 FME are: SDBS System in off or SDBS System unable to pass steam. The proposed change does not result in any possible adverse effects or create any probable common mode/common cause failures. Therefore, the possibility of an equipment malfunction of a different type than previously evaluated is not created.

7. Will the margin of safety as defined in the basis for any technical specification be reduced? Yes ☐ No ☒

Technical Specification Bases 3/4.4.2 and 3/4.4.3 (Pressurizer Safety Valves) and 3/4.7.1.1 (Main Steam Safety Valves) assume no operation of the SDBS System and no operation of the SDBS Valve dump to condenser (loss of heat sink), respectively. SDBS stroke time is not considered in bases and do not affect system design margins or involve any fission product boundary margins. Therefore, no margin of safety defined by any technical specification bases is reduced.

ARKANSAS NUCLEAR ONE		
FORM TITLE: 10CFR50.59 EVALUATION	FORM NO. 1000.131B	REV. 003-04-0

M. Tyler Bennett — Certified Reviewer's Signature

M. Tyler Bennett — Printed Name

5/30/01 — Date

Rev. 1

Reviewer's certification expiration date: 5-15-2003

Assistance provided by:

Printed Name	Scope of Assistance	Date
N/A	N/A	

PSC review by: _____ Date: 6/7/01

II

FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 3 PC-1

This Document contains 3 Pages.

Document No. CR-2-98-0436 Rev./Change No. 0

Title Fire Hazards Analysis Update To Include Alternate Shutdown Critical Timing Actions

Brief description of proposed change:

This change will incorporate time critical actions needed to safely shutdown the unit in an alternate shutdown scenario where it is hypothesized that the control room must be evacuated and cabling associated with redundant safe shutdown components is subject to fire damage.

Will the proposed Activity:

1. Require a change to the Operating License including:
   - Technical Specifications (excluding the bases)? Yes☐ No☒
   - Operating License? Yes☐ No☒
   - Confirmatory Orders? Yes☐ No☒
2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:
   - SAR (multi-volume set for each unit)? Yes☐ No☒
   - Core Operating Limits Report? Yes☐ No☒
   - Fire Hazards Analysis? Yes☒ No☐
   - Bases of the Technical Specifications? Yes☐ No☒
   - Technical Requirements Manual? Yes☐ No☒
   - NRC Safety Evaluation Reports? Yes☐ No☒
3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒
4. Result in a potential impact to the environment? (Complete Environmental Impact Determination of this form.) Yes☐ No☒
5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒
6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6? Yes☐ No☒
7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7?
   - QAMO? Yes☐ No☒
   - E-Plan? Yes☐ No☒

FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 3 PC-1, 2

Document No. CR-2-98-0436 Rev./Change No. 0

Basis for Determination (Questions 1, 2, & 3):

1. The time critical actions do not appear in the Tech Spec, OL or confirmatory orders and are only being added to the FHA.
2. The only place that the time critical actions appear will be in the FHA.
3. This change does not affect any test or experiments not described in the SAR.

☐ Proposed change does not require 10CFR50.59 Evaluation per Attachment 1, Item #____, (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in questions 1, 2 and 3. If search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document	Section
LRS: 50.59-Common	All ("time critical actions")
MANUAL SECTIONS:	9.8 and 9.5
FIGURES:	N/A

Thom Robinson — Certified Reviewer's Signature
Thom Robinson — Printed Name
6/20/00 — Date

Reviewer's certification expiration date: 3/23/2001

Assistance provided by:

Printed Name	Scope of Assistance	Date
Steve Bennett	Reviewed evaluation	6/20/00

Search Scope Review Acceptability (NA, if performed by Technical Reviewer per 1000.006)

[signature] — Certified Reviewer's Signature
Ronnie Riggle — Printed Name
6-22-00 — Date

FORM TITLE: 10CFR50.59 REVIEW CONTINUATION PAGE	FORM NO. 1000.131C	REV. 3

This Document contains 3 Pages.

Document No. CR-2-98-0436 Rev./Change No. 0 10CFR50.59 Eval. No. FFN# 00-064 (Assigned by PSC)

Title Fire Hazards Analysis Update to Include Alt Shutdown Critical Timing Actions

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1. Will the probability of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒
2. Will the consequences of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒
3. Will the probability of a malfunction of equipment important to safety be increased? Yes ☐ No ☒
4. Will the consequences of a malfunction of equipment important to safety be increased? Yes ☐ No ☒
5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒
6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒
7. Will the margin of safety as defined in the basis for any technical specification be reduced? Yes ☐ No ☒

Thom Robinson	Thom Robinson	6/20/00
Certified Reviewer's Signature	Printed Name	Date

Reviewer's certification expiration date: 3/23/2001

Assistance provided by:

Printed Name	Scope of Assistance	Date
Steve Bennett	Reviewed evaluation	6/20/00

PSC review by: _____ Date: 6/21/2000

ENVIRONMENTAL IMPACT DETERMINATION (UNIT 1 and UNIT 2)

Document No. CR-2-98-0436 Rev./Change No. 0

Complete the following Determination. If the answer to any item below is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

FORM TITLE: 10CFR50.59 REVIEW CONTINUATION PAGE	FORM NO. 1000.131C	REV. 3

Document No. CR-2-98-0436 Rev./Change No. 0

10CFR50.59 Review Continuation Page

BACKGROUND:

CR-2-98-0436 was generated as a result of a revision that was made to the Unit 2 Alternate Shutdown Procedure 2203.014 which did not include an adequate review of the alternate shutdown timeline. The timeline is a list of operator actions that are performed for a fire in the control room when alternate shutdown is entered. The timeline is currently contained in the Alternate Shutdown Technical Guidelines however, since this is not a controlled document, it was not reviewed as part of a safety related procedure revision. If the critical actions were in a LBD, they would be reviewed under the 50.59 process.

It has been determined that the only actions that will be incorporated into the FHA will be the time critical actions as determined by NED under action item #04 of this CR ("Ensure that time critical actions are identified and accurately reflected in the timeline."). Attached are the time critical actions identified in AI #04 and their bases. There will be one additional critical action added at a later for (Emergency Diesel Generator Rooms cooling) which is being tracked under AI #9 of CR-2-98-0436.

This CR action will address the inclusion into the FHA of the Unit 1 time critical actions only. The Unit 1 alternate shutdown procedure bases will still contain the timeline. CR AI #12 (due 12/15/00) will track the addition of the Unit 2 time critical actions into the FHA. Action items # 10 and # 11 have been issued to Ops Standards to ensure that these timelines agree with the time critical actions.

1. Will the probability of an accident previously evaluated in the SAR be increased?

   A fire is not a design bases accident that has been evaluated in the Unit 1 (Chap 14) SAR. This revision will add time critical actions that operators perform in the event they enter the alternate shutdown procedure. Therefore, the inclusion of the alternate shutdown timelines cannot be an accident initiator of any accidents in the SAR. Thus, the probability of an accident previously evaluated in the SAR will not be increased.

2. Will the consequences of an accident previously evaluated in the SAR be increased?

   AS discussed in Q-1, a control room fire is not an accident described in the unit SAR and the alternate shutdown timelines cannot similarly be an accident mitigation action described in the SAR. Additionally, the inclusion of time critical actions for alternate shutdown do not affect the function of any safety related equipment. Thus, the consequences of an accident previously evaluated in the SAR will not be increased.

3. Will the probability of a malfunction of equipment important to safety be increased?

   A control room fire has the potential to affect equipment important to safety and prevent the timely and effective shutdown of the affected unit. However, the application of the alternate shutdown actions by the operations staff occurs after the fire event is already initiated and in itself cannot be an accident initiator. There is no equipment important to safety associated with this revision to the FHA. This revision will not affect any equipment important to safety but will identify the time critical actions to be performed in the event of a fire. Thus, the probability of a malfunction of equipment important to safety will not be increased.

4. Will the consequences of a malfunction of equipment important to safety be increased?

   As stated in Q-3, a control room fire has the potential to affect equipment important to safety and prevent the timely and effective shutdown of the affected unit. Inclusion of the alternate shutdown timeline into the FHA will ensure that operator actions are credited on a timely and effective basis to mitigate fire events if they occur. Therefore, the mitigation capability of the fire event will improve. By crediting the time critical actions in the FHA, there will be no introduction of credible failures that will affect release rates or pathways. The offsite dose consequences will not be increased beyond the acceptance limit due to this revision. Thus, the consequences of a malfunction of equipment important to safety will not be increased.

5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created?

   The SAR has evaluated all major fire potential events previously considered credible. The addition of the alternate shutdown actions for operator response to the event will not change the credible fire events but will act to mitigate such events. There are no other known accidents of any type that will be affected by adding the time critical actions to the FHA. The addition of this information can in no way lead to any credible accidents. Thus, the possibility of an accident of a different type than any previously evaluated in the SAR will not be created.

6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?

   The addition of time critical actions will not affect any equipment important to safety but will identify time critical actions to be performed during an alternate shutdown scenario. Thus, the possibility of a malfunction of equipment important to safety of a different type than previously evaluated in the SAR will not be created.

7. Will the margin of safety as defined in the basis for any technical specification be reduced?

   The time critical actions are not mentioned in the basis of any ANO-1 technical specifications. Thus, the margin of safety as defined in the basis for any technical specifications will not be reduced. These actions also do not affect the fission boundaries evaluated in the SAR or in the TS bases.

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ARKANSAS NUCLEAR ONE		
FORM TITLE: 10CFR50.59 DETERMINATION	FORM NO. 1000.131A	REV. 003-04-0

Document No. 963089D203 Rev./Change No. 0 PAGE 6 REV. 0

Title Replace Bus 2A3 Breakers

Brief description of proposed change: See attached Form C.

Will the proposed Activity:

1. Require a change to the Operating License including:

   Technical Specifications (excluding the bases)? Yes☐ No☒

   Operating License? Yes☐ No☒

   Confirmatory Orders? Yes☐ No☒

2. Result in information in the following SAR documents (including drawings and text) being (a) no longer true or accurate, or (b) violate a requirement stated in the document:

   SAR (multi-volume set for each unit)? Yes☒ No☐

   Core Operating Limits Report Yes☐ No☒

   Fire Hazards Analysis? Yes☐ No☒

   Bases of the Technical Specifications? Yes☐ No☒

   Technical Requirements Manual? Yes☐ No☒

   NRC Safety Evaluation Reports? Yes☐ No☒

3. Involve a test or experiment not described in the SAR? (See Attachment 2 for guidance) Yes☐ No☒

4. Result in a potential impact to the environment? (Complete the Environmental Impact Determination of this form.) Yes☐ No☒

5. Result in the need for a Radiological Safety Evaluation per section 6.1.5? Yes☐ No☒

6. Result in any potential impact to the equipment or facilities utilized for Ventilated Storage Cask activities per Section 6.1.6? Yes☐ No☒

7. Involve a change under 10CFR50.54 for the following SAR documents per Section 6.1.7:

   QAMO? Yes☐ No☒

   E-Plan? Yes☐ No☒

8. Does this review depend on future NRC approval of other actions (NRC SER, Relief, etc)? (forward change to PSC per 6.3.8 or 6.3.9) Yes☐ No☒

Document No. 963089D203 Rev./Change No. 0

PAGE 7 REV. 0

Basis for Determination (Questions 1, 2 & 3):
See attached Form C.

☐ Proposed change does not require 10 CFR 50.59 Evaluation per Attachment 1, Item #___, (If checked, note appropriate item #, send LDCR to Licensing).

Search Scope:

List sections reviewed in the Licensing Basis Documents specified in Question 1, 2 and 3. If a search was performed on LRS, the LRS search index should be entered under "Section" with the search statement(s) used in parentheses. Controlled hard copies of the documents shall be reviewed (LRS is not verified and searches only text, not figures or drawings). **Attach and distribute a completed LDCR per Section 6.1.2 if LBD changes are required.**

Document	Section
LRS: **Unit 2 50.59**	**All ("Magne-blast", Magneblast, "250 MVA", vacuum w/10 breaker, air w/10 breaker, GE w/10 breaker, General w/10 breaker, breaker w/10 rating*, 2A3, "circuit breaker", 4160 w/10 rating*, 2A301 thru 2A311, "2A-301" thru "2A-311", "152-301" thru "152-311", "52STA"**

MANUAL SECTIONS:
U2 SAR CHAP 8, U2 SAR SEC 3.10.2, U2 SAR CHAP 15, Table 3.2-6

FIGURES:
8.3-1, 8.3-5, 8.3-26, 8.3-26A, 8.3-27, 8.3-39sh.1, 8.3-40sh.1, 8.3-45 sh. 1 8.3-49sh1.

David A. Robinson — Certified Reviewer's Signature
David A. Robinson — Printed Name
4/27/00 — Date

Reviewer's certification expiration date: **03/01/01**

Assistance provided by:

Printed Name	Scope of Assistance	Date
Brad Risner	**LRS search and SAR search**	4-27-00

Search Scope Review Acceptability (NA, if performed by Technical Review per 1000.006)

Robert J Buser — Certified Reviewer's Signature
Robert Buser — Printed Name
5/1/00 — Date

ENVIRONMENTAL IMPACT DETERMINATION
(UNIT 1 and UNIT 2)

Document No. 963089D203 Rev./Change No. 0

Complete the following Determination. If the answer to any checklist item is "Yes", an Environmental Evaluation is required. See Section 6.1.4 for additional guidance.

Will the Activity being evaluated:

Yes	No	
☐	☒	Disturb land that is beyond that initially disturbed during construction (i.e., new construction of buildings, creation or removal of ponds, or other terrestrial impact)? See Unit 2 SAR Figure 2.5-17. This applies only to areas outside the protected area.
☐	☒	Increase thermal discharges to lake or atmosphere?
☐	☒	Increase concentration of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Increase quantity of chemicals to cooling lake or atmosphere through discharge canal or tower?
☐	☒	Modify the design or operation of cooling tower which will change drift characteristics?
☐	☒	Install any new transmission lines leading offsite?
☐	☒	Change the design or operation of the intake or discharge structures?
☐	☒	Discharges any chemicals new or different from that previously discharged?
☐	☒	Potentially cause a spill or unevaluated discharge which may effect neighboring soils, surface water or ground water?
☐	☒	Involve burying or placement of any solid wastes in the site area which may effect runoff, surface water or ground water?
☐	☒	Involve incineration or disposal of any potentially hazardous materials on the ANO site?
☐	☒	Result in a change to nonradiological effluents or licensed reactor power level?
☐	☒	Potentially change the type or increase the amount of non-radiological air emissions from the ANO site.

ARKANSAS NUCLEAR ONE		
FORM TITLE: 10CFR50.59 EVALUATION	FORM NO. 1000.131B	REV. 003-04-0

PAGE 9 REV. O

10CFR50.59 Eval. No. FFN# 00-073
(Assigned by PSC)

Document No. 963089D203 Rev./Change No. 0

Title Replace Bus 2A3 Breakers

A WRITTEN RESPONSE PROVIDING THE BASIS FOR THE ANSWER TO EACH QUESTION MUST BE ATTACHED. EACH QUESTION MUST BE ANSWERED SEPARATELY. A SIMPLE STATEMENT OF CONCLUSION IS NOT SUFFICIENT. ATTACHMENT 2 PROVIDES GUIDANCE FOR RESPONSE.

If the answer to any question on this form is "Yes," then an unreviewed safety question is involved. If the answer to all questions is "No," then the proposed change does not involve an unreviewed safety question.

1. Will the probability of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒

   See attached form C.

2. Will the consequences of an accident previously evaluated in the SAR be increased? Yes ☐ No ☒

   See attached form C.

3. Will the probability of a malfunction of equipment important to safety be increased? Yes ☐ No ☒

   See attached form C.

4. Will the consequences of a malfunction of equipment important to safety be increased? Yes ☐ No ☒

   See attached form C.

5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒

   See attached form C.

6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created? Yes ☐ No ☒

   See attached form C.

7. Will the margin of safety as defined in the basis for any technical specification be reduced? Yes ☐ No ☒

   See attached form C.

Document No. 963089D203 Rev./Change No. 0

10CFR50.59 Review Continuation Page

PAGE 10A REV. 0

Brief Description of Change

This modification replaces the General Electric Magneblast circuit breakers in bus 2A3 with Siemens vacuum circuit breakers and replaces the 52STA Operator in each cubicle with a new operator designed by Siemens. The vacuum breakers interrupting ratings are 350 MVA compared with 250 MVA for the Magneblast breakers. The new 52STA operators require less force to operate the auxiliary switch (<50 lbs) as compared to the existing operator (approximately 90 lbs).

Basis for Determination (Questions 1, 2 and 3)

Question 1: The operating license does not address the breaker type or interrupting ratings for the breakers in bus 2A3 nor does it address the 52STA operator.

Question 2: Section 3.10.2.2.1 of the U2 SAR discusses the seismic qualification of the 2A3 assembly and will be revised to discuss the seismic qualification of the new replacement breakers as documented in Calc 88-E-0035-72. Section 8.3.1.1.3 of the U2 SAR discusses the type of breakers used in the 4.16kV switchgear. This section will be revised to discuss the new vacuum breakers used in bus 2A3. Table 3.2-6 of the U2 SAR contains a list of specifications for various equipment including bus 2A3. The specification for the new breakers (E-2451) will be added to this table. Additionally, Figures 8.3-1, 8.3-5, 8.3-26, 8.3-26A, 8.3-27, 8.3-39sh1, 8.3-40sh1 and 8.3-49sh1 will be revised to incorporate changes made to the corresponding ANO drawings per this DCP. None of the remaining SAR documents address the breaker type or interrupting ratings of the 2A3 breakers nor do they address the 52STA operator.

Question 3: The proposed activity does not involve a test or experiment except for post-modification testing which will not operate the breakers outside of their normal modes of operation.

EVALUATION

1. Will the probability of an accident previously evaluated in the SAR be increased?

   This modification replaces the existing air circuit breakers in bus 2A3 with vacuum breakers with higher interrupting ratings and replaces the 52STA operators with new operators which require less force to actuate the auxiliary switch. The function and operating modes of the breakers are not changed or affected by this modification. This modification does not affect any accident initiator for the accidents described in the LBD's and will not cause the probability of an accident to be increased from one category to the next or cause any movement within a category.

2. Will the consequences of an accident previously evaluated in the SAR be increased?

   Bus 2A3 supplies power to various ECCS system components used for accident mitigation. However, as stated in question 1 above, this modification does not affect the function or operating modes of the circuit breakers, thus it will not affect any accident mitigation equipment. This modification will not affect any of the actions described in an accident discussed in the SAR and will not affect any barriers which mitigate dose to the public. This activity will not affect any onsite doses in any way. Therefore, the consequences of any accident previously evaluated in the SAR will not be increased.

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David A. Robinson — Certified Reviewer's Signature

David A. Robinson — Printed Name

4/27/00 — Date

Reviewer's certification expiration date: 03/01/01

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Printed Name	Scope of Assistance	Date
Brad Risner	Initial Draft	4-27-00

PSC review by: _____ Date: 7/13/00

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3. Will the probability of a malfunction of equipment important to safety be increased?

   This modification replaces the existing air circuit breakers in bus 2A3 with vacuum breakers with higher interrupting ratings and replaces the 52STA operators with new operators which require less force to actuate the auxiliary switch. The function and operating modes of the breakers are not changed or affected by this modification and there are no changes to the breaker controls or protective functions. The breakers are seismically qualified and meets the same design requirements as the original breakers. Although the failure modes of the vacuum breakers are slightly different than those of the existing air circuit breakers, the probability of a failure is not increased. Thus, the probability of a malfunction of equipment important to safety will not be increased.

4. Will the consequences of a malfunction of equipment important to safety be increased?

   This modification does not alter, affect or create any barriers which mitigate dose to the public or pathways for the release of radioactive materials. The effects of a malfunction of the breakers on bus 2A3 is not changed by this modification. The modification dose not introduce any single failures which result in increased consequential effects. There are no increases in the dose consequences due to a failure of the new equipment. Thus, the consequences of a malfunction of equipment important to safety will not be increased.

5. Will the possibility of an accident of a different type than any previously evaluated in the SAR be created?

   Replacement of the breakers cannot possibly create an accident of a different type. The new equipment is operated in the same manner as the existing equipment and functionally operates the same as the existing breakers. There are no changes to the controls or protective functions of the breakers. There are no changes in plant operating conditions and no actions are affected or failures introduced in any accident evaluated in the SAR that would cause a new type of accident to be introduced. Therefore, the possibility of an accident of a different type than any previously evaluated in the SAR will not be created.

6. Will the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR be created?

   There are no new failure modes which will result in a malfunction of equipment important to safety which has not been previously evaluated in the SAR. Loss of a single AC train has already been evaluated in the ANO licensing basis. The new breakers were designed to meet or exceed the requirements of the original breakers and are functionally equivalent to the existing equipment. There are no changes to the controls or protective functions of the breakers and no common mode failures have been identified. Additionally, the equipment will not be operated in any new modes or conditions,nor will it be operated outside of its design capabilities. Therefore, the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR will not be created.

7. Will the margin of safety as defined in the basis for any technical specification be reduced?

   There are no margins of safety defined in the basis for any technical specification related to the 2A3 circuit breakers' type or rating. No fission product boundaries are affected by this modification.